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Auditory Habilitation of Children with Hearing Impairment

Varsha Gathoo* & Smita Pais**

Children with hearing impairment (without additional handicaps) can perform any task as their typical hearing counterparts, except 'hear' the way the latter do. As there are discrepancies in performance of a task within typical children, there also exist discrepancies in learning styles and achievement in children with hearing impairment. However, certain enabling provisions can facilitate equal or greater opportunities for participation of these children in the educational programmes and truly make these programmes more beneficial and inclusive.

Technological innovations in the present millennium have brought about remarkable advancements and achievements in prevention, detection, identification and intervention of hearing loss at a very young age. It is possible to screen neonates and assist them with amplification devices within the very first few weeks itself. It is also possible to bridge the gap between identification and intervention, so that optimum utilisation of the critical period of the child's development can take place. 0-3 years is especially considered important for the development of language and speech faculties of children. Developments in these areas are vital not only for the development of communication skills, but also for education per se.

Acquisition of verbal language is an auditory phenomenon and there are research-based evidences to prove that longer the deprivation of stimulation to the auditory system, more the auditory brain growth will be 'stunted'. In fact, not only do the auditory centres not grow, the existing pre-wired auditory tracts can also degenerate. The fact is that the human brain is most sensitive and the neuro-plasticity is maximum till 3.5 years of age. It has therefore, time and again been envisaged to start caring and educating children

...the new concept of school readiness puts more onus on the parents/caregivers and teachers of young children to make them ready for school. The idea is to make children ready to learn, so that when they enter the formal school in grade/ standard I, they are equipped with the emergent skills and are ready to acquire the imparted content knowledge in schools.

at a very young age. Pioneers promoting the concept of Early Childhood Education have therefore been emphasising the need to start early and provide a stimulating environment for all-round development of a child. Further to this, the new concept of school readiness puts more onus on the parents/caregivers and teachers of young children to make them ready for school. The idea is to make children ready to learn, so that when they enter the formal school in grade/ standard I, they are equipped with the emergent skills and are ready to acquire the imparted content knowledge in schools.

Does readiness to learn for children with hearing impairment differ from that of typical children? The answer to it is – 'the developmental domains remain the same across all children except the manner and the way it is developed'. There is a need to open small gateways to input and make use of 'learning windows' in child's development. Children with hearing impairment also need to go through the same

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developmental stages of cognition, literacy, socio-emotional maturity, etc., but they need assistance and support to compensate for the diminished hearing ability. If this aspect is restored, it provides them an access for 'learning windows' and develop as their 'hearing' counterparts.

Advancement in technology of amplification devices in the form of digital and programmable hearing aids and the more sophisticated state of the art like the cochlear implant is perhaps the greatest gift of technology to children with hearing impairment. These devices have enabled such children to obtain maximum acoustic neurological benefits and, most importantly, access to verbal language through listening. It is important to mention here that there is a vast difference in accessing verbal language through listening vs. verbal language through speech reading (reading lips). Not all characteristics and components of spoken language are visual and hence the verbal language acquisition through observing is incomplete and so the child's expressive language sounds deficient. As against this, children who acquire verbal language through listening, receive or perceive all the features of a spoken language, so also the acoustic features of speech. Hence, their speech intelligibility improves drastically.

According to Flexer (1999), 'it is critical to note that as human beings are neurologically-wired to develop spoken language and reading skills through the central auditory system, most people think that reading is a visual skill, but recent research on brain mapping shows that the primary reading centres are located in the auditory cortex'. Hence, congenitally deaf children, who have had little access to auditory input at a young age, tend to encounter difficulty in developing reading and academic skills.

It is crucial to know that though access to auditory stimulation is most desirable, it may still not yield the desired results, if it is not aptly supported by an effective intervention programme. Educational intervention programmes differ in the way they emphasise the 'use' of particular modality(ies). There are currently two broad approaches to interventions for children with hearing impairment - Visual and Auditory. The visual approach utilises the manual mode of communication and the auditory approach makes use of the residual hearing capacity and enhances it. There is a third and a mixed approach of Total Communication, which combines visual and auditory input to the language development and intervention.

