

INFORMATION AND COMMUNICATION TECHNOLOGY AND ASSISTIVE TECHNOLOGY: CONVERGENCES AND DIVERGENCES

TECNOLOGIA DA INFORMAÇÃO E COMUNICAÇÃO E TECNOLOGIA ASSISTIVA: APROXIMAÇÕES E DISTANCIAMENTOS

TECNOLOGÍAS DE LA INFORMACIÓN Y LA COMUNICACIÓN Y LA TECNOLOGÍA DE ASISTENCIA: APROXIMACIONES Y DISTANCIAS

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ABSTRACT: This article presents and discusses convergences and divergences between Information and Communication Technology (ICT) and Assistive Technology (AT) in the field of Special Education from the perspective of Inclusive Education. We sought to show how these terms were used in the World Declaration on Education for All, in the Salamanca Statement, at the World Education Forum in Dakar, at the International Convention on the Rights of Persons with Disabilities (CRPD) and its Optional Protocol, in the Brazilian Law for the Inclusion of Persons with Disabilities and in different publications of the United Nations Educational, Scientific and Cultural Organization (UNESCO). It was concluded that there is a complex overlap between these two modalities of technology, and that both terms are widely used in an intricate manner by professionals with the most different backgrounds.

KEYWORDS: Information and Communication Technology. Assistive technology. Guiding milestones. Person with disabilities.

RESUMO: O artigo apresenta e discute aproximações e distanciamentos entre Tecnologia da Informação e Comunicação (TIC) e Tecnologia Assistiva (TA) no campo da Educação Especial na Perspectiva da Educação Inclusiva. Buscou-se evidenciar como estes termos foram empregados na Declaração Mundial de Educação para Todos, na Declaração de Salamanca, no Fórum Mundial de Educação de Dakar, na Convenção Internacional sobre os Direitos das Pessoas com Deficiência e seu Protocolo Facultativo, na Lei Brasileira de Inclusão da Pessoa com Deficiência e em distintas publicações da Organização das Nações Unidas para a Educação, a Ciência e a Cultura. Concluiu-se que há um complexo imbricamento entre essas duas modalidades de tecnologia, sendo ambos os termos amplamente empregados de maneira intrincada por profissionais com as mais distintas formações.

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PALAVRAS-CHAVE: *Tecnologia da Informação e Comunicação. Tecnologia assistiva. Marcos norteadores. Pessoa com deficiência.*

RESUMEN: *El artículo presenta y discute aproximaciones y distancias entre las Tecnologías de la Información y la Comunicación (TIC) y la Tecnología de Asistencia (TA) en el campo de la Educación Especial desde la Perspectiva de la Educación Integrada. Intentamos mostrar cómo estos términos fueron utilizados en la Declaración Mundial sobre Educación para Todos, en la Declaración de Salamanca, en el Foro Mundial de Educación en Dakar, en la Convención Internacional sobre los Derechos de las Personas con Discapacidad y su Protocolo Facultativo, en la Ley Brasileña para la Inclusión de Personas con Discapacidad y en diferentes publicaciones de las Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. Se concluyó que existe una superposición compleja entre estas dos modalidades de tecnologías, y que ambos los términos se utilizan ampliamente de manera intrincada por profesionales con los más diferentes antecedentes.*

PALABRAS CLAVE: *Tecnologías de la Información y la Comunicación. Tecnología de asistencia. Principios rectores. Personas con discapacidad.*

Introduction

Information and Communication Technology (ICT) and Assistive Technology (AT) are technologies present in different spaces and widely used, nowadays, by different professionals. In a restricted way, ICT refers to the technical means that treat information and promote communication, while AT comprises technologies that aim at autonomy, independence, quality of life and social inclusion of People with Disabilities (PwD). These people are recognized as those who have “long-term impairments of a physical, mental, intellectual or sensory nature, which, in interaction with one or more barriers, may impede their full and effective participation in society on an equal basis with others. people” (BRAZIL, 2015).

Disability can be classified according to two different models. The biomedical model was proposed in the International Classification of Disabilities and Disadvantages (ICDD), 1989), through a linear model in which the disability is centered on the person, in normal patterns of psychological, physiological or anatomical functions. The biopsychosocial model was indicated in the International Classification of Functioning, Disability and Health (ICF), 2003), it has as a parameter the functionality and disability associated with a health condition, and the disability is centered on personal and environmental factors that affect or can affect directly or indirectly to people, from attitudinal, technological, urban, architectural, transport, communication and information barriers, present in the most diverse environments.

