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### SCOPE OF ASSISTIVE TECHNOLOGY IN LEARNING PROCESS OF STUDENTS WITH DISABILITIES

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#### **Abstract**

Disability is a global health concern that affects all people irrespective of age. The International Classification of Functioning, Disability, and Health, WHO (ICF-WHO 2001) defines disability as a term including impairment, activity limitation, and participation restriction. It denotes the negative aspects of the interaction between an individual with a given health problem and that individual's environmental and social factors. Persons with disabilities may have a lack of access to health-care services due to various reasons, and lesser opportunities for education and employment, as well as participation in social and cultural events, or to enjoy social protection. Addressing disability needs a multidimensional approach. Learning process is the central part of teaching - learning process and learners are playing most important role in this process, but except those there is also another part in this process and that is teaching method and the teaching method becomes more interesting when teacher use technology with the instruction. We are talking in 21st century about inclusiveness in our classroom, assistive technology plays important role in creating inclusiveness inside the class room. This article is a conceptual paper on the review of different literature, focused on the role of additive technology in learning process of disabilities, here researcher focused on how assistive technology helps students having disabilities in the learning process. This paper described different types of assistive technology for different subjects as well as it described the scope of assistive technology in different disciplines.

**Keywords-** *assistive technology, disabilities, learning process, education*

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## INTRODUCTION

Disability is a global health concern that affects all people irrespective of age. The International Classification of Functioning, Disability, and Health, WHO (ICF-WHO 2001) defines disability as a term including impairment, activity limitation, and participation restriction. It denotes the negative aspects of the interaction between an individual with a given health problem and that individual's environmental and social factors. Persons with disabilities may have a lack of access to health-care services due to various reasons, and lesser opportunities for education and employment, as well as participation in social and cultural events, or to enjoy social protection. Addressing disability needs a multidimensional approach. A disability is any condition that makes it more difficult for a person to do certain activities or interact with the world around them. These conditions, or impairments, may be cognitive, developmental, intellectual, mental, physical, sensory, or a combination of multiple factors. Impairments causing disability may be present from birth or occur during a person's lifetime. The World Health Organization proposes the following definition of disabilities:

Disabilities are an umbrella term, covering impairments, activity limitations, and participation restrictions. Impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations. Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the society in which he or she lives.

Disabilities can affect people in different ways, even when one person has the same type of disability as another person. Some disabilities may be hidden, known as an invisible disability. There are many types of disabilities, such as those that affect a person's:

- Vision
- Hearing
- Thinking
- Learning
- Movement
- Mental health
- Remembering
- Communicating
- Social relationships

Categories of disability types include various physical and mental impairments that can hamper or reduce a person's ability to carry out his day to day activities. These impairments can be termed as a disability of the person to do his or her day to day activities. Disability can be broken down into several broad sub-categories, which include the following 8 main types of disability.

- Mobility and Physical Impairments
- Spinal Cord Disability
- Head Injuries (TBI) - Brain Disability
- Vision Disability
- Hearing Disability
- Cognitive or Learning Disabilities
- Psychological Disorders
- Invisible Disabilities

## **OBJECTIVES:**

To find out the scope of assistive technology in the learning process of students with disabilities.

## **CONCEPTUAL FRAMEWORK: ASSISTIVE TECHNOLOGY**

AT for kids with LD is defined as any device, piece of equipment, or system that helps bypass, work around or compensate for

an individual's specific learning deficits. Over the past decade, several studies have demonstrated the efficacy of AT for individuals with LD. AT doesn't cure or eliminate learning difficulties, but it can help your child reach her potential because it allows her to capitalize on her strengths and bypass areas of difficulty. For example, a student who struggles with reading but who has good listening skills might benefit from listening to audio books.

In general, AT compensates for a student's skills deficits or area(s) of disability. However, utilizing AT does not mean that a child can't also receive remedial instruction aimed at alleviating deficits (such as software designed to improve poor phonic skills). A student could use remedial reading software as well as listen to audio books. Research has shown that AT can improve certain skill deficits (e.g., reading and spelling).

AT can increase a child's self-reliance and sense of independence. Kids who struggle in school are often overly dependent on parents, siblings, friends, and teachers for help with assignments. By using AT, kids can experience success by working independently.

### **SCOPE**

#### ***What types of learning problems does assistive technology address?***

AT can address many types of learning difficulties. A student who has difficulty writing can compose a school report by dictating it and having it converted to text by special software. A child who struggles with math can use a hand-held calculator to keep score while playing a game with a friend. And a teenager with dyslexia may benefit from AT that will read aloud his employer's online training manual. There are AT tools to help students who struggle with:

### **Listening**

Certain assistive technology (AT) tools can help people who have difficulty processing and remembering spoken language. Such devices can be used in various settings (e.g., a class lecture, or a meeting with multiple speakers).

