Lia POP
University of Bucharest
Faculty of Psychology and Educational Sciences

ASSISTIVE TECHNOLOGY IN SPECIAL EDUCATION: ROLE, RELEVANCE AND ADDED VALUE

Theoretical article

Keywords
severe disabilities
assistive technology
augmentative and alternative communication
evidance - based practice

JEL Classification
A21,I29

Abstract

In recent decades, technology and especially communication and information technology revolutionized all relevant fields in society. In this context of technological developments explosion, special education enjoys great interest as well, regarding the impact of technology on increasing the quality life and activities of people with disability and this fact comes handy to the techniques used by specialists. This study presents the analysis on theoretical perspectives in the practical matrix of technology in order to produce added value, something that is beneficial to both, people with disability and society, that can make use of their activity. Family and society need longer periods of time for the activity of children with disability that is why we are aware that techniques and modern technology should not be neglected as these can increase efficient recuperation and education in such situations.

INTRODUCTION

Special education and educational inclusion represent one of the most investigated and controversial themes in the last two decades (Vrăsmaș, 2015). Even though at times professionists are anchored in traditional approaches when it comes to the concept of disability with a direct impact upon actions carried out, the analysis in specialty literature appeals to approaching the concept from a scientifical practical point of view and in accordance with human rights.

Making a selection approach, the implementation of practices based on scientific evidence requires physical, mental and material efforts. How well prepared professors are and their availability along with the contexts in which they develop their activity can facilitate or hinder learning situations that lead to optimal results. Despite the fact that lately special education in our country has made great progress from multiple points of view, the present analysis in specialty literature identifies a significant gap, approximately 25 years, in comparison with other European countries (Gherguț, 2011).

Therefore, the study at hand does not intend to go through all the data in the vast specialty literature, but to present an analytical synthesis of conclusions and directions summarized in some up to date publications.

The analysis is made from a practical perspective and is submitted to future debates meant to increase the standards of educational services in learning offered to students with disability. The emphasis falls on methods of overcoming the activities and participation barriers with the help of assistive technology on children with severe learning disabilities and as a landmark in conceptual analysis subscribes the perspective of the World Health Organization through International Classification of Functioning, Disability and Health of Children and Young People (CIF-CT).

The disability concept from CIF perspective

After identifying numerous deficiencies from a conceptual and methodological point of view regarding health, functioning and disability, World Health Organization creates International Classification of Functioning (CIF), Disability and Health for Children and Young People (CIF0-CT) that is based on practical and philosophical considerations. CIF incorporates *Standard rules regarding the equalization of opportunities for people with disability* and it is considered an implementing tool of human rights at an international level and mandated through national legislation. CIF can be applied as a statistical tool, a clinical investigation instrument, social policy and as an educational intrument in the realm of conceiving public opinion senzitivity and thus, leading to taking actions (World Health Organization- Bucharest, 2012, p.5).

In recent years two predominant models explaining the concept of disability have been proposed: the medical and social one. The medical model has been dominating and it still does in its area of action, being a construct, a paradigm that sees disability as a problem of the individual as a consequence of a disease. In order to help the individual, those involved try to heal through physical and behavioural individual treatments. Therefore, the final goal is the adaptation of the individual to his environment and ''naming" medical care for him. In response to the needs generated by this model another conceptual model has been designed, the social one. From this perspective, disability is seen as a socially created problem, a model that supports ''complex integretation of the individual in society" (World Health Organization- Bucharest, 2012, p.18).

In this theoretical frame, disability is not a characteristic of the individual, but the result of several factors interacting in a social context. The management of such a situation entails the responsibility of all those involved and it can be observed in attitude and ideology. CIF is based on the integration of the two models so as to promote an efficient and coherent vision regarding disabilities and their possible consequences.

