Technology Supported Education for People with Disabilities

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ABSTRACT

The development of information society affects each & every aspect of people live. The technologies which are currently available and those which are about to come, having the potential to transform the entire educational system. Students with mild learning disorder can fulfil their educational activities through computer-based technology. Now there is also an adaptive technology, which enables students those are suffering from severe disabilities to take an active participation in the classrooms with their classmates who do not have disabilities. Any item, equipment or system that helps people with disabilities is termed as assistive technology. The purpose of assistive technology to makes things possible for disabled rather than fixing them. In the present paper, there is description of technologies, which enables the disabled student to perform their educational activities in a more possible manner.

Keywords: Disability, adaptive technology, assistive technology, education for disabled

For most people, technology makes things easier.
For people with disabilities, technology makes things possible.

— **Mary Pat Radabaugh**

In the present scenario, progress & prosperity of the society largely depends upon the acquisition of knowledge and information. The development of information society affects each & every aspect of people live. Information technology makes it possible to get information within a few seconds. It completely changes the structure form of society by making a new cultural environment. It not only alerts the way of doing business but also the way of studying, acquiring skills and information. The technologies which are currently available and those which are about to come, having the potential to transform the entire educational system. At
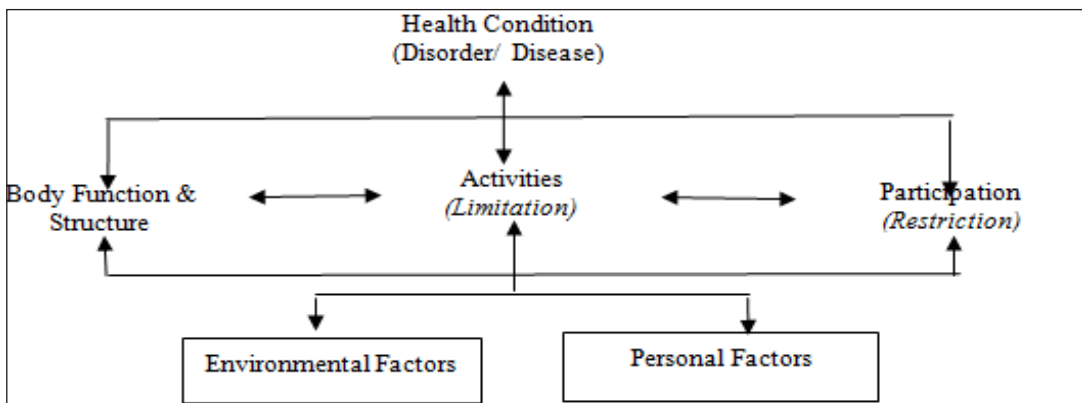
present we can see a lot of methods which are based on information technology. Information & communication technology (ICT) alters the educational system by making teachers as facilitators, students as an active learners & learning as a joyful learning.

There are large numbers of students all over the world, which do not get all benefits from traditional classroom environments because of their disability, which makes them unable to participate freely in a typical classroom environment. Computer based technology can play a vital role. Students with mild learning disorder can fulfil their educational activities through computer-based technology. Now there is also an adaptive technology, which enables students those are suffering from severe disabilities to take an active participation in the classrooms with their classmates who do not have disabilities.

According to the research of British Educational Communication and Technology Agency (BECTA, 2003) ICT usage in schools can help students with special needs. They enable students to communicate, participate in lessons, and learn more effectively. In the present lesson, there is discription of technologies, which enables the disabled student to perform his educational activities in a more possible manner.

DISABILITY

The international classification of functioning, disability and health (ICF) has given the improvised definition of disability. It was emerged through long process involving academics, practitioners of medicine and psychology and person having disabilities. The ICF gave much importance to environmental factors in creating disability, which is the key difference between this new classification and the previous International Classification of Impairments, Disabilities and Handicaps (ICIDH).

Disabilities are an umbrella term, covering impairments, activity limitations and participations restrictions. Impairment is a problem in body function or structure, ex–paralysis or blindness, an activity limitation is a difficulty encountered by an individual in executing a task or

action ex –walking and eating, while a participation restriction is a problem experienced by an individual in involvement in life situations ex- facing discrimination in employment or transportation. Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a society in which he or she lives. Disability evolved through interaction of health condition with environmental and personal factor as shown in above figure.

