Current Educational Research
DOI: https://doi.org/10.52845/CER/2019/215
Curr. educ. res. 2 (1), 102—106 (2019)
Received 6 Dec 2018 | **Revised** 15 Feb 2019 | **Accepted** 10 Mar 2019 | **Online Available** 30 Feb 2019

Current Educational Research
ISSN: 2393-7637 | 2393-7610
Instituto Nacional de Viticultura

OPEN ACCESS

RESEARCH ARTICLE

Challenges of ICT by Using AT (Assistive Technology) for Inclusive Education of Visual Impairment

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Abstract
This paper presents challenges of ICT by using AT (Assistive Technology) for Inclusive Education of Visual Impairment.The visually impaired students can take advantage of a large number of effective assistive technologies but, while using electronic material for learning purposes, they often encounter a number of different accessibility and usability problems. The variety of obstacles they may find on their way is quite large mainly because the term "visually impaired" encompasses a wide range of deficits, ranging from blindness to a number of other multifaceted, although less severe, visual impairments. It highlights to improve the quality of life for people with visual disabilities and contribute to the economic and cultural development of the society they belong. ICT is very important to make available the lifelong access to high quality education and training for their vocational, social, and personal needs. The application of ICTs must empower as well as enhance independence, integration, and equal opportunities for such people and in this way will facilitate their inclusion in society as valued, respected, and contributing members.

Key words: Effective Management, Inclusive Education, ICT

1 | INTRODUCTION

Rapid progress in knowledge and easy access to information are becoming a driving force of economic and social development. Inclusion or integration is an important part of equal opportunity in education. Students with disabilities are educated alongside their peers within the local community therefore mainstream schools are required to adapt to accommodate a diverse group of students with a variety of needs (O"Gorman, 2005, (1)

p. 377). Approaches to the inclusion of children and young people into mainstream classrooms, and the identification and recognition of special educational needs, is an integral part of daily school work. Historically, the term ,,inclusions has often used to mean either the moving of disabled children into the mainstream settings, or reducing the exclusion of other students from school. It is now acknowledged that the inclusion of disabled children requires not only their integration without providing the support they need, but changes in the existing policies, practices, and attitudes of the society. In the first instance, the movement of inclusion is extended over the category of people, who are deprived of the opportunity to receive education, thereby to take a full-fledged part in the life of the society because of inborn or acquired impairments, socioeconomic deprivation, war conflicts, or other negative factors — barriers to learning. (2, 3)

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Supplementary information The online version of this article (https://doi.org/10.52845/CER/2019/215) contains supplementary material, which is available to authorized users.

2 | AT (ASSISTIVE TECHNOLOGY)

AT plays a fundamental role in carrying out the process of inclusion. AT can build the necessary bridge between the students" functioning and participation in school activities, offering them the possibility to learn. Through facilitating functional abilities, overcoming some impairment, eliminating architectural barriers, supporting the student, AT is the best ally, sometimes the solution, to let children with disabilities take part in the educational process to the full. Persons with physical impairments caused by the damaged central or peripheral nervous systems, have difficulties in motor control because of a health condition or trauma during or after birth. (4) Additional impairments can be associated with physical, for example cognitive, visual, or hearing impairments, verbal language difficulties. Such people may experience reduced or no movement; imprecise movement, low speed and muscular strength; fatigue or difficulties in hand-eye coordination. AT can make for each of these problems. When an individual"s primary disability is visual, his/her visual needs must be carefully evaluated in order not to underestimate the impact of the impairment on his/her daily life – especially in case of educational contexts – so that the AT solution can be rightly accommodated to them. (5)

Visual Impairment

Several types of measurements are employed to assess visual capability: visual acuity (target size), visual range (field size), visual tracking (following a target), and visual scanning (finding a specific visual target in the field of several targets). Vision loss or vision impairment can result from a variety of causes (diseases, trauma, and problems at birth...) that can lead to varying degrees of vision loss from total blindness to affected eyesight in one eye only. As Scherer refers, different degrees are described as partially sighted, low vision, legally blind, or totally blind: "It is important to note that as the vision loss becomes more complete, the individual typically needs to use more assistance as well as high-tech and complex technologies for reading, writing, and mobility." (6, 7)

AT (Assistive Technology) for Visual Impairment

The affect of visual problems on a child"s development depends on the severity, type of loss, age at which the condition appears, and overall functioning of the child; visual handicaps can create obstacles to a growing child"s independence. In mainstream schools the most of academic work is structured so that vision is the primary sense through which information is given. Consequently, to assure equal possibility to learn for students with visual impairment, perceptive stimuli other than the visual ones must be provided being typically based on auditory or tactile senses. "Students with visual impairment may need additional help with special equipment and modification in the regular curriculum; students with low vision or those who are legally blind may need help in using their residual vision more efficiently and in working with special aids and materials." (8, 9)

