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EMPOWERING EDUCATION THROUGH INCLUSIVE TECHNOLOGY

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Abstract: *A number of laws have been put in place for children with disabilities after India's independence. The major goal of this is to give all children, regardless of their disability, equal access to school. A number of educational initiatives were introduced, including inclusive education, mainstreaming, integration, and special schools. The newest idea in the realm of education is inclusive education. It's aimed at providing special education to children in mainstream schools. The idea of inclusive education guarantees that schools must identify and address the various needs of their students while providing high-quality instruction to all through the use of appropriate curricula, organizational structures, teaching techniques, resource utilization, and community partnerships. The role of assistive technologies in promoting inclusive learning is important, as they help children with special needs to carry out tasks independently that had previously been impossible for them or which could be very difficult; by providing enhanced or modified methods of interacting with the technology needed to do so. Within this broader framework, in order to provide children with special needs with a high-quality education in regular classrooms, the paper will explain the concept of inclusive education in general, discuss the various assistive technology types that are used, benefits of using assistive technologies, barriers of using assistive technologies, and offer remedial strategies for the use of assistive technology in inclusive education*

Key Words: *Inclusive Education, Assistive Technology, Children with Special Needs.*

1. INTRODUCTION:

The field of education is changing dramatically every day. Inclusive education can be considered as a latest ray of philosophy currently changes the face of modern education. An inclusive education means that all children are given the opportunity of learning under one umbrella, regardless of certain criteria. The concept of providing education to all students irrespective of their level of ability, nature disability, caste, creed etc. can be considered as the major underlying philosophy of Inclusive education. Children with Blindness, Low Vision, Hearing Impairment, Mental Retardation, Locomotor Disability, Speech Problem and so on will learn together with non-disabled students in an Inclusive class room. Inclusive education means creating effective class rooms where educational needs of all children are addressed irrespective of ability, disability, gender differences, caste, creed, color, socio economic background or locality.

For successful academic inclusion, they need certain clear cut supporting strategies. Assistive technology acts as a scaffolding which equips the differently abled to enjoy the essence of Inclusive Education. The paper shows appropriate assistive technology suitable for the nature of differential abilities of children with special needs. Inclusive education offers an equal platform for differentially abled students to learn along with non-disabled peers. The ideal system of Inclusive Education is a combination special education and general education strategies to equip. This implies that general class room teacher should be equipped with skills to address the educational needs of children with special needs with minimum or no assistance of specialist resource teacher. Assistive technologies will definitely act as a scaffolding which increases the easiness of teachers as well as students and thereby will make inclusive education a successful venture.

2. Objectives

- To find out different types of Assistive Technologies in providing quality education to children with special needs in inclusive classrooms.
- To find out the benefits of using Assistive Technologies for children with special needs in inclusive classrooms.
- To access the barriers in using Assistive Technologies and remedial strategies using assistive technologies.

3. Methodology: Document analysis method was employed.

Inclusive Education

According to UNICEF 2007, Inclusive Education is defined as a process of addressing the diverse needs of all learners by reducing barriers to, and within the learning environment. Inclusive education is a learning environment that promotes full personal, academic and professional development of all leaners irrespective of race, class, colour, gender, disability, learning style and language.

Assistive Technology

According to WHO's definition, 'an assistive product is any external product, specially produced or generally available, the primary purpose of which is to maintain or improve an individual's functioning and independence, and thereby promote their well-being'. Assistive technologies are used by people with disabilities for the purposes of performing functions that might not be possible or feasible in any other way. Mobility devices such as walkers and wheelchairs, along with hardware, software or accessories that assist persons with disabilities to use computers or other information technology may be part of assistive technologies.

Types of Assistive Technology

It may be important to note that not all the technologies are appropriate for all individuals. People have their own unique set of strengths, weaknesses, interests, experiences and special abilities. Therefore, a technology that may be a blessing for one purpose may be useless for another. It is therefore important to consider the type of individual, setting and task at hand when selecting an aid device. For children with different types of disability, the following assistive technologies shall be used.

4. Technologies for Students with Hearing Impairment

There are several technologies available to assist students with hearing impairments in educational settings.