The two classifications were proposed by the World Health Organization (WHO) and different modalities of technologies that promote the inclusion of PwD are foreseen in both models, but the way in which they were intended is different. In our studies, we have defended the biopsychosocial model as the most appropriate to foster discussions about the functionality, purpose and usability of these technologies.

Specifically in relation to ICT and AT, these technologies present themselves as an interdisciplinary area of knowledge and were not conceived exclusively for the educational area, but strongly incorporated into it, mainly with the objective of favoring access to education, facilitating the teaching-learning process and promoting equity.

In order to verify the possible approximations and distances between ICT and AT and how these expressions were used in terms of their functionality and purpose, essential documents were analyzed in their content (BARDIN, 2016) to guide actions aimed at the use of these technologies by PwD, both nationally and internationally. We consider that this study is justified not only by the need to approach the relationship between ICT and AT in a conceptual perspective, but also by the small number of works that approach the theme, especially in the field of Special Education in the Perspective of Inclusive Education, as pointed out by Oliveira and Mill (2016) and Nascimento and Nascimento (2018).

Discussing the concepts of ICT and AT

Information and knowledge have become essential in contemporary times, just as ICTs have become great causes of social changes and ways of thinking and doing education.

The acronym ICT emerged in the 1990s and was initially used in the United Kingdom, and was later disseminated with the popularization of the internet. Although the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2014) predicted that any static definition of this technological modality would not help much to understand it, ICTs can be defined as

[...] any type of technology that handles information and helps in communication, which can be in the form of hardware, software, network or mobile phones in general. The term IT, without the C for communication, is even more commonly used and represents all technology resources for information processing, including software, hardware, communication technologies and related services (SENAI, 2019).

Understood as fundamental for social and human development, ICT had its origin in the 1970s, with the creation of microprocessors and microcomputers and, in this same decade,

computers were used for educational purposes.

Valente and Almeida (2020), when discussing education technologies, reveal that, in Brazil, also in the 1970s, the use of computers started from experiences in three universities: Federal University of Rio de Janeiro (UFRJ), Federal University of Rio Grande do Sul (UFRGS) and State University of Campinas (UNICAMP), with reference to what was happening in other countries, such as the United States of America (USA) and France. They noted that it was only in the following decade that initiatives aimed at the insertion of ICT in basic education were implemented, based on public policies of the Ministry of Education (MEC). For these authors, since the 1980s, education has been considered one of the pillars of the population's digital inclusion policies, through the promotion of research, professional training and programs for the insertion of technological resources, implementation of infrastructure in schools, internet connection and teacher training. As already stated by Bruzzi (2016, p. 476), “the impact of ICT on education is, in fact, a particular aspect of a much broader phenomenon, related to the role of these technologies in the current information society”.

Concerning the elaboration of the AT concept in Brazil by the Technical Assistance Committee (TAC), three terms of reference were used: 'Technical Assistance', 'Assistive Technology' and 'Support Technology'. Committee members found that these terms are used in English-speaking, Spanish-speaking and Portuguese-speaking countries (Portugal), being found, respectively, as Assistive Technology, *Ayudas Técnicas* and *Tecnologia de Apoio* in the following documents: Americans with Disabilities Act (ADA), Empowering Users Through Assistive Technology (EUSTAT) and the National Secretariat for the Rehabilitation and Integration of People with Disabilities (SNRIPD) (BRASIL, 2009a).

The term AT initially appeared in American legislation in 1988, through Public Law 100-407, which together with other laws of the United States of America (USA) make up the ADA. In this document, in Section 3, entitled Definitions and Rules, AT is characterized by two words: device and service (AMERICAN WITH DISABILITIES ACT, 2021).

EUSTAT (2021), on the other hand, defines Assistive Technology as products and services. The focus of the study was the user of this technology in the educational context, as well as the production of educational materials for PwD, their families and caregivers. Another document analyzed by the TAC was that of the SNRIPD. This Secretariat was proposed by Decree-Law no. 35, of 2 May 1996, within the scope of the Ministry of Solidarity and Social Security of Portugal. By the same Decree, the National Council for the Rehabilitation and Integration of Persons with Disabilities (CNRIPD) was created to define

and implement the policy for the rehabilitation and integration of People with Disabilities. The definition of Technical Aids, in the first MEC publication in this area, comes from Portugal and refers to

[...] any product, instrument, strategy, service and practice, used by People with Disabilities and the elderly, specially produced or generally available to prevent, compensate, alleviate or neutralize a disability, incapacity or disadvantage and to improve autonomy and quality of life of individuals (BRASIL, 2009a, p. 15).