TYPES OF DISABILITY

Various mental and physical /loco-motor impairments that obstruct the person's ability to perform his/her daily activities called as disability. Disability can be further categories in a following manner as:

1. **Visual /Vision disability:** In this type of disability an individual is:
   - ❖ Totally blind, or
   - ❖ No apprehension of light instead of wearing light glasses or
   - ❖ Has recognition of light but has uncleared vision even using eyeglasses.
   - ❖ Cannot move independently as vision is not clear.

2. **Hearing Disability:** In this type of disability person is either partially or completely deaf. Person having difficulty in hearing conversational speech comes under this category. Hearing aids can be used by people who are partially deaf.

3. **Language & Speech Disability:** In this type of disability an individual is unable to speak at all or having difficulty in speaking normally. Person stammers in such way that the speech is not comprehensible. Person having difficulties associated with the expression, reception and decryption of thoughts in language form.

4. **Physical/Locomotors Disability:** Person having this type of disability is unable to perform his day to day activities like walking, bathing, toileting etc. These are two reasons for this type of disability.
   - ❖ **Congenital /hereditary:** The person has disability since birth or developed at later stage as a result of some genetic disorders injury during birth.
   - ❖ **Acquired:** This ability comes to the person when he met with an accident or some infections or disorders

5. **Cognitive Disability:** Cognitive disabilities includes various intellectual and cognitive inadequacy such as mental retardation, developmental delay, learning disabilities and conditions using cognitive impairment such as acquired brain injuries or neuro degenerative diseases like dementia.

6. **Specific learning impairments:** In this type of impairments following problems are faced by an individual:

   ❖ Problem in identification, decryption & encryption of letters and syllables of word

   ❖ Numbers and their combination are not properly identified & inabilities in calculation.

   ❖ Problem of concentration & focus.

   Ex –Dyslexia, dysgraphia, dyscalculia, attention deficit.

ASSISTIVE TECHNOLOGY (AT)

Assistive technology is an umbrella term that includes assistive, adaptive and rehabilitative devices for people with disabilities and includes the process used in selecting, locating and using them.

ICF define assistive technology as, *"Any product, instrument, equipment or technology adapted or specially designed for improving the functioning of a person with disability"*.

Any item, equipment or system that helps people with disabilities is termed as assistive technology. The purpose of assistive technology to makes things possible for disabled rather than fixing them. It helps disabled people to make their performance at its fullest and live satisfactory & rewarding lives. Many people thought that assistive technology and instructional software are same. However, there is a quite difference between them. Assistive technology is used to bypass, work around or compensate for learning difficulties. Instructional software is designed to develop or enhance specific skill in particular area such as reading, writing and dancing etc.

Assistive technology helps facilitate the participation and enjoyment in the classroom for disabled students. Students are able to achieve success in learning and obtain more autonomy in the learning process through assistive technology. Teachers can provide better learning environment to the disabled students by using assistive technology.

EVOLUTION OF ASSISTIVE TECHNOLOGY

Earlier in 1973, assistive technology had not been formally defined, but was being used to assist student with disabilities. Many children with disabilities were not allowed to attend the public school. In 1975, the Education for all Handicapped children Act (EHA), Public law 94-142 was passed, according to which every school has to provide children with Free Appropriate Public Education (FEPA). In 1990, Individuals with Disabilities Education Act (IDEA) was passed that allowed students with disabilities to work in classrooms with non-disabled students rather than in special school/classrooms. Further in 1997, IDEA allowed access to general education curriculum which required AT devices or services. Assistive technology device was first formally defined in the technology related assistance for individuals with

disabilities act of 1998. It was later replaced by the Assistive Technology Act of 1998. In 2004 individual with disabilities improvement act passed. AT defined within law first as "any piece of equipment or product, system, whether acquired commercially off the shell, modified or customized i.e. used to increase, maintain, or improve the functional disability." Since then it keeps on growing and revolutionized the education system for students with disability.

TYPES OF ASSESTIVE TECHNOLOGY

The types of assistive technology devices are as follows:

❖ **Computer & Software:** They consist of interactive instructional formats, simulation approaches and educational games. These devices enable drill and practice session, tech problem solving skills through simulation, assist is communication, facilitate physical movement, and increase motivation level.

❖ **Peripheral Services:** Adapted joysticks, enlarged keyboards and touch screen come under this category. These devices are used to simplify information input and output for students with disabilities.