- **Hearing Aids**: Hearing aids are electronic devices worn behind or inside the ear that amplify sound, making it easier for students with mild to moderate hearing loss to hear speech and environmental sounds.
- **Cochlear Implants**: Cochlear implants are surgically implanted devices that stimulate the auditory nerve, providing a sense of sound to individuals with severe to profound hearing loss. They can significantly improve speech perception and language development in suitable candidates.
- **FM Systems**: FM systems consist of a microphone worn by the speaker and a receiver worn by the student. They transmit the speaker's voice directly to the student's hearing aid or cochlear implant, reducing background noise and improving speech clarity, particularly in noisy environments like classrooms.
- **Assistive Listening Devices**: ALDs include devices such as personal amplifiers, loop systems, and infrared systems that enhance sound transmission and reduce background noise, making it easier for students with hearing impairments to hear and understand speech in various listening situations.
- **Speech To Text (STT) Software**: STT software converts spoken language into written text in real-time, allowing students with hearing impairments to read what is being said during classroom discussions, lectures, or group activities.
- **Visual Alerts and Vibrating Devices**: Visual alerts and vibrating devices notify students with hearing impairments of important auditory cues, such as fire alarms, doorbells, or timers, through flashing lights or vibrations.
- **Assistive Apps and Software**: Various mobile apps and software programs offer features specifically designed for individuals with hearing impairments, including speech recognition, text messaging, note-taking, and communication support tools.

By incorporating these technologies and accommodations, educational institutions can create inclusive learning environments that cater to the needs of students with hearing impairments.

5. Technologies for Students with Visual Impairment

Technologies for students with visual impairments aim to enhance access to information, facilitate learning, and promote independence.

- **Screen Readers**: Screen readers are software programs that convert digital text into synthesized speech or Braille output. They allow students with visual impairments to access and navigate digital content, including websites, documents, and applications.
- **Screen Magnification Software**: Screen magnification software enlarges on-screen content, making it easier for students with low vision to read text, view images, and navigate graphical interfaces on computers, tablets, and smartphones.
- **Refreshable Braille Displays**: Refreshable Braille displays are tactile devices that convert digital text into Braille characters, allowing students who are blind to read and interact with electronic content in Braille format.
- **Optical Character Recognition (OCR) Software**: OCR software converts printed text into digital text, enabling students with visual impairments to access printed materials by scanning and converting them into accessible electronic formats.
- **Voice Recognition Software**: Voice recognition software allows students to control computers, dictate text, and navigate software applications using spoken commands, providing an alternative input method for students with visual impairments or physical disabilities.
- **Accessible Learning Management Systems**: Accessible learning management systems offer features such as screen reader compatibility, keyboard navigation, and customizable display settings to ensure that students with visual impairments can access and participate in online courses and educational materials.
- **Electronic Braille Notetakers**: Electronic Braille notetakers are portable devices equipped with Braille keyboards and refreshable Braille displays, allowing students to take notes, write assignments, and access electronic content in Braille format.
- **Audio Description and Descriptive Video**: Audio description provides verbal narration of visual elements in videos, films, and multimedia presentations, enabling students with visual impairments to understand visual content through audio descriptions of scenes, actions, and settings.
- **Assistive Apps and Tools**: Various mobile apps and assistive technology tools offer features such as text-to-speech, object recognition, color identification, and navigation assistance to support students with visual impairments in daily tasks, educational activities, and mobility.

By leveraging these technologies and accommodations, educational institutions can create inclusive learning environments that empower students with visual impairments to fully participate in academic activities and achieve their educational goals.

6. Technologies for Students with Locomotor Disabilities

Assistive technology for students with locomotor disabilities aims to support mobility, communication, and access to educational materials.

- **Mobility Aids**: Mobility aids such as wheelchairs, walkers, crutches, and canes help students with locomotor disabilities move around independently and navigate their environment.
- **Adaptive Seating and Desks**: Adaptive seating and desks provide ergonomic support and adjustability to accommodate students' specific needs, promoting comfort and proper posture during class activities.
- **Assistive Technology for Computer Access**: Adaptive computer peripherals and software tools enable students with limited mobility to access computers and electronic devices. This may include alternative keyboards, mouse alternatives (e.g., trackballs, joysticks), switch access systems, and voice recognition software.
- **Accessible Transportation**: Accessible transportation services and vehicles equipped with ramps, lifts, and securement systems ensure that students with locomotor disabilities can safely travel to and from school and other educational activities.