### **Math**

Assistive technology (AT) tools for math are designed to help people who struggle with computing, organizing, aligning, and copying math problems down on paper. With the help of visual and/or audio support, users can better set up and calculate basic math problems.

### **Organization and memory**

Assistive technology (AT) tools can help a person plan, organize, and keep track of his calendar, schedule, task list, contact information, and miscellaneous notes. These tools allow him to manage, store and retrieve such information with the help of special software and hand-held devices.

### **Reading**

There is a wide range of assistive technology (AT) tools available to help individuals who struggle with reading. While each type of tool works a little differently, all of these tools help by presenting the text as speech. These tools help facilitate decoding, reading fluency, and comprehension.

### **Writing**

There is a wide range of assistive technology (AT) tools available to help students who struggle with writing. Some of these tools help students circumvent the actual physical task of writing, while others facilitate proper spelling, punctuation, grammar, word usage, and organization.

### **Kinds of assistive technology tools are available?**

The term "assistive technology" has usually been applied to computer hardware and

software and electronic devices. However, many AT tools are now available on the Internet. AT tools that support kids with LD include:

#### **Abbreviation expanders**

Used with word processing, these software programs allow a user to create, store and re-use abbreviations for frequently-used words or phrases. This can save the user keystrokes and ensure proper spelling of words and phrases he has coded as abbreviations.

#### **Alternative keyboards**

These programmable keyboards have special overlays that customize the appearance and function of a standard keyboard. Students who have LD or have trouble typing may benefit from the customization that reduces input choices, groups keys by color/location, and adds graphics to aid comprehension.

#### **Audio books and publications**

Recorded books allow users to listen to the text and are available in a variety of formats, such as audiocassettes, CDs, and MP3 downloads. Special playback units allow users to search and bookmark pages and chapters. Subscription services offer extensive electronic library collections.

#### **Electronic math worksheets**

Electronic math worksheets are software programs that can help a user organize, align, and work through math problems on a computer screen. Numbers that appear onscreen can also be read aloud via a speech synthesizer. This may be helpful to people who have trouble aligning math problems with pencil and paper.

#### **Freeform database software**

Used in conjunction with word processing or other software, this tool allows the user to create and store electronic notes by "jotting down" relevant information of any length and on any subject. He can later retrieve the

information by typing any fragment of the original note.

#### **Graphic organizers and outlining**

Graphic organizers and outlining programs help users who have trouble organizing and outlining information as they begin a writing project. This type of program lets a user "dump" information in an unstructured manner and later helps him organize the information into appropriate categories and order.

#### **Information/data managers**

This type of tool helps a person plan, organize, store, and retrieve his calendar, task list, contact data, and other information in electronic form. Personal data managers may be portable, hand-held devices, computer software, or a combination of those tools working together by "sharing" data.

#### **Optical character recognition**

This technology allows a user to scan printed material into a computer or handheld unit. The scanned text is then read aloud via a speech synthesis/screen reading system. Optical Character Recognition (OCR) is available as stand-alone units, computer software, and portable, pocket-sized devices.

#### **Personal FM listening systems**

A personal FM listening system transmits a speaker's voice directly to the user's ear. This may help the listener focus on what the speaker is saying. The unit consists of a wireless transmitter (with microphone) worn by the speaker and a receiver (with earphones) worn by the listener.

#### **Portable word processors**

A portable word processor is a lightweight device that is easy to transport (e.g., from classroom to home). It can be helpful to kids who may have trouble writing by hand and prefer to use a keyboard. Word processing

allows the user to edit and correct his written work more efficiently than doing so by hand.

### **Proofreading programs**

Students who struggle with writing (e.g., spelling, grammar, punctuation, word usage, and sentence structure) may benefit from software programs (included in many word processing systems) that scan word processing documents and alert the user to possible errors.

### **Speech-recognition programs**

A speech recognition program works in conjunction with a word processor. The user "dictates" into a microphone, and his spoken words appear on the computer screen as text. This can help a user whose oral language ability is better than his writing skills.

### **Speech synthesizers/screen readers**

These systems can display and read-aloud text on a computer screen, including text that has been typed by the user, scanned in from printed pages (e.g., books, letters), or text appearing on the Internet.

### **Talking calculators**

A talking calculator has a built-in speech synthesizer that reads aloud each number, symbol, or operation key a user presses; it also vocalizes the answer to the problem. This auditory feedback may help him check the accuracy of the keys he presses and verify the answer before he transfers it to paper.