As a consequence, approaching disability does not focus on the individual or the resulted process as a consequence of environment factors with the personal and biological ones. Environment factors consist of: 1. Products and technologies; 2. Natural environment and changes brought by humans upon the environment; 3. Support and relationships; 4. Attitudes; 5. Services systems and politics (World Health Organization-Bucharest, 2012).

Research questions

In the analysis environment factors were taken into account and priority was given to the part referring to products and technologies. In order to identify ensuring methods of participation in different school activities for pupils with severe learning disabilities from several perspectives such as role, relevence and added value; the importance of assistive technology in learning progress is analyzed. Thus, the reseach questions are the following:

1. Are there any differencies between projecting learning activities in a traditional manner and the inclusion of assistive technology in the learning process of pupils with severe disabilities?
2. What is the drawback and action directions at a global scale regarding the use of assistive technology in the learning process of pupils with severe disabilities?

Theoretical Considerations

Specialty literature analyzes and exemplifies ways in which technology contributes to increasing the dependence level in the learning process of children with disability, thus increasing the productivity level of the educational act. Also, ways through which assistive technology (AT) acts are considered, specifically when it comes to: a) maximizing independence and maximizing the implication in school activities; b) implication in classroom conversations; c) facilitating communication with equals, with teachers and allow access to diverse educational options; d) participation to diverse learning experiences that would not be possible in other ways, etc (Lancioni & Nirbhay , 2014).

Moreover, in some states among quality standards of special education it is mentioned the accreditation / certification of professors in regards to technological competences and intervention strategies (Edyburn & Gardner, 1999).

In order to emphasize even more the relationship between special education and technology, USA has elaborated a law (AT Act, 2004) that places in an official context this way of intervention on people with disability in order to minimize functional deterioration, maintaining a reasonable level of functioning according to particular needs and reaching an optimal level of functioning in existential areas (AT Act 2004: http://atto.buffalo.edu/registered/ATBasics/Foundation/Laws/atlegislation.php).

What is assistive technology(AT)?

Assistive technology is represented by any item, piece of equipment, product or software meant to increase, maintain or improve the functional capacity. Technological assistive services refer to those assistance services of persons in the process of selections, acquisition and use of one of the technological items (Technology - Related Assistance for Individuals with Disabilities Act of 1988 (Public Low 100-407); Public Low 100-407). Assistive technology provides support for persons that are confronting with difficulties when it comes to sensory, motion, cognitive and / or linguistic diversity. Assistive technology allows or improves the participation of children and adults in common activities such as talking, writing, listening, seeing, eating, moving from one place to another in the house and in the community, using the phone, opening or closing doors, turning on or off lights. This entails a series of devices from low tech to high tech.

High tech systems refer to software and hardware components. Low tech communication systems are not electronic. For example, communication boards with icons, alarm communication, markers / phosphorescent indices, etc. in the classroom, assistive technology can be used to increase, maintain and improve functional capacities of pupils (Beck, 2002).

Severe learning disabilities

The field of learning disabilities covers all the problems that arise in growing up and learning. Together with the easy or false difficulties, transient learning difficulties, specific learning difficulties represent a problem category that is usually ignored in school for all children. These disorders are considered to be specific to learning as the main adapting process. From this perspective, specific learning difficulties manifest in school, but also outside the school. Severe disability is a permanent one that cannot be corrected, but can be compensated (Vrăşmas, 2007). There are a lot of definitions for learning disabilities, however we will go with the one used in England.

Learning disabilities are given by the following criteria:

- Significant affectation of intellectual functioning
- Significant affectation of social and adaptive functioning
- Debut before adulthood and that remains for the rest of the life (Professional Affairs Board of The British Psychological Society, 2000)

This definition is according to international disease classification system ICD-10 (World Health Organization's International Classification of Disease). The term started to be used in England in order to replace the notion of mental handicapped which is considered to be offensive and it does not fit in the new non-category orientation of the last decade. Despite all this, a lot of people when referring to learning disabilities prefer to use the term learning difficulties, the terms being interchangeable when used in medical or social assistance context. Also, the British educational system uses the term learning difficulties also in the case of specific difficulties such as dyslexia and that does not imply a significant affectation of the intellectual functioning. At the same time, they classify learning difficulties as light, severe and profound (Professional Affairs Board of The British Psychological Society, 2000).