- **Accessible Restroom Facilities**: Accessible restroom facilities equipped with grab bars, accessible sinks, and toilet accommodations ensure that students with locomotor disabilities can independently manage their personal care needs at school.
- **Assistive Apps and Tools**: Various mobile apps and assistive technology tools offer features such as task management, note-taking, communication support, and accessibility enhancements (e.g., voice commands, text-to-speech) to help students with locomotor disabilities stay organized, communicate effectively, and access educational resources.
- **Physical Therapy and Rehabilitation Equipment**: Physical therapy and rehabilitation equipment may be provided on-site or through referral to support students' ongoing mobility and functional independence, including adaptive exercise equipment, orthotics, and assistive devices for activities of daily living.

By leveraging these technologies and resources, educational institutions can create inclusive learning environments that empower students with locomotor disabilities to fully engage in academic activities, pursue their educational goals, and thrive in their studies.

7. Technologies for students with learning disabilities

Technologies for students with learning disabilities are designed to support their cognitive processes, compensate for challenges, and enhance learning experiences.

- **Text-To-Speech (TTS) Software**: These tools can convert written text into spoken words, helping students who struggle with reading or comprehension.
- **Speech-To-Text (STT) Software**: Conversely, STT tools allow students to dictate their thoughts verbally, which are then transcribed into written form. This can be beneficial for students with dyslexia or other writing challenges.
- **Mind Mapping Software**: These tools help students organize their thoughts visually, which can be especially helpful for those with attention deficit disorders or difficulties with traditional outlining techniques.
- **Adaptive Learning Platforms**: These platforms use personalized learning algorithms to tailor educational content to each student's individual needs and learning style.
- **Graphic Organizers**: These visual tools help students organize information, making it easier to understand and retain complex concepts.
- **Audiobooks and Podcasts**: Listening to audiobooks or educational podcasts can provide alternative ways for students to access content and engage with learning materials.
- **Virtual Reality (VR) And Augmented Reality (AR):** These immersive technologies can create interactive learning experiences that cater to diverse learning styles and provide hands-on learning opportunities.
- **Sensory Tools**: For students with sensory processing disorders, tools such as noise-canceling headphones, fidget toys, or sensory-friendly learning environments can help reduce distractions and improve focus.
- **Educational Apps and Games**: There are many apps and games designed specifically to support students with learning disabilities, covering a wide range of subjects and skills.

It's important to note that the effectiveness of these technologies can vary depending on the individual needs of each student, so it's essential to assess and customize the tools to meet each student's unique requirements. Additionally, ongoing support and training for both students and educators are crucial for successful implementation.

8. Benefits of Using Assistive Devices

Assistive Technology makes children with disabilities to be more independent, productive and included in the society and community life. The benefits of assistive technology were first recognized by Congress in 1988 when it passed the Technology-Related Assistance for Individuals with Disabilities Act (Public Law 108-446), as amended in 1994 (also known as the Tech Act). Congress reiterated its intent to enable students with disabilities to be included into society through technology by incorporating the Tech Act definition of assistive technology into the disabled students Individual Education Plan (IEP) (Sagstetter, 2002).

Enhance Academic Achievement: Assistive Devices enhance participation and achievement of students with disabilities in their educational programs. Assistive Devices fulfils the needs of students with disabilities in academic areas like reading, writing, spelling and math.

Makes the Child Independent: Assistive technology devices are only the beginning of a long road to independence, not the end (Fleisch, 1989). With the help of Assistive Technology children with significant disabilities can increase

their meaningful participation across school, home, work, and community settings. According to Levin and Scherfenberg (1990), technology is the gift our generation can give to many children and adults with significant disabilities. Technology can increase access to new experiences, new activities and new environments, bridging the gap imposed by a disability.

Augmentative Communication: Students with severe expressive communication impairments have difficulty in communication with peers and adults within their environments. Many of these students need a means of supplementing their communication skills. These students frequently use augmentative communication technology. Various devices like object-based communication displays, picture communication boards and books, talking switches, voice output communication devices and computer-based communication devices helps speech impaired children.

Interact in Educational or Social Environment: Assistive technology enhances the chances for students who have a wide range of physical and intellectual disabilities to be more autonomous and interact in educational or social environments. Through assistive technology equipment learners can learn specific social and educational tasks in the least preventive setting.

Helps in Social Development: Assistive technology helps the disabled students in their social development. In most cases, these students find it hard to connect with their normal peers, making it difficult for them to make friends and hence face isolation and sometimes depression. Thus, it helps in developing self-determination, self-advocacy and independent living skills.