Children with hearing impairment need to go through the same developmental stages of cognition, literacy, socio-emotional maturity, etc., but they need assistance and support to compensate for the diminished hearing ability. If this aspect is restored, it provides them an access for 'learning windows' and develop as their 'hearing' counterparts.



The auditory approach further branches into:

- Auditory-Oral Approach, and
- Auditory-Verbal Approach.

Though the two approaches may sound similar in terms of use of audition and spoken language as a goal, there is a fundamental difference between the two approaches and hence a great difference in the implementation and the output between the two.

Auditory-Oral Approach

It is carried out in a traditional classroom setting and there are, in fact, schools, bracketed as 'oral schools'. Children in such oral schools are grouped for instructions for a day long programme and hence, the onus of success naturally lies on the trained teacher.

Auditory-Verbal Approach

As against the above approach, the Auditory -Verbal Approach is a highly structured, goal oriented individualised programme where the goal is to place and support children for mainstream education. Auditory Verbal Approach acknowledges the fact that 'listening' and not mere 'hearing' is essential for children. The learning to listen is integrated in the daily routine activities of a child and hence it calls for parent/caregiver empowerment. They are considered as primary agents and are central to the intervention programme

of the child. The Auditory-Verbal Approach calls for an explicit commitment on the part of parents and certified professionals for audiological management and development of verbal language. This approach adheres to a strong developmental framework and acknowledges that the child needs highly enhanced auditory and language inputs to achieve his/her potential.

Ideally there are no schools for Auditory-Verbal therapy and there are, in fact, habilitation/therapy centres. Attendance for an auditory verbal programme may be once or twice a week on a one-on-one basis during the pre-school years. The therapy sessions are designed for optimum parental participation in the child's education. Each session is diagnostic as it assesses the progress level of the child and his/her parents. Children are diagnosed early and learn to use their amplified hearing or their cochlear implant to listen and monitor their own voices and understand the spoken language. There are no separate curricula for Auditory-Verbal Therapy and it encourages and follows the natural language and speech development. The parents and the therapist encourage the child to integrate hearing, language and spontaneous speech for cognition and integrate it into the child's personality. Once the child moves to a regular school, the Auditory-Verbal therapy programme usually is for monitoring the regular school curriculum.

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The Sondag System – A Hope for Children with Reading Problems

Geet Oberoi*



The Sondag System is a programme for teaching reading and spelling, using multi-sensory, structured, systematic phonics. It was developed by Arlene Sondag of the Academy of Orton Gillingham Practitioners and Educators (AOGPE). It meets the standards outlined by The National Reading Panel, The National Institutes of Health and Human Services and No Child Left Behind in USA. It is a complete non-consumable system. The contents include:

- A Learning Plan Book with complete, explicit lesson plans for 5 pre-reading levels and 36 reading levels.
- Video instructions to provide accurate sounds of letters and combination of letters. This enables teachers to see student demonstrations and teaching strategies.
- Word Book lists organised by families for introducing new sounds and mixed lists for essential review and practice.
- Flash cards, games and manipulatives to enhance instruction.
- Mastery tests after every third level to evaluate the progress and guide the pace of instruction. Phonological and phonemic awareness is emphasised at the pre-reading levels.

The Sondag System is ungraded and may be used for students of any age for whom reading and/or spelling skills are at or below 4th grade. It is focused on teaching phonics, phonemic awareness and fluency, and provides an important pre-requisite to comprehension—the ability to read words, phrases and sentences efficiently.

The Sondag System – Learning to Read, a curriculum for teaching the code, was written to provide a reading programme that can be implemented quickly. Based on the Orton-Gillingham Approach, it includes a systematic, easy-to-follow design, and a video tutor that significantly reduces training time for teachers, aides, parents, etc. The tools and strategies of this design enable teachers to deliver immediate and meaningful instructions.

