



Assistive Technology: Tools for Teaching Children with Special Needs

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Abstract:

Assistive technology (AT) serves as a crucial tool in facilitating the educational journey of children with special needs. This paper explores the significance and efficacy of various assistive technology tools in enhancing the learning experiences of students facing diverse challenges. By providing an overview of the principles underlying assistive technology implementation, the paper delves into the ways in which AT addresses the unique needs of children with disabilities, including but not limited to physical, cognitive, sensory, and communication impairments.

The abstract highlights the role of assistive technology in fostering inclusive education environments where children with special needs can actively participate and thrive. It discusses the wide array of AT tools available, ranging from simple adaptations to complex devices, and their applicability across different educational settings. The paper examines case studies and research findings that demonstrate the positive impact of assistive technology on academic achievement, social integration, and overall well-being of students with disabilities.

Moreover, the abstract emphasizes the importance of collaboration among educators, parents, therapists, and assistive technology specialists in identifying, implementing, and evaluating appropriate AT solutions tailored to individual needs. It underscores the need for ongoing training and professional development to ensure effective utilization of assistive technology tools in educational practices.

Keywords: *Children with special needs, Assistive Technology, 21st Century technologies*

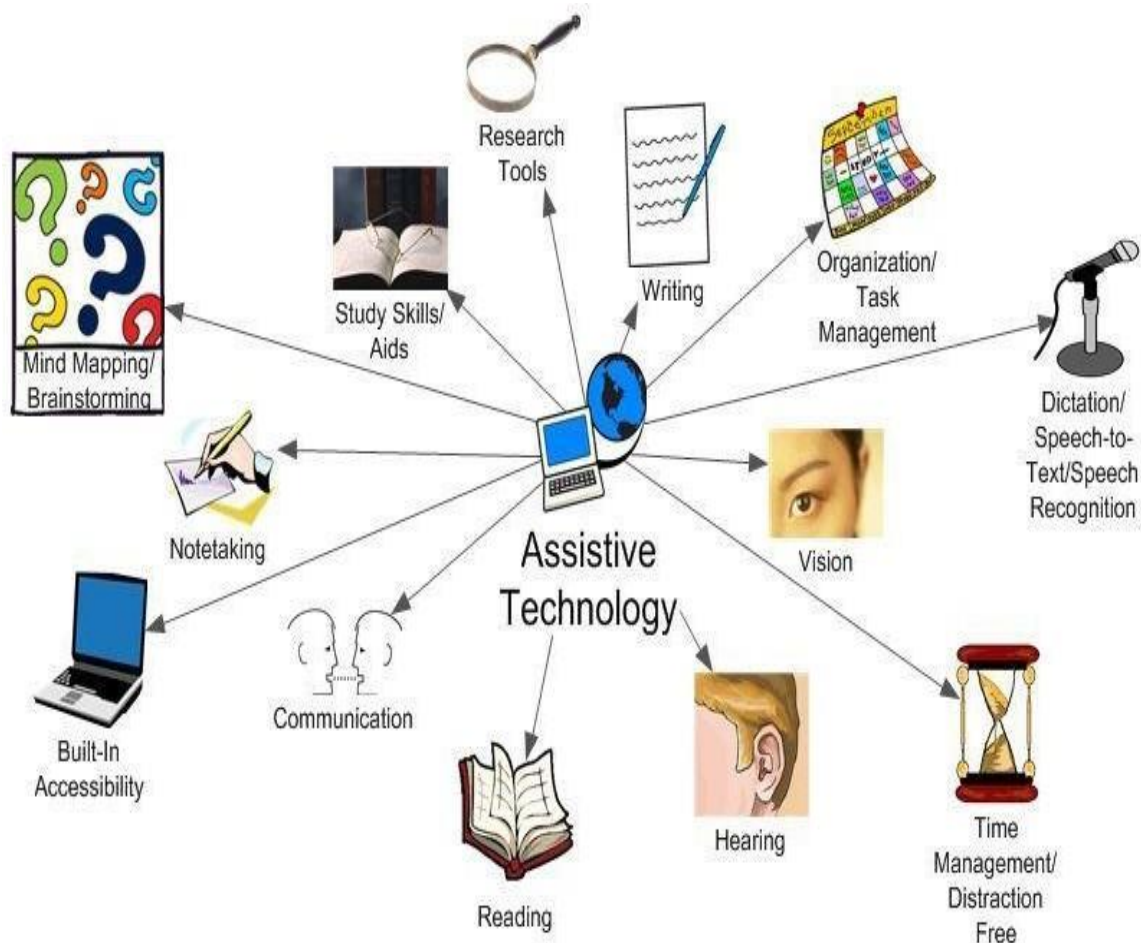
1. Introduction

The field of Assistive Technology over the past three decade has been growing by leaps and bounds from slides, film strips and overhead projectors to current 21st century technologies, such as 3D simulations and virtual reality.