Note that the three concepts cover different but complementary issues. The ADA proposition boils down to devices and services; EUSTAT, to products and services; and in SPRIPD, the concept is more comprehensive, encompassing product, instrument, strategy, service and practice. However, there is a fundamental difference regarding the implementation of the AT concept that must be considered: while in the USA it is a specific legislation (ADA), which regulates the rights of PwD in this country, among them the use of AT, in Europe it is a consortium (EUSTAT), which expands its use throughout the continent, in the form of a support network, called “Global information network on support products that promote the autonomy of people with disabilities”. Having as a parameter the three previous concepts, the TAC proposed a concept in an interdisciplinary perspective, integrating knowledge from the areas of Health, Education, Engineering, ICT, among others, to effect the process of inclusion of PwD, namely:

[...] products, equipment, devices, resources, methodologies, strategies, practices and services that aim to promote functionality, related to the activity and participation of people with disabilities or reduced mobility, aiming at their autonomy, independence, quality of life and social inclusion (BRAZIL, 2009a, p. 9).

The concept of AT coined by the TAC, which is quite comprehensive, as well as that of ICT, was defined from the fusion of the three international concepts proposed by the ADA, EUSTAT and SNRIPD. It so happens that when proposing this definition, the Brazilian reality was not considered and certain elements that make up the concept of AT allow different understandings of what, effectively, is characterized as AT. In addition, the close approximation between AT and ICT at times, such as the use of computers and cell phones, leads to misapprehension about the functionality and purpose of AT for PwD.

The use of AT and ICT by People with Disabilities: guiding frameworks

In the report entitled “Opening new paths for empowerment: ICT in access to information and knowledge for People with Disabilities”, UNESCO emphasizes inclusion, but also deals with public policies and regulations for these technologies, because when used by PwD, provide them with access to information and knowledge, as indicated in the title of the document. This Organization, whose main objective is to preserve human rights, creates ICTs as enabling tools that enable the execution of innovative practices and, with regard to PwD, accessible ICTs are those conceived from the principles of Universal Design (UNESCO, 2014). Here, a gap between AT and ICT is evident, because when conceiving the latter from the principles of Universal Design, both are engendered for any person, whether disabled or not, different from what was referenced by the TAC when proposing the concept of AT, defining it as your target audience PwD or people with reduced mobility.

In Brazil, initially, the Universal Design was understood as:

[...] the design of spaces, artifacts and products that aim to simultaneously serve all people with different anthropometric and sensory characteristics, in an autonomous, safe and comfortable way, constituting the elements or solutions that make up accessibility (BRAZIL, 2004).

In 2015, this concept was revised and included in the Brazilian Law for the Inclusion of People with Disabilities (BLI) as “the design of products, environments, programs and services to be used by all people, without the need for adaptation or a specific project, including the assistive technology resources” (BRAZIL, 2015). This law highlights the expansion of the concept and the inclusion of AT resources in the Universal Design paradigm.

Although Universal Design is not the core of this article, this concept has a close relationship with ICT in its usability by PwD, in addition to AT itself, which must be understood from the perspective of this paradigm, as pointed out in the BLI (BRAZIL, 2015). Accessibility in ICT provides that all people will have the possibility of accessing these technologies and, regarding this information, UNESCO stated in the report that

[...] the accessibility of ICTs is related to the concept of Universal Design - which establishes that the design and creation of environments, products, applications and content must be able to be used by all people, including those with disabilities, without need for special modifications. The Universal Design paradigm in ICT does not establish the creation of a model that meets everyone's needs. In fact, it is aimed at meeting the needs of each user, taking into account the challenge that a set of settings can help one group of People with Disabilities, but be problematic for another group (UNESCO, 2014, p. 76).

From the perspective of meeting the specificities of the subject, Universal Design presents a flexible project, allowing each user to feel contemplated in their individual preferences and abilities and, above all, to have their needs met.

UNESCO (2014) also mentions that ICT must be understood from two aspects: in the inclusive perspective and in the identification of specific benefits in the use of these technologies for PwD. This inclusive perspective is important, as it shifts the focus from the question 'What are technologies?', initially based on the definition of a concept, to another, 'What is being done to make current and emerging technologies more accessible, low cost and relevant?', focusing on accessibility and usability for all individuals, PwD or not. The first question becomes more relevant for the evaluation, establishment of parameters and the development of indicators for which there must be a clear and harmonized agreement on what will be measured. The second shows concern with the customization of technology to meet a specific need, of a specific audience, with ICT being considered AT. In the UNESCO report, the term AT was used for hardware and software or tools used to access information and communication devices, which makes explicit the close relationship between them that this document intended to highlight. Regarding Information Technology, still in this report, ICT and AT have a synergistic function, allowing the user to perform a function. Therefore, it is necessary to make the contents accessible to eliminate the technological, communicational and informational barriers present.