The following components are included in the Sondag System:

Phonological Awareness

This is the ability to play with language by rhyming, isolating the beginning or ending sound of a word, deletion and substitution of parts of a word into syllables. Print is not involved.

* Director – Orkids

Phonemic Awareness

This means understanding that words and syllables are made up of speech sounds which are represented by alphabetic symbols or letters.

Systematic and Explicit Phonics

This entails direct instruction in the sound-symbol correspondences, with practice reading and spelling sounds in isolation, in the context of words, and in sentences.

Spelling

This implies teaching consonant sounds and clusters, vowel spellings, syllables, affixes and the rule base needed for correct use. Spelling strengthens concepts and skills needed for reading.

Multi-sensory Reinforcement

This is a practice using three pathways of learning through eyes, ears and the sense of touch. A student simultaneously sees the letter(s), hears the sound, feels how it is formed with his/her lips, tongue, and throat, and senses the form as the sound is traced or written.

Controlled Reading with Decodable Text

New sounds and spellings must be practiced in the context of words, phrases, sentences and paragraphs which emphasise those new sounds. Books written with controlled text are often less than inspiring but provide necessary practice of new material taught. Beginner readers should read a variety of text at appropriate levels.

Vocabulary

Adding new words, word definitions and practicing using those words appropriately should be built into reading programmes. Understanding new words comes faster to those with a well-developed vocabulary. Nothing increases vocabulary faster and more efficiently than reading.

Comprehension

The most important activity for increasing comprehension is reading itself, with increased practice. The very first step in developing reading comprehension is the ability to read words.



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Progress Testing

Regular testing, monthly or quarterly, using informal measures, will determine the progress in reading and spelling. Teachers, students and parents should know if there is growth or if an intervention is indicated.

For students who need to learn to read, spell and write in English, teaching the code of the language is the solution. Reading is talk written down in code form. By learning the code, students have the necessary tools to decode (read) and encode (spell) words. Teaching the sound-symbol



connection, blending sounds into words for reading, segmenting words into sounds for spelling, and learning the basic rules will integrate reading and spelling instruction. Combined with multi-sensory practice, this, integrates learning into long term memory. Learners trace letters to reinforce shapes, names and sounds. When spelling words, students are encouraged to break each word into its phonemic elements or sounds to make the phonemes recognisable and to ensure correct sequencing of sounds. Learners assign one

sound to each finger and then spell the sequence of sounds to create a word. This is called finger counting, finger spelling, finger tapping, Touch Spelling and by various other descriptive titles.

English language learners, especially those who have learnt to read and write in their mother tongue, are searching for the code of English. Knowing the code leads to accurate pronunciation, reading for decoding and fluency, and precise spelling that enhances communication skills.

Based on the Orton-Gillingham philosophy—a sequential, systematic, multi-sensory, and cumulative way of teaching the structure and code of the English language—the Sondag System is appropriate for all ages and skill levels. These methods rely on repetition and logic to drive home the lesson. This programme offers step-by-step instruction that helps the students to master one skill before tackling the next. These techniques incorporate touch and vision as well as auditory elements.



Students need beginning instruction in systematic, explicit phonics. Sound cards are used to help build mastery and fluency and manipulative skills for controlled reading provide practice to the reader in mastering an important skill. Spelling is taught in conjunction with reading. When teaching a phonic approach with a spelling component, multi-sensory practice hones the skills needed to read fluently with good comprehension and communication through writing.

Based on the Orton-Gillingham philosophy—a sequential, systematic, multi-sensory, and cumulative way of teaching the structure and code of the English language—the Sondag System is appropriate for all ages and skill levels. These methods rely on repetition and logic to drive home the lesson. This programme offers step-by-step instruction that helps the students to master one skill before tackling the next. These techniques incorporate touch and vision as well as auditory elements. The curriculum ensures that every student has

the skills and the confidence to succeed in and out of the classroom. The Sondag System gives students a solid foundation upon which they can build a thorough understanding of reading, writing and vocabulary.