2. Assistive technology

Assistive Technology consists of devices and services. An Assistive Technology device is an item or piece of equipment that helps a person with a disability increase, maintain or improve a student's functional capabilities.

Assistive Technology devices can be high-tech or low tech. Examples of Assistive Technology devices are



- Wheelchair or wheelchair ramp.
- Voice-activated computer.
- Telecommunication device.
- Electronic note takers and cassette recorders.
- Large-print books.
- Word prediction, voice recognition and synthesis, and word processing software.
- Switches and controls for access to equipment.
- Tactile materials for visually impaired students, such as Braille flashcards, pegboards for teaching shapes or spatial relations, manual and electronic Braillewriters, and adaptive paper that provides extra visual or tactile feedback such as raised-line paper.
- Pencil grips
- Hearing aids

Generally, Assistive Technology falls in to three categories:

1. **LOW- TECH:** Technologies that don't involves complex electronics or specialized software are considered low- tech. Some examples include graphic organizers and a pencil-grip.
2. **MID-TECH:** Mid-tech Assistive Technologies enhance another technology's performance. Examples includes screen magnifiers, adapted switches and talking calculators.
3. **HIGH-TECH:** Assistive Technologies are considered high-tech when they're stand - alone technologies that enhance performance.

Examples includes keyboard and mouse alternatives, word prediction programs and text-to-speech software



3. Myths about Assistive Technology for Learning Are

1. The first myth is assistive technology is used only by students with special needs. It is not true only students with special needs assistive technology. Assistive technology can enhance quality of learning for all students from preschool to higher education.
2. The second myth is about cost of assistive technology that it is expensive and countries with low resources cannot afford them.
3. The third myth assistive technology is highly advanced technology. But in reality, assistive technology is an application of basic engineering technology for learning.

4. Justification

The researcher opted this topic because the researcher wanted to create awareness about these assistive technologies for helping students as well as teacher and parents to use these tools for teaching children with special needs.

- Assistive Technology helps children with special needs students to learn by doing, by feeling, by touching etc.
- Conducive learning environment in classroom.
- Globally, more than 1 billion people need one more assistive product.
- With an ageing global population and a rise in non-communicable disease, more than 2 billion people will need at least 1 assistive product by 2030.
- Today, only 1 in 10 people in need have access to assistive products.
- Assistive Technology is essential to maintain and improve functioning, reduce need for caregivers and rationalize costs.
- Assistive Technology helps people work around their challenges and succeed in their studies.
- Assistive Technology it makes teacher and students capable of using new technologies for teaching CWSN.

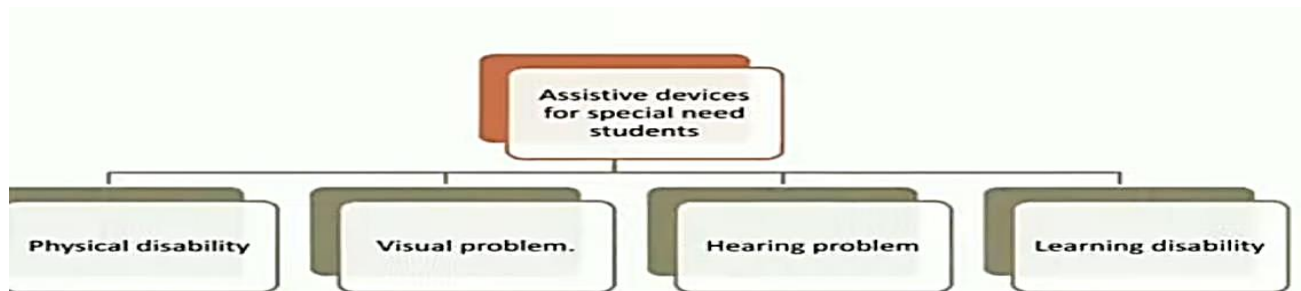
5. Educational Significance

- **Enhancement academic achievement:** Academic achievement helps the students in gaining knowledge in a better way which indirectly enhance their academic achievement.
- **Flexibility:** knowledge about assistive technology make a teacher flexible to change their teaching methods as per the needs of CWSN.
- **Child become independent:**As the child's academic achievement increase the child develops confidence and boosts up the self - esteem and become confident of being independent.
- **Social development:** as the child become independent, he starts interacting with the people of society which leads to social development of CSWN.