Although information and communication can be carried out through different means and in different ways, the UNESCO report ended up reducing the concept of AT to a tool, limiting it to the field of Informatics. However, it is necessary to understand AT in a broader sense, as access to information and communication is just one of the needs of PwDs. Specifically in relation to students with disabilities, UNESCO (2011) recommended that they should 'self-adapt':

[...] through the identification of computing resources that best suit your needs. The ability to customize technology to suit your personal preferences and needs is a lifelong learning that will benefit students on their journey through the education system (UNESCO, 2011, p. 32).

Several guiding frameworks support the use of ICT in Education for PwD, including the World Declaration on Education for All (UNICEF, 1990), approved by the World Conference on Education for All, held in Jomtien, Thailand, in 1990. This declaration proposed an action plan to meet the basic learning needs of children, young people and adults, and highlighted the importance of training education professionals for its use, both in the

classroom and in educational management, expanding the possibility of use beyond the teacher-student relationship. It is possible to identify in this document a gap between ICT and AT, as the use of ICT was proposed for everyone, regardless of the disability condition.

Another milestone is the Salamanca Declaration, conceived at the World Conference on Special Education held in Salamanca, Spain, in 1994, with the participation of 88 governments, including Brazil, and 25 international organizations, with the intention of reaffirming the commitment with Education for All, recognizing the need and urgency of providing Education for children, youth and adults with special educational needs in the regular education system and re-endorsing the Framework for Action in Special Education. This document indicated, among other actions, the use of appropriate and viable technology that should be used, when necessary, to improve the school success rate and assist in communication, mobility and learning, in addition to technical aids in the scope of professional training, the importance of knowledge and skills required to teach students with disabilities was highlighted, including the assessment of special needs, adaptation of curricular content, the use of assistive technology and the individualization of teaching procedures in the sense to encompass a wider variety of skills (SPAIN, 1994).

In the Salamanca Declaration, there is a clear division between 'appropriate technology' used in three major areas of human performance (communication, mobility and learning) and 'technical aids', although the document does not specify what this technology or aids would be. However, the assistive technology mentioned in the context of the training of Education professionals characterizes what is currently called AT, as it refers to the communication, mobility and learning of students with disabilities, while technical aids can be understood as ICT, referring to school-related factors. Here, synergy between ICT and AT is identified with the aim of conceiving Special Education in a new way, as proposed in this Declaration.

A decade after the World Conference on Education for All, in which several countries committed to meeting the basic learning needs of children, young people and adults, eradicating illiteracy and universalizing access to schooling in childhood, UNESCO promoted throughout the worldwide process of evaluating progress, which culminated in the Dakar World Education Forum, held in 2000 in Dakar, Senegal. At this Forum, a document entitled "Dakar Framework for Action" was produced, which is a collective commitment assumed by member countries to achieve the objectives and goals of Education for All. One of the proposals was to acquire new ICTs to support the effort to reach the established goals (UNESCO, 2001). However, these new technologies have not been defined, characterizing the

breadth of the concept and enabling the use of any ICT in education, regardless of the specific needs of each person.

In 2009, through Decree no. 6,949, Brazil enacted the International Convention on the Rights of People with Disabilities and its Optional Protocol, signed in New York on March 30, 2007. Its purpose is “to promote, protect and ensure the full and equitable exercise of all human rights and fundamental freedoms by all Persons with Disabilities and to promote respect for their inherent dignity” (BRAZIL, 2009b). In this Convention, five concepts were defined: communication, language, discrimination on grounds of disability, reasonable accommodation and universal design and, among them, we highlight the first:

“Communication” encompasses languages, text visualization, braille, tactile communication, large characters, accessible multimedia devices, as well as plain, written and oral language, auditory systems and digitized voice media and augmentative and alternative modes, means and formats of communication, including accessible information and communication technology (BRAZIL, 2009b).

As expressed in the text, there is an approximation between ICT and AT, because “text visualization, braille, tactile communication, enlarged characters, accessible multimedia devices, auditory systems and digitized voice means and the modes, augmentative and alternative means and formats of communication” characterize AT, while accessible ICT is the use of these technologies by PwD, configuring itself as ICT in the perspective of AT or ICT as AT.

