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RESEARCH ARTICLE

INTEGRATING ASSISTIVE TECHNOLOGY INTO INSTRUCTIONAL STRATEGIES FOR LEARNERS WITH SENSORY DISABILITIES: A UNIVERSAL DESIGN FOR LEARNING APPROACH

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Abstract

This paper examines integrating assistive technology within the Universal Design for Learning (UDL) framework to improve educational outcomes for learners with sensory disabilities.UDLas an inclusive instructional strategy, accentuates providing multiple means of representation, expression, and engagement, thereby accommodating diverse learning needs. Incorporating assistive technology within UDL frameworks offers significant advantages, enabling students with sensory disabilities to access and engage with educational content more effectively. This synergy promotes academic achievements by providing customized support that transcends traditional barriers posed by sensory impairments. The paper highlights how assistive technology facilitates a seamless transition in service delivery, ensuring that learners with sensory disabilities receive equitable educational opportunities. By fostering an inclusive learning environment, the integration of UDL and assistive technology not only increasespupils' scholastic abilities but also supports their global development and empowerment within the educational system. This study underscores the critical role of innovative educational practices in promoting accessibility and inclusivity, ultimately contributing to the academic and personal growth of pupils with sensory disabilities.

Introduction:-

Universal Design for Learning is an instructive methodology that opens prospects for all pupils by utilizing advanced media and adaptable guidance to enable pupils to meet up with their educational objectives. It very well may be connected to the plan of learning encounters too. Assistive devices and technologies for visually and hearing-impaired people aim to expand vision, hearing and communication limits among those affected. Innovation, including those recently referenced including vision or amplifiers, prostheses, or inserts (cochlear inserts or bionic eyes), voice acknowledgment and control, contact/material innovation, sensor innovation, picture and information (visual or sound) acknowledgment, in particular encouraging access of print impaired people to distributed works, electronic incitement and specific programming/exceptional availability highlights of innovation items.

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Universal design for learning

Universal Design for Learning (UDL) is an educational approach that ensures all students have equal learning opportunities. At its core, UDL involves designing flexible learning experiences that cater to the diverse needs of individual learners. By implementing a UDL framework, educators create inclusive learning environments using adaptable methods, strategies, and materials, effectively supporting each student's unique learning requirements.It is only an instruction thing. It is an approach to associate each studentwith the learning background and a path to take a gander at discovering that is completely comprehensive and advances accomplishment for all students, paying little respect to ability. In this progression, we see Universal Design and its job in making equivalent open doors for differing students in the classroom.

Assistive devices and technologies are tools designed to enhance an individual's functioning, independence, and overall well-being. Their primary goal is to facilitate participation in daily activities while also preventing impairments and secondary health conditions. Common examples include wheelchairs, prostheses, hearing aids, visual aids, and specialized computer software and hardware that support mobility, hearing, vision, and communication. Despite their benefits, access to assistive devices remains limited, with only 5-15% of those in need in low- and middle-income countries having access to these essential resources.

"According to the World Health Organization (WHO), no person with a disability should be denied access to assistive technology, as it holds the potential to transform their lives into fulfilling and meaningful endeavors" (Metts, 2000).

Assistive Technology (AT)

Assistive Technology (AT) is defined in government legislation as any device, piece of equipment, or product system—whether commercially available, modified, or customized—that is used to enhance, maintain, or improve the functional abilities of individuals with disabilities. Examples of AT include wheelchairs, electronic communication systems, reachers, computer adaptations, walkers, and numerous other commercially available devices.

Sensory Impairment

Sensory impairment can significantly impact an individual's life, leading to emotional and psychological challenges. People with sensory impairments are more likely to experience depression, social isolation, and a loss of confidence and independence. Sensory impairment also places a strain on healthcare, social support systems, and economic resources for both individuals and society as a whole (WHO).

The term "sensory impairment" broadly refers to conditions such as deafness, blindness, visual impairment, hearing loss, and deaf blindness. Sensory impairment occurs when one or more senses—sight, hearing, smell, touch, taste, or spatial awareness—do not function normally. For example, wearing glasses indicates a visual impairment, while requiring a hearing aid signifies a hearing impairment. Importantly, an individual does not need to have a complete loss of a sense to be classified as having a sensory impairment.

Definition of Impairment:

"Any temporary or permanent loss or abnormality of body structure or function, whether physiological or psychological. An impairment affects functions that are primarily mental (such as memory and consciousness) or sensory, as well as internal organs (such as the heart and kidneys), the head, trunk, or limbs." (WHO).

Types of Sensory Disabilities

Blindness:

Visual impairment refers to partial or complete loss of vision that cannot be corrected with glasses or contact lenses. Partial blindness means having limited vision, while total blindness means the individual cannot see anything, including light.

Deafness:

Deafness is the complete loss of hearing in one or both ears. It is classified as a severe hearing impairment, typically defined as an average hearing threshold of 81 dB or greater at frequencies of 0.5, 1, 2, and 4 kHz.