6. Assistive Technology Tools for Childrens with Special Needs

Assistive technology (AT) is available to help individuals with many types of disabilities — from cognitive problems to physical impairment. This article will focus specifically on AT for individuals with learning disabilities (LD).

The use of technology to enhance learning is an effective approach for many children. Additionally, students with Learning disability often experience greater success when they are allowed to use their abilities (strengths) to work around their disabilities (challenges). AT tools combine the best of both of these practices.



7. Assistive device for physically impaired children

Assistive technology is also helpful for physical impairment support. For example, Jordan is a fifth-grade student who loves all kinds of sports. However, Jordan rarely gets to participate in athletics because he has a physical disability that limit his movements.

1. **Key guards** - A key guard is a thin plate that is placed above the keys on the normal keyboard.It helps the person to type easily.
2. **Book Holder** - It is used to hold the book properly.
3. Disabled people can't hold books, Magazines properly. So, they used a book holder that help them to read and write.
4. **Large size keyboard** - It is really beneficial for disabled people. With this they can types the words easily and do their work.
5. **Page Turner** - This is helpful for the children who have problem in their hands. Page turner can easily turn over the pages and one can easily read.
6. **Lap board** - It used as a substitute of table. It can be easily kept at the lap and one can place books on it. Cushion is placed on one side of it.

8. Assistive Device for Visually Impaired Children

1. **Large Print Material** - For visually impaired children large printing is to be done. That helps the person low vision.
2. **Magnifying Lens** - It is a hand lens that is used to magnify the image of an object. It produces enlarged image of text and help visually impaired children.
3. **Tape Recorders** - With the help of tape recorders teachers can record their lessons and these are presented before visually impaired children.

4. **Talking Dictionary** - It is a revolution for visually impaired children. If they want to know a particular meaning, they can speak up the words and get their meaning.
5. **Braille** - It is a coding system that is used to teach languages to the individuals. Information is written in dotted form. One can read it with fingers.

9. Assistive Device for Hearing Impaired Children

1. **Use of Charts / Flashcards** - Charts, Flashcards are used to teach the students. As they can't here. So, they can learn by reading or analyzing the pictures.
2. **Power Point Presentation** - It also help to teach students. Here series of still images are used to inform the children about the content.
3. **Educational Materials** - It is used in primary classes. Different materialistic things are used to teach by the teachers.
4. **Visual Displays** - Various types of visual displays are used to inform the students about the content. Projectors, Smart classes, Computers are used for it.





10. Assistive Device for Children with Learning Disability

1. **Puzzles and Blocks** - Different learning material is used by the teacher to inform the children about different things and to give them concrete understanding.
2. **Clay Modeling** - It is the best activity used by teachers to teach students. Here students make different objects by hands.

Examples of Assistive Technology

Category	Examples of assistive technology
Mobility	Walking stick, Crutch, walking frame, Manual and powered wheelchair, Tricycle Artificial leg or hand splint, Clubfoot, Brace corner chair, Supportive seat, standing frame adapted cutlery and cooking utensils, Dressing stick, Shower, Toilet seat, feeding robot.
Vision	Eyeglasses, Magnifier, magnifying software for computer, White cane, GPS-based navigation device, Braille system for reading and writing, A screen reader for computer, Talking Book Player, Audio Recorder and player Braille chess, Balls that emit sound.
Hearing	Headphones, Hearing aid, Amplified Telephone, Hearing loop.
Communication	Communication cards with texts, Communication boards with letters, Symbols or pictures, electronic communication device with recorded or synthetic speech.
Cognition	Task lists, Picture schedule and calendar, Picture – based instructions, Timer, Manual or Automatic reminder, Smartphone with adapted task lists, schedules, Calendars, Audio recorder, Adapted toys and games.

11. Mobile Applications

Categories	Apps
<p>Dyslexic Learner</p> 	<p>Augmented 11y Jolly phonics Dashboard Dyslexia Learn Letters Speaking Dictionary Read 2 Me Happy Math Eye games OCR Read Me</p>
<p>Autistic Learners</p>	<p>Autism Speech Sequencing Language and Cognitive Therapy for children for children MITA Tal to me 100 Lite – Autism Symbol Talk- ACC Autism Help Visual Schedule Talker and Social Stories</p>
	<p>Autism Read and write</p>
<p>Visually Impaired</p> 	<p>Speech notes – Speech to Text Eye D- for Visually Impaired Tap Tap See Talking Calculator Cash Reader; Bill Identifier Read to me Visor – Low Vision Magnifier Be My Eyes – Helping the blind Smart Braille</p>
<p>Writing Difficulties</p> 	<p>Writing the alphabet Word Magic Spell Write and Read Writing Wizard Kid Handwriting</p>

1. Dyslexia-friendly reading app

Augmentally is an Augmented Reality (AR) app that helps people with learning disabilities like dyslexia easily read signage, paper, and other material in the real world.