Assistive technology and teaching design

In the light of last decade, modifications when all the fields have undergone real transformations as a result of technological revolution, special education seems to benefit from a major impact due to the development of brand new technologies (Rose, Hasselbring, Stahl, & Zabala, 2005). It is already known that assistive technology brings benefits for pupils with disability. In order to establish the extent and conditions in which assistive technology generates added value, different global organization

appeal to legislative and political notions and to practices that indentify the factors involved in facilitating progress in learning activities, mediated by assistive technology (Beck, 2002).

According to children's needs, assistive technology seems to have the appreciation of the agents involved in special education (Crealock & Sitko, 1990; Hebert & Murdock, 1994; MacArthur & Haynes, 1995; MacArthur, Haynes, Malouf, Harris, & Owings, 1990; Raskind & Higgins, 1999; van Daal & Reitsma, 1993; von Tetzchner, Rogne, & Lilleeng, 1997; Xin & Rieth, 2001; apud Rose and others, 2005). In accordance with the data referring to the role of assistive technology in learning process specialty literature proposes the concept of universal design in learning, a concept that appeals to appreciation and criticism in equal measure (Bowser & Reed, 2000; Hitchcock & Stahl, 2003; apud Rose, 2002).

Universal design in learning assumes conceiving a strategy to facilitate learning for all pupils and assistive technology represents the means through which objectives can be achieved. Assistive technology has the purpose to eliminate as much as possible the barriers of traditional learning and their interaction seem to generate a higher level of efficiency (Rose & Meyer, 2002; Miiller & Tschantz, 2003; apud. Rose & al., 2005).

The concept of universal design in learning emphasizes the learning context and its purpose. It does not provide information about patterns in the learning process, but the ways in which abilities can be promoted and acquisitions involved in the learning process. Even though ensuring space and teaching materials are essential in the learning process, these are not sufficient. Success comes from combining pedagogic material: techniques, methods, sketches and processes are incorporated in classroom and curriculum and are accessible and can support progress in learning. Reference framework in universal design in learning relies on the neuroscience of learning and on three key principles of pedagogy: means of representing information, means of expressing of knowledge and means of engaging in learning (Rose & Meyer, 2002; apud. Rose & al., 2005).

Assistive technology and augmentative alternative communication

Alternative and augmentative communication (AAC) represents a part of assistive technology used for temporary and permanent compensation for severe affectation when it comes to expressive communication (American Speech-Language-Hearing Association, 1989 from http://www.asha.org/uploadedFiles/SP2007-00283.pdf). Alternative and augmentative communications are based on behavioral principles that are applied to all people. AAC is a term that entails any system that is meant to facilitate communication. It may include strategies, techniques, devices or different items that support communication.

The efficiency of using AAC has been a study subject in different researches meant to identify the added value that might be produced. One study referring to the extent of how useful AAC is, analyzes 40 published articles over seven years time. The conclusions of the study reveal a certain level of efficiency; however the authors are reluctant in enunciating predictions and could not generalize results (Snell, Chen, & Hoover, 2006).

Another two recent published papers: *Assistive technologies for people with diverse abilities* and *Aided Augumentative Communication for Individual with Autism Spectrum Disordes* approach the efficiency of assistive technology. The first paper makes quantitative analysis of published articles from the category of disability perspective and the latter analyzes AAC efficiency only for persons who are diagnosed with autistic spectrum disorders. Both publications present similar conclusions with the above mentioned (Lancioni & Nirbhay , 2014; Ganz, 2014).