Although this Convention shows that access to ICT and AT facilitates the exercise of other rights, including access to Education, these concepts have not been defined or characterized. In article 4, General Obligations, there are two items related to the use of technologies:

g) To carry out or promote research and development, as well as the availability and use of new technologies, including information and communication technologies, technical aids for locomotion, devices and assistive technologies, suitable for persons with disabilities, giving priority to affordable technologies;

h) To provide accessible information to Persons with Disabilities regarding technical mobility aids, assistive devices and technologies, including new technologies as well as other forms of assistance, support services and facilities (BRAZIL, 2009b).

However, in this article, technical aids and devices are mistakenly mentioned as separate from the AT. It is necessary to clarify that technical aids, as well as support technologies, were terms used as synonyms of AT until the definition of the concept by the

TAC in 2007, and device and support service is encompassed in the concept of AT, which does not justify the use of these terms like different technologies.

likewise, the use of ICTs was foreseen to promote accessibility and with regard to personal mobility, “access to assistive technologies, devices and quality technical aids, and forms of human or animal assistance and mediators, including making them available at affordable cost” (BRAZIL, 2009b). Here too, technical aids and devices appear separately in the AT concept, which is not the case, as Technical Aids and AT are synonyms and devices are one of the elements that make up the AT concept.

First of all, the use of human assistance as AT, which does not appear in the other documents consulted, and the animal, not necessarily the guide dog, as provided for in Decree n. 5,904 (BRAZIL, 2006). Secondly, the use of the term assistive technology in the plural contradicts that proposed by the TAC, which coined it in the singular because it understands it as an area of knowledge with an interdisciplinary characteristic. Although the Convention on the Rights of PwD is international, there seems to have been no concern on the part of the researchers who prepared the document to adapt the translation to the concept of AT coined in Brazil or to offer some kind of clarification through the translator's notes, stating that this concept differs between countries.

More recently, in 2015, LBI also provided for the use of AT, ICT and Social Technology (ST), although the latter two were not defined or characterized in this law. Regarding AT, there is a specific chapter dealing with it, chapter III, entitled ‘On Assistive Technology’. The expression assistive technology appears in the text sometimes in the singular, sometimes in the plural, and most of the time the concept is reduced to a resource. Regarding ICT, these are used as instruments to overcome functional limitations and barriers to communication, information, education and entertainment for PwD. Unlike the other documents analyzed, BLI separates ICT and AT as independent technologies (BRAZIL, 2015).

After analyzing these guiding frameworks, it was possible to evidence different approximations and distances between ICT and AT, which causes an entanglement and, sometimes, an imbrication between these two technologies, making confusing questions regarding the functionality, purpose and usability of these modalities of technologies. , especially by PwD.

Final considerations

As announced throughout the text, ICT and AT are terms widely used interchangeably, as is the case with the use of computers and cell phones by PwD. Depending on the type of disability and the way the user uses the computer and cell phone, these artifacts may or may not be configured as AT. In order for it to be characterized as AT and, above all, used properly, it is necessary to take into account who the user is, the functionality of the technology, the context in which it is being used and what the purpose of this use is.

ICT can be used by any user. Although the documents consulted present the target audience of these technologies, there is, at various times, no distinction between what is one or the other, in addition to the indiscriminate use of ICT in the perspective of AT or as AT, which makes it possible to use these terms in a different way. tangled up by professionals with the most different backgrounds.

For Sardenberg and Maia (2019, p. 7),

[...] to think about assistive technology(ies) is to reflect on what they can “do” or “bring” to all of us, subjects [considered] with disabilities or not. It is to understand that the computer, the cell phone, the programs and the internet, by themselves, do not configure assistive technologies. Perhaps we can identify them as powerful tools to “place” and “live” in the world.

Although the concept of AT is specifically related to PwD or people with reduced mobility, as proposed by the TAC in 2007, these authors argue that AT, based on the biopsychosocial model of disability, encompasses different health perspectives (biological, individual and social), since the founding objective of this concept is the promotion of autonomy, independence, quality of life and social inclusion.

People who are not considered deficient in the light of the biomedical model, such as those with learning disorders, for example, are considered deficient in the proposed biopsychosocial model. In addition, according to BLI (BRAZIL, 2015), these people have long-term impediments of different natures, which, in interaction with one or more barriers, may be partially or totally prevented from participating in society on an equal basis with other people. Therefore, people with dyslexia, dyscalculia, among other disorders, can benefit from AT, especially in school contexts, since this technology can enable and expand their effective participation in the educational process.

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