Visual Impairment

Visual disability, otherwise called vision weakness or vision misfortune, is a diminished capacity to see to a degree that causes issues not fixable by regular methods, for example, glasses. Some additionally incorporate the individuals who have a diminished capacity to see since they don't approach glasses or contact focal points. Visual impedance is frequently characterized as a best amended visual sharpness of more terrible than either 20/40 or 20/60.The term visual deficiency is utilized for complete or about complete vision loss. Visual weakness may cause individuals troubles with ordinary day by day exercises, for example, driving, perusing, mingling, and strolling.

Hearing Impairment

Hearing disability, or hearing misfortune, happens when you lose part or the majority of your capacity to hear. Different terms that are utilized to allude to hearing debilitation are hard of hearing and in need of a hearing aide. Hearing debilitations are ordered as far as the seriousness and sort of hearing weakness. The seriousness of the consultation hindrance is classified dependent on the base sound that can be heard with your better ear. The higher the decibel (dB), the more intense the sound.

Deaf blindness

Hard of hearing visual deficiency alludes to a kid with both hearing and visual handicaps. Hearing and visual weaknesses, the mix of which causes such serious correspondence and other formative and instructive needs that they can't be suited in a specialized curriculum program exclusively for youngsters with deafness or kids with visual deficiency."

Characteristics of Sensory Impairments:

1. **Cognitive** 1. Powerlessness to perform fundamental scholarly assignments 2. Trouble in performing the utilitarian fundamental abilities
2. **Communicate** 1. The trouble with communicating in language (nonverbal in certain cases) 2. Constrained jargon
3. **Behaviour** 1. Shows low disappointment resistance 2. Trouble in exhibiting age-proper conduct 3. Shows issues in acclimating to change 4. Shows self-stimulatory practices, for example, body shaking, a fascination with light and hyperactivity 5. Shows unseemly practices in contacting and smelling objects as well as individuals
4. **Physical** 1. Trouble with ecological portability 2. Trouble with vision 3. Trouble with hearing 4. Trouble with physical ambulation (engine issues/orthopaedic issues/cerebral paralysis) 5. Showcases seizure action 6. Trouble with eating 7. Trouble with gut as well as bladder control 8. Trouble in overseeing self-care

Universal design for learning in Instructional Methodologies:

- Working out in the Digital Age
- Research tells us about Beginner Differences
- The Need for Flexible Instructional Media
- Using UDL to Establish Clear Goals
- Leveraging UDL to Support the Learning of Every Student
- Applying UDL to Effectively Assess Student Progress
- Turning Universal Design for Learning into a Reality

The term "rehabilitation technology" refers to the methodical utilization of advancements, building methodologies, or scientific principles to address the issues of and address the boundaries stood up to by people with disabilities in the training of education, rehabilitation, employment, transportation, living independently, and amusement. The term incorporates recovery building, assistive technology devices, and assistive technology services. In general, the collection can be divided into three key concepts:

1. Restorative Technology for Vision/Hearing
2. Assistive Technology for Vision/Hearing
3. Enhancement Technology for Vision/Hearing

Assistive technology for sensory impairments can be partitioned into the accompanying six classes:

1. Instructive Devices
2. Portability Devices

3. Professional Devices
4. Everyday Living Devices
5. Low Vision Devices
6. Mental Tests for Vocational Assessment and Preparing

The assistive device and technologies are:

- Handheld or Stand Magnifier
- Slant Board for Bringing Materials Closer While Working
- Colour Overlays for Improved Contrast on Printed Materials
- Bold-Lined Paper for Easier Writing Alignment
- Bold Marker for Writing
- Calculator with Large-Print Display
- Digital Recorder
- Computer with Screen Magnification Software
- Smartphone or Tablet
- Video Magnifier
- Braille Writer

Refreshable Braille display

- Slate and stylus
- Raised-line paper for writing or graphing
- Signature guide used to position a pen when signing one's name
- Calculator with voice output that speaks what is on the screen
- Digital recorder
- Talking dictionary
- Computer, Smartphone, or tablet with screen reading software
- Audio book player
- Wireless Hearing aids
- Infrared (IR)
- FM
- Induction Loop
- Televised announcements
- Sound field amplification systems
- Interactive white boards

Teachers should begin by conducting a thorough assessment of learning media for students with visual impairments before selecting any medium for instruction. It is essential to prioritize the preferences of these students when choosing appropriate materials, ensuring their comfort and engagement. Understanding the unique needs of each student is also crucial, as teachers should offer ample opportunities and experiences with various learning media to foster effective learning. Additionally, teachers should focus on developing proficiency in both Braille and computer skills, including the use of screen reader software, to equip students with the tools they need for future success.

Conclusion:-

The level of technology accessible today there's the possibility to build the availability of training for students with sensory disabilities. Now and again, such understudies can take an interest in figuring out how to a similar degree as some other individual. The wide assortment of assistive innovation in global level executions permit picking the arrangement that fits better a specific student.

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