### **Talking spell checkers and electronic dictionaries**

Talking spell checkers and electronic dictionaries can help a poor speller select or identify appropriate words and correct spelling errors during the process of writing and proofreading. Talking devices "read aloud" and display the selected words onscreen, so the user can see and hear the words.

### **Variable-speed tape recorders**

Tape recorders/players allow a user to listen to pre-recorded text or to capture spoken information (e.g., a classroom lecture) and play it back later. Variable speed control (VSC) tape recorders speed up or slow down the playback rate without distorting the "speaker's" voice.

### **Word-prediction programs**

Word prediction software can help a user during word processing by "predicting" a word the user intends to type. Predictions are based on spelling, syntax, and frequent/recent use. This prompts kids who struggle with writing to use proper spelling, grammar, and word choices, with fewer keystrokes.

The following technologies help people use computers to access the web:

- **Screen readers:** Software used by blind or visually impaired people to read the content of the computer screen. Examples include JAWS for Windows, NVDA, or Voiceover for Mac.
- **Screen magnification software:** Allow users to control the size of text and or graphics on the screen. Unlike using a zoom feature, these applications allow the user to have the ability to see the enlarged text about the rest of the screen. This is done by emulating a handheld magnifier over the screen.
- **Text readers:** Software used by people with various forms of learning disabilities that affect their ability to read the text. This software will read text with a synthesized voice and may have a highlighter to emphasize the word being spoken. These applications do not read things such as menus or types of elements - they only read the text.

- **Speech input software:** Provides people with difficulty in typing an alternate way to type text and also control the computer. Users can give the system some limited commands to perform mouse actions. Users can tell the system to click a link or a button or use a menu item. Examples would be Dragon Naturally Speaking for Windows or Mac. Please note both Windows and Mac have some speech recognition utilities, but they cannot be used to browse the web.
- **Alternative input devices:** Some users may not be able to use a mouse or keyboard to work on a computer. These people can use various forms of devices, such as:
  - **Head pointers:** A stick or object mounted directly on the user's head that can be used to push keys on the keyboard. This device is used by individuals who have no use of their hands.
  - **Motion tracking or eye tracking:** This can include devices that watch a target or even the eyes of the user to interpret where the user wants to place the mouse pointer and moves it for the user.
  - **Single switch entry devices:** These kinds of devices can be used with other alternative input devices or by themselves. These are typically used with on-screen keyboards. The on-screen keyboard has a cursor move across the keys, and when the key the user wants is in focus, the user will click the switch. This can also work on a webpage: the cursor can move through the webpage, and if the user wants to click on a link or button when that link or button is in focus, the user can activate the switch.

## **RESULT AND DISCUSSION:**

**From different studies, it is concluded that the role of assistive technology is vital in the learning process of students with disabilities.** Assistive computer technology access solutions for the usage of microcomputers by the disabled are a result of recent advances in computer programming and microcomputer technology. These technologies, which are often specialized programs as opposed to customized systems or devices, are paving the way for gains in educational and employment opportunities for the disabled. Blind users can use a computer screen that can display in an auditory mode, a tactile mode using Braille, or a combination of both methods. Deaf or hearing-impaired users can have access to a microcomputer's tones or beeps by the implementation of a highly visible icon or prompt to notify users of work completion, error conditions, or other events. Such solutions as keyguards and keyboard control programs can greatly help users with orthopedic disabilities. This study was carried out to investigate the scope of assistive technology in the learning process of students with blindness. The sample of this study included 56 students with blindness between the ages of 11-22 years from the secondary level of education. These students were selected through convenient sampling from five special schools located in four cities of the province of Sindh, Pakistan including; Karachi, Hyderabad, Larkana, and Nawabshah. The study was conducted with the help of a structured questionnaire. The hypotheses of the study were tested through percentage and Chi-Square method. The results of the study revealed that the majority of the special education schools/institutes were not providing sufficient assistive

technology for students with blindness and the schools did not have sufficient accessibility of assistive technology for students. There was a lack of awareness among students with blindness regarding the importance of assistive technology. It is expected that this study will help in creating awareness among students with blindness about the importance of assistive technology in the learning process. The study will enable the school administrators to arrange assistive technology in their schools. Studies tell about the importance of assistive technology in the learning process of disable children.

#### **IMPLICATION OF THE STUDY**

1. It will help the educational planner, academic-practitioner & administrator at different levels of education.
2. It will help stakeholders to conduct appropriate research regarding the scope of assistive technology in process of learning for disabled children.
3. It will help the government to provide the necessary provisions of assistive technology to schools.
4. It will help the researcher to find out the gap in a research study regarding assistive technology for disabled students.

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