Because every student has different needs, there are no pre-conceived timelines or paths of progression. The process begins with a free evaluation to assess the student's skills and to tailor a plan accordingly. The student is then placed with other students at the same skill level which is generally one school grade higher or lower. Each student receives an individual lesson plan, and the instructor/teacher constantly monitors student progress through teacher observation and formal evaluations every four months. The instructors rely on their own assessments, as well as feedback from teachers, parents and the students themselves, to determine the level of success achieved. Some students may reach their goals within months; others take years.

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Role of ICT for Differently Abled Children: An Imperative for Inclusive Technology, Digital Diversity and Inclusive Education

By Swati Chakrabarti *

Article 24 of the UN Convention for the Rights of Persons focuses on the right of persons with disabilities to education. In realising this Right, the Convention states:

- (a) Persons with disabilities are not excluded from the general education system on the basis of disability, and that children with disabilities are not excluded from free and compulsory primary education, or from secondary education, on the basis of disability;
- (b) Persons with disabilities can access an inclusive, quality and free primary education and secondary education on an equal basis with others in the communities in which they live;
- (c) Reasonable accommodation of the individual's requirements is provided;
- (d) Persons with disabilities receive the support required, within the general education system, to facilitate their effective education;
- (e) Effective individualised support measures are provided in environments that maximise academic and social development, consistent with the goal of full inclusion.

Launching the UN initiative to standardise information and communications technology (ICT) for People With Disabilities (PWDs), Kofi Annan, Ex-UN Secretary-General said, "Access to ICT creates opportunities for all people, perhaps none more so than persons with disabilities" (December, 2006,). But the reality of the situation is that ICT is often created without regard to people with disabilities, creating unnecessary barriers to hundreds of millions of people and strengthening the digital divide on the basis of availability, accessibility and affordability of ICT.

"Perhaps no other field allows for the inclusion of persons with disabilities into society as do ICTs"

Mr. Sha Zukang, United Nations Undersecretary-General.



* Co-ordinator ICT, IICP

Therefore the need of the hour is to create universal accessibility, a drive to develop inclusive technologies or technology for 'ALL'. Universally accessible technology yields great rewards to the typical user; while at the same time it caters to the need of the users with special needs – by providing a universal design which is both good, and easily accessible.

Even though India is in the forefront of developments in the field of ICT, very little effort is given to the development of technologies to assist persons with disabilities (who make up 2.13% of the population) to become independent within their abilities. The issue of creating inclusive technology in the context of 'The Persons with Disabilities Act', passed by the Government of India in 1995, that stresses the rights to access, to communicate, to be educated and to be included in the society, needs to be considered.

ICT Initiatives in the Indian Institute of Cerebral Palsy (IICP)

The challenge faced by children with cerebral palsy, neuro-motor and communication disabilities, is the provision of 'reasonable accommodation' that can facilitate their education in an inclusive setting- a challenge that is further compounded by attitudinal, social and economic barriers. This article focuses on how an NGO has worked towards addressing this issue by developing technology that is inclusive. It focuses on the strategies used in creating an 'environment' that is conducive to inclusion for people with cerebral palsy and complex communication needs.

Indian Institute of Cerebral Palsy (IICP), is a Non-Government organisation (NGO), recognised by the Ministry of Social Justice & Empowerment, Govt. of India, and a specialist resource centre for cerebral palsy. IICP has 31 years of experience in service delivery, research and training and has focussed on inclusion using assistive technologies to empower access, education, communication, vocational training and leisure skills. It uses a variety of methodologies, initiatives and intervention strategies to mitigate the problems of children suffering from neuro-motor disorders and multiple disabilities and to include them in the mainstream education.