2. Jolly Phonics Lessons App

The Jolly Phonics Lessons App is a comprehensive app that provides daily lessons plans for each of the 42 letters sounds. It provides teachers with easy to follow plans enabling them to deliver lessons, which embed the key skills that children need to master for reading and writing.

3. Speaking Dictionary

A talking dictionary is a device or program that provides spoken pronunciations of words in addition to the normal information provided by dictionaries. In some cases, such dictionaries also speak the definitions, synonyms, and other information.

12. Autistic Learners Autism Speech Sequencing ZApps

Helps Autistic child narrate a story, improve memory speech communication skills. Sequencing is the first fun step to narrative speech, something most Autistic children struggle with. This App grew out of Special Education Kindergarten classroom curriculum, where he was cutting and pasting the sequences onto paper. For my son, I wanted to make it colorful, fun and full of audio and visual feedback to help him and then other children in his classroom learn sequencing, and take turtle steps towards speech and communication.

Repetition of sequences builds a child's brain connections:

1. Logical next connections: this leads to narrative speech.
2. Time concepts--- first, second, third, fourth, last
3. Teaches logic.
4. Teaches recollection.
5. Improves memory.
6. Focuses on cognitive visually immersive tasks that will build the synaptic connections in the brain.

For children on the Spectrum, Autistic, speech delayed, impacted by Asperger's or verbally challenged, making connections can be difficult. Attention deficit and sensory overload can make focusing difficult. Here immersive colorful images entice challenged children to play and play will help to strengthen synaptic connections and increase speech and communication.

13. Language Therapy for Kids - MITA

Autism Therapy with MITA is an app designed to help children with autism learn using pivotal response treatment, a type of therapy for autistic children. MITA stands for "mental imagery therapy for autism" and uses puzzles to improve childhood development, attention, language, and visual skills, according to the app makers. It's available for both iOS and Android and is free to download and install.

14. Symbol Talk -ACC Talker

Symbol Talk is an augmentative and alternative communication (AAC) system, designed to make communication boards for any use.

Symbol Talk designed for those whose physical or mental condition does not allow them to speak for themselves, For example, people with Autism, Asperger's or anyone on the autistic spectrum, Down Syndrome, ALS, apraxia, stroke, etc.

15. Visual Schedules and Social Stories

Visual Schedules and Social Stories is a visual support app focusing on Visual Schedules and Social Stories. The app focuses on using social stories and visual schedules to improve socially appropriate behaviors in children with autism. It's a virtual visual support app to assist children with autism and

communication challenges at home, school and the community. The app replaces the traditional visual supports that can be cumbersome, time consuming, costly to create and limited in function.

16. Technology as a caring friend for Blind and Visually Impaired.

Eye -D for visually impaired

Eye-D builds innovative solutions for the blind and Visually Impaired (VI). These solutions act as a true companion, helping them achieve independence in 3 major areas – Learning, Identification and Navigation.

TapTap See, app for visually impaired people

TapTapSee is a mobile phone app designed specifically for blind people. The app uses the device's camera and screen reader features to photograph objects and identify them aloud to the user.

In TapTapSee, the user double-taps the device screen to photograph any two- or three-dimensional object at any angle and have it analyzed and defined in seconds.

Cash Reader Bill Identifier

Best money reading app for blind and visually impaired. Point your phone's camera at almost any banknote in the world and hear the value instantly.

Visor- Low Vision Magnifier

Visor is a low vision magnifier app for iPhone, iPad, iPod touch and Android that turns your smartphone and tablet into a fully featured magnifier for visually impaired people. For better reading in low light environments, simply turn on the LED flash light.

Be My Eyes- Helping the Blind

Be My Eyes is a free smartphone app for iOS and Android. Be My Eyes connects blind and low vision users with sighted volunteers or company representatives for visual assistance through a live video connection. In more basic terms, it allows users to have a sighted person on demand through video chat. There is no limit for how often a user can access Be My Eyes, and the service is free to use.

17. Writing Difficulties

Word Magic

Word Magic is an excellent application for kids to have fun with words and their spellings and learn them.