❖ **Switches:** These types are very useful for students with limited motion. They allow students to use computer & other appliance through simple motions. Students may control the switches by muscle tension, head movement etc.

❖ **Electronic Communication Devices:** Augmentative and alternative communication devices assist in the area of communication. Electronic communication board and speech synthesized generate synthesized speech that is a result of the human voice.

CHARACTERISTICS OF GOOD ASSISTIVE TECHNOLOGY

Every child is unique so assistive technology used by him should in accordance with his abilities needs and wants. In other words assistive devices used by disabled students meet his need and environmental conditions. It is also required that assistive technology used by disabled student should be safe, durable and applicable when it is required. These are some characteristics of appropriate assistive technology which are discussed below:

❖ **Adaptability:** The services and products for disabled children's communities are available in a sufficient quantity so that they can be benefitted by them easily.

❖ **Accessibility:** Accessibility refers to the physical and cognitive access to services and products. Building are accessible, lighting are appropriate, text are available in Braille are some example of physical accessibility. Cognitive accessibility means that the information should be clear and simple, language & symbols should be concreter rather than abstract. Devices are such that it can be easily adopted by the child.

❖ **Affordability:** The cost of assistive technologies services and products should be in such a manner that every family of disabled child have a capacity to afford it. There is a provision of free and subsidized services and products for families that are unable to afford them [according to standard rules on the equalization of opportunities for person with disabilities (1995)].

❖ **Adaptability:** Assistive products are manufactured in such a manner that they are suitable to the needs and requirements of the disabled students. Individual factors such as health conditions, physical structure and function, capacity, age, gender, ethnicity and preference as well as environmental factors such as physical & psychological environment, climate & culture should be taken into account while preparing and providing services and products. They are available in such a way that it is adaptive to the need of disabled students.

❖ **Quality:** Disabled students can get benefit from the services and products only if they are of an appropriate quality. Strength, durability, capacity, safety and comfort are some technical standards or guidelines through which the quality of services and products can be measured. The quality of products should comply with relevant international standards of the International Organization for Standardization (ISO).

SOURCES OF ASSISTIVE TECHNOLOGY

Student with disabilities have Individual Education Plan/ Program (IEPs) that determine the nature and type of assistive technology required by the students. There are various assistive technology services and sources available to help students and their parents, service providers in order to know the appropriate technology devices according to the specific need of the students. Apart from all these there are online sources which give the complete assistance and help in the identification of the suitable devices for the child.

USE OF ASSISTIVE TECHNOLOGY IN EDUCATION

Technology has an immense power in providing access for all learners, according to their capabilities. AT is a comprehensive term that includes operative, convenient, dependable, adaptive and rehabilitation devices for disabled, ranging from low-tech devices like special grip for a pen/pencil, to more advanced items like alternative keyboards, specialized software etc. There are large variety of assistive technology devices and services available to accommodate disabled students and their learning disabilities. AT is available ranging from low tech to high tech in accordance with need, wants and requirements of the disabled students.

ASSISTIVE TECHNOLOGIES FOR THE EDUCATIONAL NEEDS OF STUDENT WITH DISABILITY

There is a variety of assistive technologies available to benefit the students with disability. There are some popular assistive technologies which are described below:

❖ **Mouth Stick:** It is a device through which students can control input with the help of stick which is moved by their mouth.
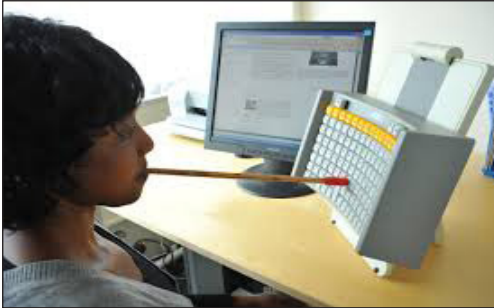

Fig. 1: Mouth Stick   **Fig. 2:** Head Wand

❖ **Head Wand:** It is similar to the mouth stick but in this device, the stick is attached to the head.

❖ **Screen magnifier:** This device magnifies text, photographs, graphics etc on a computer or on a mobile device. This device helps the students with low vision.

❖ **Screen Readers:** It is a kind of software application, which converts the visual content into synthesized speech. *Ocra* for Unix-like systems is the example of free & open source screen readers.