IICP recognises the role of ICTs in assisting children and adults with multiple neurological disorders. ICT is playing a major role in the lives of people with multiple disabilities



and complex communication needs by providing support in many ways. The approach at IICP has been to develop pragmatic, affordable, easy to use, flexible, and inclusive techniques, which respond to the users' individual and contextual needs. This has led to the establishment of a National Resource Centre for Augmentative and Alternative Communication (AAC) that aims to maintain, display, demonstrate and develop alternative and inclusive technology resources that support and augment inclusion. At present, 176 children and adults receive ICT input at the IICP.

Inclusive Technology

Responding to the educational needs of children with cerebral palsy and complex communication needs, IICP experimented with various strategies to see how inclusion could be successfully implemented. Based on its experience IICP has



come up with a model of inclusion which includes the following primary strands:

- a) Placing children in mainstream school provided it is least restrictive for the student.
- b) Participating in activities alongside other schools on an equal platform.

“Before I started using computers seriously I was somewhat frustrated – I had to discontinue my studies, I could not express myself in my own language as I wished to do and I was lacking in self-confidence while talking to strangers. The opportunity of using ICT has changed my attitude altogether, it has made me more demanding and hopeful in general. It has encouraged me to take up my studies again...” says Barsha Bhattacharya a young woman with cerebral palsy and complex communication needs and who uses a wheelchair.

- c) Training teachers on the principles and methods of inclusive education.
- d) Opening certain IICP services to disadvantaged non-disabled persons through its National Institute of Open Schooling (NIOS) Centre and providing ICT infrastructure with proper access facilities for successful inclusion.

The key hindrance in placing students with disabilities in mainstream schools is lack of accessibility. Accessibility in different areas of education can be effectively improved with ICT input with special hardware and software adaptations which are not yet available in the schools. IICP has participated in activities with mainstream schools in various competitions, workshops and social functions. About 1300 teachers have been trained in different districts of West Bengal in the year 2007-08. The most successful inclusion is through opening up services to non-disabled persons. Provision of appropriate assistive technology has facilitated inclusion in the NIOS Centre. More than 300 students are being trained in the Centre at present. Barsha Bhattacharya, a young woman with cerebral palsy and complex communication needs, who uses a wheelchair states her experience, *“Before I started using computers seriously I was somewhat frustrated – I had to discontinue my studies, I could not express myself in my own language as I wished to do and I was lacking in self-confidence while talking to strangers. The opportunity of using ICT has changed my attitude altogether, it has made me more demanding and hopeful in general. It has encouraged me to take up my studies again...”*

Deepak Ghosh, another student of the Centre, who uses a wheelchair and has complex communication needs uses his toes to access a keyboard and mouse with special adaptations, has passed higher Secondary with 1st Division and has completed high-end courses in computer studies from the vocational training centre of IICP. Deepak says, *“I can’t imagine my life without computers! How could I study and get good marks without using ICT? I dream to be a web designer after I finish graduation...”*

Low Tech Methods that work: Communication Display Boards

IICP has initiated pioneering steps for the development of communication display boards, and culturally appropriate picture symbols to meet the wide range of communicative needs for users with complex communication needs. This

Indian Picture Communication Symbols for Communication



- A Software to navigate a library of 1960 picture symbols and make communication displays
- Text can be incorporated in any language
- Phrases can be designed
- Scope to add new categories / symbols

includes people with cerebral palsy, aphasia, ataxia, autism, strokes, spinal and brain injury, throat cancer and other neuro-motor problems. These displays can be used extensively because these are versatile, non-expensive and easily made. The picture symbols can be extensively used by people with low literacy abilities. Obviously it is very important that these symbols relate to the environment of the persons interacting, which could not be met by commercially available ICTs of the west. This need culminated in the development of the software *Indian Picture Symbols for Communication* (IPSC) to enable facilitators to replicate linguistically and culturally appropriate symbols to plan and produce communication displays for AAC users. Text can be typed in any language, as required, on the top of the picture symbols if the font for the language is available in the computer. The displays can be printed or saved for later use. A teaching manual with demonstration software is also available for IPSC. There are 1956 symbols in colour.