Special toys and games

A lot of special toys and games exist to support play and development of a visually impaired child. Almost any common board game is available in the enlarged format. There are also enlarged and tactually labeled playing cards, as well as Braille versions of common board games, dice, and computer games emphasizing text and sounds rather than graphics. The process of studying mathematics and algorithms requires the use of technical aids to learn the numbers in Braille and to set them up in columns. Talking watches are used by blind individuals, but Braille watches exist, too

Portable devices

There are portable devices that read paper money and voice the denomination of the bill. Traditionally the blind used the Braille code for reading and writing, and many special tools have been developed to support their studies with Braille. The development and spreading of the PCs have changed this trend greatly (10–12)

Learning to use the computer

Learning to use a computer is a long and difficult route for a blind person, but building a totally autonomous life is considered a must, not only by rehabilitation experts but by the communities of blind people, too. The most effective software for blind children is still written to run under DOS, so old PCs can be used; a student does not have to learn DOS rules and commands, a technician skilled in

DOS and capable of solving wouldbe problems must be at hand instead. Children might not have comprehensive knowledge of the computer to start the school curriculum, though for their future a well-formed specific training is needed, since this tool is likely to become their most important working instrument.

Graphical User Interface (GUI)

The advent of Graphical User Interface (GUI) has created particular problems for blind computer users. In GUI visual information indicating relative spatial positions of objects on the screen becomes highly significant. Interaction is mediated by a mouse, however for a blind person it is almost impossible to use it and to know where it is pointing. GUIs have been made accessible via the development of screen readers, which essentially translate the screen into speech pronounced by a synthesizer (Cook and Hussey, op. cit.). (13–16)

AT for writing and reading with the PC

Some AT solutions are available for drawing and recognition of geometrical shapes, e.g. grids, on which segments can be built with wool threads or small sticks used as segments to be assembled in a geometrical shape. Current embossing printers can produce a tactile paper representation of the graphical content of a document, while the textual content is translated into Braille. It is now possible to print directly from any application running in the Windows environments. Some software prototypes support graphical activity of the blind on the computer by giving them an auditory feedback (Kamel and Landay, 2002). General comfort and working conditions. (17, 18)

Educational resources made available through interconnected computer networks, comprising also synchronous and asynchronous communication tools, when used in an educational perspective.

"Computer-based learning": those learning materials locally available on the user"s PC and used when the computer is not connected to a network.

"M-learning": those educational tools made available through "mobile devices" such as palmtops (or handhelds), Personal Digital Assistants (PDAs), tablet PCs, mobile or smart phones; such tools, may also take advantage of the connection to the net via "wireless transmission" [Hoppe et al, 2003].

The concept of "e-learning tool" is, then, linked both to the media (hardware devices) employed and to the programs (software applications) used to support the educational process. Such software applications can be roughly divided into: E-learning platforms: those internet-based environments expressly addressed to the delivery of integrated electronic educational contents and to the management of a variety of educational activities aimed at fulfilling specific educational objectives

The blind student"s work-station, at home and at school, should be easily accessible and sufficiently large to contain the most used devices. The computer desktop must be simple and tidy; useless icons are to be eliminated, though the used ones must be in „pole position", i.e. in upper left. Keyboard shortcuts usage instead of menu selections make a lot of computer activities faster and more comfortable for blind students; it is also useful to associate auditory cues with certain keys. A Braille printer is bulky and noisy but needed for a young student learning to write to get the printed version of the screen text immediately. Later on it may be easier to connect the computer to a printer located outside the classroom. (19–21)

People with low vision

A large screen is always necessary for a student with low vision. The screen should also be of high quality with emissions as low as possible, that it can be safely explored at a very close distance. A high resolution screen is preferable, since it helps enlarge objects on the screen. The user is involved in finding the most fitting combination of colours, fonts, and dimensions for his/her residual vision. The screen desktop must be simple and well-organised without decorative but uniform backgrounds instead. The shape of the mouse pointer is crucial, as to its dimension, colour, borders, tail, contrast with the background; some pointers can be found in the Windows system, however free software also exists (downloadable from the Internet) giving a wider choice of mouse pointers (22, 23)

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How to cite this article: Chand B. Challenges of ICT by Using AT (Assistive Technology) for Inclusive Education of Visual Impairment. Current Educational Research. 2019;102−106. https://doi.org/10.52845/CER/2019/215