Fig. 3: Screen Magnifier   **Fig. 4:** Screen Reading Software (JAWS)

❖ **Pencil grips and raised line paper:** They can be used to guide the students to practice to how to hold pencil in a proper way and write in a well-mannered way.

❖ **Symbol based learning system:** It is a learning system in which symbols are used in place of written text or readings to help disabled students recognizing words associated with a given symbol.

❖ **Talking Calculators:** They are the best devices for student suffering from *Dyscalculia.* It provides the necessary audio feedback to one, who cannot understand numbers in written form.
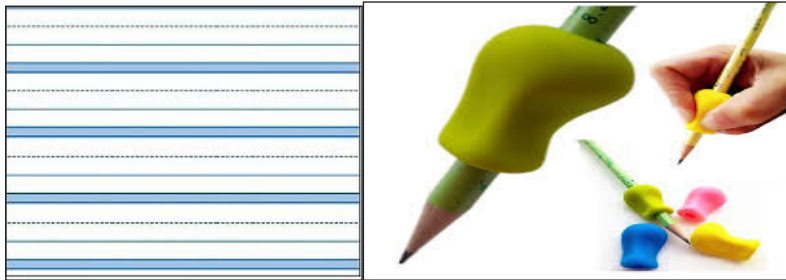

Fig. 5: Raised line paper and Pencil grips

❖ **Assistive Listening Devices (ALDs):** ALDs are devices which amplifies the sound in such a way that it enables the students to listen even when there is a lot of noise in the background. It is especially suitable for students with partial hearing impairment.

❖ **Augmentative and Alternative Communication (AAC):** It is a comprehensive term that includes the communication methods used to complement speech or writing for those with impairments in the production or comprehension of spoken or written language.

Fig. 6: ALDs   **Fig.7:** AAC

❖ **Dyslexia:** Optical character recognition (OCR) and screen reading software, tape recorders for classroom, book on tape, adaptive keyboards etc are proved very useful for students having reading problem.

PROS OF ASSISTIVE TECHNOLOGIES FOR DISABELED PERSON

The pros of assistive technologies for disabled person can be listed in a following manner:

❖ Use of ATs make disabled students quite independent as they can accomplish their learning activities and day to day activities without extra help of any other person.

❖ ATs enables students to do their work according to their pace, comfort and convenience.

❖ AT make it possible for disabled students to learn in normal classrooms. These technologies do not help only students with disability but also non-disabled students and teachers.

❖ As ATs help students to learn things effectively, they can also achieve academic standards.

❖ Disabled students get an opportunity to socialize with more students hence get confidence in them to face the problems of real world.

❖ Organization skills and writing skills can also be improved effectively by using assistive devices.

❖ ATs help disabled students to refine their skills so that they can reach up to the higher level of education and competitions.

CONS OF ASSISTIVE TECHNOLOGIES FOR DISABLED PERSON

The cons of assistive technologies for disabled person can be listed in a following manner:

❖ ATs helped disabled students in a number of ways but most of the ATs are very expensive. Many of the schools and institution do not have so many grants to provide all these technologies to disabled students.

❖ In order to perform activities with the help of ATs, special training is required which take lots of time.

❖ Each and every technologies has some flaws in it, we cannot rely completely on them. The student may not be able to perform his tasks/ works if the device is not working properly.

❖ There are varieties of assistive technologies available in the present time. Some students may abuse the use of technology by using technologies they don't necessarily need.

CONCLUSION

Appropriate assistive technology is a potent tool to increase a child's autonomy and improve their involvement. It helps children to become mobile, communicate more effectively, see and hear better, and participate more fully in learning and play activities. It supports children to access and enjoy their rights and to participate in things they like and it bridges the gap between children with and without disabilities. An educated disabled child supported by assistive technology will have greater opportunities for employment, resulting in less reliance on welfare and social security agency and their greater contribution to the country's economy. To make assistive technology of an appropriate quality available, accessible, affordable, adaptable and acceptable to children and their families, stakeholders need to maintain a

high level of commitment to realizing the provisions of the CRC and the Convention on the Rights of Persons with Disabilities (CRPD). The stakeholders include governments, United Nations (UN) agencies, development organizations, disabled people's organizations, service providers, academic institutions, the private sector, communities, and Children with disabilities and their families.

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