ICT Solutions

IICP offers advanced software solutions to assist differently abled people with interactive learning mechanisms and alternative intervention strategies. The primary focus of IICP is to develop:

- Multimedia educational tools
- Language prediction and processing tools
- Communication hardware - Voice output communication aids.

Webel Mediatronics Limited (WML), in compliance with

the standards and requirements of IICP, has developed a multi-media based educational software called Information Technology for Cerebral Palsy (ITCP). ITCP is developed for users representing different cognitive levels and range from simple software to reinforce basic concepts, early literacy and numeracy skills to writing with picture icons. Digitised speech is attached to the icons for auditory feedback. Switches and hardware interface have been indigenously developed to facilitate indirect access for people who cannot use a regular keyboard or mouse.

Simple adaptation of the regular mouse helps students with access problems to use commercially available multimedia software and proves to be important for inclusion in normal pre-primary and primary levels. Access switches have been indigenously designed by IICP and are low in cost and thus easily affordable. The switches facilitate inclusion in mainstream pre-primary and primary levels. A regular mouse can be adapted by making two connections at its sides to attach switches. A press of the switch will then be equivalent to a click of the mouse. This is again a low-cost strategy for inclusion. An easy solution is to use power-point presentations. Lessons, picture-stories or talking books can be developed in MS Power-point and the students can access the presentation using either the spacebar or with an adapted mouse. These switches can also be used to play various electrical gadgets and toys.

Shikshak

This is a more complex software with auto-generated programmed learning which has text-to-speech output in Indian languages. Also adaptive hardware interface with indigenous switches has been developed. IICP collaborated with IIT Kharagpur for R & D of this software. The software helps the teacher to develop teaching material and lessons for different levels of students. These lessons are multi-media based (with attractive graphics animation) and interactive. Multiple-option exercises based on the topic can be auto-generated randomly and the student can access these with switches. This software is extremely beneficial for inclusive education at the primary level.

Sanyog

This is a language prediction and processing based software has been developed to facilitate language development and communication skills for users with multiple disabilities and



complex communication needs. IICP has collaborated with Indian Institute of Technology, Kharagpur, to develop this software, which won a national award this year. Sanyog helps the user to pick up picture icons with word-inflections and auto-generates syntactically and semantically correct messages and produces synthesised speech output in the vernacular. Visual soft keyboard with text-to-speech and intelligent word prediction provided with the software is the first of its kind in India. It has an easily accessible opening menu and hardware interface to facilitate access. A visual mouse emulator to access the entire desktop area and facilitate web accessibility has also been developed.

Voice Output Communication Aids

(VOCAs) are effectively used to minimise discrimination against non-speaking people across a range of disabilities by providing facilities for enhanced literacy learning and communication. VOCAs can be used to provide an auditory feedback and compensate for spelling difficulties and to provide a teaching tool for language development for all children in regular schools and inclusive educational settings. These devices can be used to give lectures, deliver a speech, for chatting or for planned conversation. Two entry-point digitised speech based devices 'Kathamala' and 'Gupshup' have been developed over the last couple of years. The devices are low-cost, and easy to use and maintain. A talking album

'Gupshup Book' for children or adults with severe learning difficulties and a scanning device for people with severe access problems are in the pipeline. These devices are excellent teaching tools and can be used for all children, while these are crucial for children with complex communication needs. Lessons can be planned and messages can be recorded in these devices. The students can then easily use the device in classroom situations to answer objective type questions, participate in group activities, recite poems and sort the lines of a poem in the correct order, fill in the blanks and many other activities and exercises. A laptop computer, loaded with communication software, can be an ideal voice output device for people who can afford it.