Even though issues worthy of significant improvements are analyzed it is obvious the increasingly high interest referring to initiation and ongoing of depth procedures research in this area being (Sansosti F. J., 2015; Ganz, 2014; Hansen, Blakely, Dolata & Tracy Raulston, 2014; Heath, Ganz, Parker, Burke, & Ninci, 2015; Lancioni & Singh, 2014; Tullis, Cannella-Malone, & Payne, 2015; Spooner, Knight, Browder, & Smith, 2012; Spooner, Knight, Browder, & Smith, 2012; Edyburn, 2001).

Discussion and conclusions

Education for everybody represents an education according to which acceptance, inclusion and implication, as well as the participation of all pupils represents the basic principle of didactic activities. Ensuring access to learning process, valuing personal contribution, eliminating discrimination and valuing diversity represent basic requirements in promoting an inclusive educational context. Time, rhyme and the quantity of knowledge may differ from one individual to another, but beyond these aspects that belong to particularities, education is meant to ensure added value in the process of functional development.

Changing perspective and promoting diversity as a human condition, active involvement of all people in society, regardless of their particularities in order to increase quality life and implicitly of well being are globally promoted objectives. In the light of fulfilling these objectives, special education becomes part of effective education, actions within this sphere being the subject of numerous researches that have taken place in recent years. Despite all these, indentifying scientific tested

ways are way far of being elucidated and efforts in this sense are constantly and imperatively requested. Identifying practices based on scientific evidence is not an easy task or easily at hand for those that interact daily with pupils with disability be it in general public classrooms or special classrooms.

Specialty literature presents a few empirical studies that demonstrate valid educational strategies that support pupils using assisted technology. In that sense, the majority of authors insist on generating more research that look into different strategies to present diverse experimental designs. Even though the research is fragile it presents obvious advantages of using assistive technology, but also barriers in efficient implementation: inadequate qualification and negative attitude of individuals that work in special education; insufficient funds for equipment; inadequate evaluation of children and poor planning of IP-s. The success of a plan implementation relies on elements such as analysis, implementation and team cohesion, components evaluation or parents' implication in the recovery-optimization process (McGregor & Pachuski, 1996).

The study results support the use of assistive technologies in learning process as these are considered an important means in education. Ensuring learning conditions and participation for pupils with disability can be facilitated through inclusion of assistive technology within didactic project. In a world in which nothing remains untouched by new technologies, special education seems to take full advantage of these valuable tools be it educational software that help the professors or products such as communication books, visual schedules or instructional maps.

Thus, assistive technology plays an important role in compensation-recovery process, role that is specified and supported by the World Health Organization. The relevance of using assistive technology results from the way in which this technology helps reaching a fictional target for increasing life quality for vulnerable individuals. Based on individual needs in particular cases, assistive technology can bring added value to the educational process through curriculum flexibility. For instance, the use of augmentative and alternative means of communication in the case of preverbal pupils and other severe disorders in communication, pupils that cannot manage to express themselves verbally.

Without doubt, standards referring to life quality have increased in any activity field and technology represents an important aspect in ensuring these standards. We do not send letters, we communicate via e-mail, it is not compulsory to go to a certain place when we can video call etc.; all these possibilities are identified according to the needs that we have. As with daily situations, the context of special education is up to date with global tendencies and faces more and more coherent current challenges through considering assistive technology as an important part in optimal development of pupils with severe disabilities in learning.

Acknowledgement

This material has been accomplished with financial aid given within the project "Interdisciplinary Excellence in Doctoral Scientific Research in Romania EXCELLENTIA", identification code: POSDRU/187/1.5/S/155425, Cod SMIS: 59019

Bibliography

[1] Beck, J. (2002). Emerging Literacy Throught Assitive Techolgy. *Teaching Exceptionl Children, 35*(2), 44-48. Preluat pe 9 22, 2015, de pe http://mhess1.pbworks.com/f/Assistive+Technology+Emerging+Literacy+7685811.pdf

[2] Ganz, J. B. (2014). *Aided Augmentative Communication for Individuals with Autism Spectrum Disorders* (ed. Autism and Child Psychopathology Series). New York: Springer Science+Business Media. doi:DOI 10.1007/978-1-4939-0814-1

[3] Gherguț, A. (2011). *Educational of children with special needs in Romania; attitudes and experiences.* Preluat de pe http://www.sciencedirect.com/science/article/pii/S1877042811001637.