9. Barriers to Use Assistive Technology in Inclusive Classrooms

Lack of Teacher Training: In developing country like India, there is no provision of providing training to the teacher for the use of AT in inclusive classrooms. There are limited opportunities for teachers to learn appropriate strategies for selecting, purchasing, evaluating and customizing AT devices. Many teachers have limited knowledge of the most basic AT devices. In a survey of 405 teachers, only 19% believed that they had adequate AT training (Derer et. al., 1996). Even the teachers who have pursued formal training in the area do not believe that they have the skills to use the technology effectively. Students with Learning Disabilities are not able to utilize, select the ATs in inclusive classrooms. In order to enable teachers to understand the functioning of the system, appropriate training should be provided. Workshops or in service training programmes must be organised. Administrative support is necessary in this regard. Formal preservice training programmes should be improved. Knowledge regarding AT should be given to the prospective teachers.

Attitudinal Barriers: The greatest barrier to the use of AT in inclusion classes is identified as attitudinal barriers. They are reflected in misconceptions, stereotypes, fear from unknown, resistance and lead to isolation of children with disabilities. Teachers themselves have been observed to be unwilling to support the use of AT in their classes. Consequently, assistive technology cannot easily be used by students with learning disabilities. Thus, Teachers themselves should be encouraged to use assistive technology in their classes, and experimentation with new educational trends also needs to be allowed.

Lack of Funding for AT Devices: For students and teachers, AT equipment is very expensive. AT requires a great deal of money to buy and maintain it. In order to achieve academic independence and success, ATs assist students with disabilities. The funding for assistive devices is provided by a number of NGOs and financing agencies. Liaisons with agencies or service providers who can assist students in acquiring the necessary technology to improve learning should be set up.

Lack of Awareness: Many people with disabilities and their families have limited awareness of assistive products and services. The knowledge of what aids are available or suitable and how they may be useful for children and their families is therefore not easy to obtain.

Inaccessible Environment: The barriers to assistive technology are physically or cognitively inaccessible environments. Physical barriers include stairs and poor lighting, while cognitive barriers include texts that are unclear or symbols that are difficult to understand. In addition, a child will not be able to use a wheelchair in an inaccessible house, road or school, regardless of the cost or availability of a wheelchair.

10. Remedial Strategies Using Assistive Technology

The aim of inclusive education is to ensure that all students, including those with disabilities or special needs, have a meaningful opportunity to learn and participate in the same educational activities as their peers. In the context of the use of assistive technology in inclusive education settings, here are some specific remedial strategies.

- **Individualized Assessments**: To identify the specific needs, strengths and preferences of each student in relation to assistive technologies by conducting a comprehensive assessment. The choice and configuration of suitable instruments can be guided by that information.
- **Universal Design for Learning (UDL):** Implement principles of UDL to design inclusive learning environments that accommodate diverse learning styles and abilities. Utilize assistive technology tools that offer multiple means of representation, engagement, and expression.
- **Inclusive Classroom Environment**: Create an inclusive classroom environment where assistive technology is seamlessly integrated into daily instruction and activities. Encourage peer support and collaboration to promote acceptance and understanding among all students.
- **Teacher Training and Professional Development**: Provide ongoing training and professional development opportunities for educators to enhance their knowledge and skills in using assistive technology effectively. Offer support and resources to help teachers overcome any barriers or challenges they may encounter
- **Gradual Integration**: Introduce assistive technology gradually, allowing students time to familiarize themselves with the tools and build confidence in their use. Provide opportunities for guided practice and reinforcement as needed.
- **Family Engagement**: Involve families in the assistive technology planning process and provide resources and training to support their involvement in their child's education. Foster open communication and collaboration between home and school settings.
- **Continuous Evaluation**: Regularly evaluate the impact of assistive technology on student learning and participation. Solicit feedback from students, educators, and other stakeholders to identify areas for improvement and make adjustments as needed.

By implementing these remedial strategies, educators can effectively leverage assistive technology to promote inclusion and support the diverse learning needs of all students in inclusive education settings.

11. Conclusion :

Assistive Technology has been a missing link in the chain of prerequisites that enable the children with disabilities to lead a life where they enjoy and exercise their rights rather than being deprived of them. Assistive technologies allow children with disabilities to stand on their own. They ensure that children with disabilities have full participation in all aspects of their everyday lives. They contribute to the development of confidence, self-determination and ability to interact socially. According to the child's needs, teachers can adapt their guidance easily. Let's say that AT is a blessing for children with disabilities.

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