The Need of the Hour

There is an urgent need for indigenous research and development of inclusive technology in India. This can be achieved only through a positive and thoughtful attitude towards developing technology for 'ALL'. To make it available to students, so that the advantage of using technology reaches them, the ICT tools must be included in the Assistance to the Disabled Persons (ADIP) scheme to universalise education. The potential for using supportive technology goes beyond people with disabilities, as it can be considered to be a lifeline for them. Only this can make inclusion a reality.





Universal Design for Learning

*By Dr. Anupriya Chadha**

The goal of every student is to learn, but not every child learns in the same way. Children with disabilities may have an especially difficult time with traditional classroom materials. Today, teachers teaching CWSN compensate for variation among their students by adapting how they present information, structure assignments, and test for understanding. In the future, the adaptations may be built into the curriculum materials. This opportunity has been provided due to the Universal Design for Learning (UDL). UDL uses computer technology to create an educational environment that allows all students, including those with learning disabilities, to succeed in general education classrooms with minimal use of assistive technology (AT).

Universal Design for Learning was a term coined by the Centre for Accessing Special Technologies (CAST). UDL includes Universally Designed Instruction (UDI) as well as the concept of universally designed curriculum (UD) and Universal Design in Assessment (UDA). Each of these concepts deals with the idea that education, in general, should be designed upfront for access by all students, irrespective of the curriculum, the instructional strategies, or the method of assessment. CAST found that the principles of universal design could be effective in developing useful educational tools.

* Senior Consultant: IE - SSA.

“Universal” does not imply a single optimal solution for everyone. Instead, it is meant to underscore the need for multiple approaches to meet the needs of diverse learners. UDL mirrors the universal design movement in architecture and product development. Think of speakerphones, curb cuts, and close-captioned television—all universally designed to accommodate a wide variety of users, including those with disabilities. Embedded features that help those with disabilities eventually benefit everyone.

The concept of Universal Design first appeared in education in the design of school buildings; however, creative educators quickly realised that these principles could also be applied to the design of curriculum and to classroom pedagogy. Universal Design has its roots in architecture and urban planning. Ramps, automatic doors, and curb cuts were created to provide access to people with physical disabilities but actually ease access for everyone. UDL embraces the concept of improved access for everyone and applies it to curriculum materials and teaching methods. Rather than relying on AT to bridge the gap between the material and the student’s learning needs, materials designed using UDL concepts have built-in accommodations. Add-on technology is less often needed to translate the material into a mode that enables learning.

In today’s schools, the mix of students is more diverse than ever before. Educators are challenged to teach all kinds of learners to attain high standards, yet a single classroom may include students who struggle to learn for reasons, such as:

- Learning disabilities such as dyslexia
- English language barriers
- Emotional or behavioural problems
- Lack of interest or engagement
- Sensory and physical disabilities

The beneficiaries of Universal Design in education include:

- Students with special needs, including those with disabilities.
- Students having English as the second language.
- The general population of students, all of whom will benefit from the application of Universal Design principles.

Teachers want their students to succeed, but a one-size-fits-all approach to education simply does not work. How can teachers respond to individual differences? UDL provides a blueprint for creating flexible goals, methods, materials, and assessments that accommodate learner differences. “Universal” does not imply a single optimal solution for everyone. Instead, it is meant to underscore the need for multiple approaches to meet the needs of diverse learners. UDL mirrors the universal design movement in architecture and product development. Think of speakerphones, curb cuts, and close-captioned television—all universally designed to accommodate a wide variety of users, including those with disabilities. Embedded features that help those with disabilities eventually benefit everyone. UDL uses technology’s power and flexibility to make education more inclusive and effective for all.

A definition of Universal Design, as applied to education, is: *It is an approach to designing course instruction, materials, and content to benefit people of all learning styles without adaptation or retrofitting.* Universal design provides equal access to learning, not simply equal access to information. Universal Design allows the student to control the method of accessing information while the teacher monitors the learning process and initiates appropriate methods, if required.