[4] Hansen, M. S., Blakely, A. W., Dolata, J. K., & Tracy Raulston, W. (2014). Children with Autism in the Inclusive Preschool Classroom: A Systematic Review of Single-Subject Design Interventions on Social Communication Skills. *Review Journal of Autism and Developmental Disorders, 1*(3), 192–206. doi:DOI 10.1007/s40489-014-0020-y

[5] Heath, A., Ganz, J., Parker, R., Burke, M., & Ninci, J. (2015, June). A Meta-analytic Review of Functional Communication Training Across Mode of Communication, Age, and Disability. *Review Journal of Autism and Developmental Disorders, 2*(2), pp 155-166. doi:DOI 10.1007/s40489-014-0044-3

[6] Lancioni, G. E., & Nirbhay , S. N. (Ed.). (2014). *Assistive technologies for people with diverse abilities.* New York: Springer .

[7] Organizația Mondială a Sănătății - București. (2012). *Clasificarea internațională a funcționării, dizabilității și sănătății. Versiunea pentru copii și tineri.* Buzău: Alpha MDN.

[8] Professional Affairs Board of The British Psychological Society. (2000). *Learning Disability: Definitions and Contexts.* Leicester: The British Psychological Society.

[9] Rose, D., Hasselbring, T., Stahl, S., & Zabala, J. (2005). Assistive Technology and

Universal Design for Learning: Two Sides of the Same Coin. În K. H. Dave L. Edyburn (Ed.), *Handbook of Special Education Techolgy Research and Practice* (p. 507517). Preluat pe 9 22, 2015, de pe http://spnd453cohort7.wikispaces.com/file/view/Assistive+Technology+and+UDL_TwoSidesoftheCoin.pdf

[10] Sansosti, F., Doolan, M. L., Remaklus, B., Krupko, A., & Sansosti, J. (2015). Computer-Assisted Interventions for Students with Autism Spectrum Disorders within School-Based Contexts: A Quantitative Meta-Analysis of Single-Subject Research. *Review Journal of Autism and Developmental Disorders, 2*(2), 128-140. doi:DOI 10.1007/s40489-014-0042-5

[11] Snell, M. E., Chen, L.-Y., & Hoover, K. (2006). Teaching Augmentative and Alternative Communication to Students with Severe Disabilities: A Review of Intervention Research 1997-2003. *Research and Practice for Persons with Severe Disabilities (RPSD), 31*, pg. p203-214. Preluat de pe http://eric.ed.gov/?id=EJ756425

[12] Spooner, F., Knight, V. F., Browder, D. M., & Smith, B. R. (2012). Evidance-Based Practice for Teaching Academics to Student With Severe Developmental Disabilities. *Remedial and Special Education*, 375-387. doi:10.1177/0741932511421634

[13] Tullis, C. A., Cannella-Malone, H. I., & Payne, D. O. (2015, March). Literature Review of Interventions for Between-Task Transitioning for Individuals with Intellectual and Developmental Disabilities Including Autism Spectrum Disorders. *Review Journal of Autism and Developmental Disorders, 2*(1), pp 91-102. doi:DOI 10.1007/s40489-014-0039-0

[14] Vrasmaș, E. (2007). *Dificultățile de învățare în școală - domeniu nou de studiu și aplicație.* București: V&I Integral.

[15] Vrăsmaș, T. (2015). *Cerințe speciale și dizabilitatea în educație - O perspectivă internațională.* Galați: Editura didactică și pedagogică, R.A.