Writing wizard kid handwriting

This brand-new app should be the go-to for every parent, teacher and therapist to work on handwriting”

Writing Wizard is designed to help every child learn how to trace letters, numbers, and words through a fun system carefully designed to maintain motivation.

18. Breaking Down Barrier

Dyslexia Awareness week runs from 3-9 October 2022. The theme this year is “Breaking Through Barriers”. This gives us the opportunity to recognize barriers faced by dyslexic people and celebrate their successes.

19. Explore helpful technology

Technology can help reduce some of the barriers students encounter when reading, writing and studying. Assistive technology available at UAL can help with:

1. Listening to text instead of reading it
2. Reducing visual stress when reading on screen
3. Finding the right words when you write
4. Improving your spelling and punctuation
5. Organising your thoughts and ideas.

20. Benefits of Assistive Technology for CWSN

The role of assistive technology in lectures is to provide avenues for students to actively take part in learning. Assistive Technology enhances the engagement and retention in learning in students, making it fun and less monotonous.

1. No one is excluded: The greatest benefit of assistive technology is that it ensures inclusivity for all individuals. Every person has an equal chance to participate in the technological advancements.
2. It facilitates comprehensive technology education: Assistive technology offers a method of teaching technology in a manner accessible to all.
3. Students can progress at their own pace: Learners with disabilities can navigate technology learning at their own speed, ensuring they grasp concepts without feeling pressured.
4. Individuals can achieve more independently: Those with disabilities can enhance their autonomy and accomplish more tasks individually through the assistance of technology.
5. It caters to diverse needs: Integration into mainstream classrooms benefits both students with disabilities and their peers.
6. Students can meet academic standards: With assistive technology, students find it easier to meet academic benchmarks, fostering better communication and comprehension.
7. Students have more opportunities for social interaction: Assistive technology enhances socialization opportunities for students, especially those with hearing impairments, enabling them to engage more fully with peers.
8. Improved organizational and writing skills: Technology aids students in honing their organizational and writing abilities, expanding their educational prospects.
9. Raises awareness: Assistive technology serves to raise awareness about disabilities, promoting greater understanding and facilitating easier lives for individuals with disabilities.
10. Fosters social connections: Assistive technology plays a pivotal role in fostering social connections among students, breaking down barriers and promoting inclusivity.

21. Limitations of Assistive Technology for CWSN

1. The majority of assistive technologies come with a hefty price tag: Many of these technologies are priced in the thousands of dollars, making them financially out of reach for numerous school districts.
2. Utilizing these technologies requires a significant time investment: Proper training is essential for both teachers and students to effectively use these tools, consuming valuable instructional time.
3. Dependence on technology can be unreliable: Given the inherent flaws in technology, there's always the risk of malfunctions occurring at critical moments, potentially causing significant disruptions.
4. Potential for misuse: With a plethora of assistive technologies available, some students may exploit their access to unnecessary tools.
5. High-cost factor: The specialized nature of assistive technology drives up the expenses associated with acquiring and maintaining the necessary equipment.
6. Training prerequisites: Extensive training is imperative for users to effectively operate assistive technology, requiring substantial investment of resources.
7. Space constraints: The substantial equipment required for assistive technology can pose challenges in terms of storage and space utilization.

8. Limited accessibility: Assistive technology remains a luxury that isn't universally accessible, leaving many individuals worldwide without the means to obtain the support they require.
9. Scarce ownership of AT equipment: Due to the prohibitive costs involved, not everyone has access to assistive technology, despite the widespread need for such tools.
10. AT usage can be cumbersome: Those unfamiliar with assistive technology may find it challenging to navigate and incorporate into their daily routines.

22. Suggestions

With the significant rise of assistive technology (AT), achieving a college education has become a tangible goal for numerous students with disabilities. There exists a vast array of AT tools designed to aid in overcoming learning obstacles, making the task of selecting the most suitable ones quite daunting. Many colleges have established dedicated offices to support students with disabilities by providing essential AT tools and the necessary training for their utilization.

It is worth noting that the utilization of AT significantly contributes to student achievement, albeit contingent upon the appropriateness of the AT to the individual's needs and the provision of adequate training on its usage. Familiarizing oneself with new AT options could enable colleges to make well-informed choices regarding available software and enhance the quality of tutorials provided to both staff and students, thereby maximizing the utility of various features.

23. Conclusion

Accessibility is a celebration of diversity, and a crucial factor in ensuring students' participation in the learning process. Access to information, awareness, mainstream education curriculum, learning materials, assistive devices and the necessary support services can help students with disabilities in learning at par with their non-disabled peers in the common classroom, breaking down all barriers which prevent them from having equal access to quality education.

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