Although this design enables the student to be self-sufficient, the teacher is responsible for imparting knowledge and facilitating the learning process. It should be noted that Universal Design does not remove academic challenges; it removes barriers to access. Simply stated, Universal Design is just about good teaching.

Principles of UDL

UDL stretches beyond accessibility for the disabled. A teacher’s goal is to ensure that students learn skills and understand the subject. Traditional curriculum materials tend



to offer only limited flexibility for meeting that goal — often requiring students to adapt to the curriculum. Universally designed curriculum overcomes such limitations by incorporating the following three principles of flexibility into the design:

- Multiple methods of presentation
- Multiple options for participation
- Multiple means of expression

Multiple means of representation to give learners various ways of acquiring information and knowledge.

Multiple means of expression to provide learners alternatives for demonstrating what they know, and

Multiple means of engagement to tap into learners' interests, challenge them appropriately, and motivate them to learn.

This built-in flexibility provides a wider range of options for students to choose from — meaning the curriculum adapts to the student, rather than the other way around. This article will consider each of these principles and the impact they could have in a classroom.

Multiple Methods of Presentation

Flexibility in presentation allows the same concepts to be taught using a variety of methods, media, or materials. Some suggestions in this regard are:

- Content could be presented using multiple media, such as oral lectures, textbooks, charts or diagrams, audio tapes, and videos.
- The same content could be changed from one medium to another, such as oral output for students with reading difficulties or pictures and illustrations for students who need visual images.
- Materials would have adjustable presentation characteristics — changeable font style and size, highlighting of main concepts, or variable volume and speed controls.
- Material could be adjusted to match the students' cognitive styles. For example, students who prefer sequential, factual information might learn a history lesson from a timeline-style presentation. Students who learn better with a base of broader concepts might choose to have the same lesson presented from a big picture, or



cause-and-effect perspective, with dates and facts filled in later.

Multiple Options for Participation

Since one task or teaching method may engage and motivate some kids but bore or frustrate others, UDL allows flexibility in the manner in which students interact with the material. It also lets teachers tailor the level of difficulty of assignments, ensuring that each student is sufficiently challenged while meeting the overall goals of the lesson. In a classroom setting, this would be something like this:

Curriculum materials in an electronic format are the cornerstones of UDL and offer a great deal of flexibility. Electronic materials can be used on and manipulated by computers, making it easy to alter content to meet the needs of different students. Variations in presentation can make the same text more accessible to all students, especially those with learning disabilities.

- Students would choose their preferred method of learning new material. One child might learn vocabulary by playing a game in a race against the clock; another might create stories or even artwork to incorporate the new words.
- Content would be tailored to match a child's interests. For example, the principles of mathematics could be taught using topics ranging from hockey to horses.
- Materials would provide extra support where students need it. For reading practice, independent readers could read silently from a book. Students needing more support might read computer-based stories where they could click on a troublesome word to hear it pronounced or have the entire text read aloud.
- Materials might have adjustable challenge levels, such as educational computer games with several levels of difficulty.
- Materials might allow students to add their own words, images, or ideas, such as reading software that encourages learners to customise the stories or illustrations.
- Assignments could be varied according to each child's skills. If the goal of a project is to learn research skills, more advanced students might be required to produce a longer report or cite more references. Students with less developed research skills might gain as much from creating a report using fewer references to cover a limited number of key points.

Multiple Means of Expression

With UDL, students are not limited to one way of completing assignments. Instructors can match the curriculum to each child's strengths. An ideal situation would be one in which:

- Assignments would be accepted in various formats. A student who finds written expression difficult might show his/her knowledge orally; another might turn in a report, write a play, or develop a project to demonstrate learning.
- "Paper and pencil" exercises could become "computer and printer" exercises for students who are slowed down by the physical effort of writing, or for any student who prefers to use a keyboard.

UDL in the Classroom

- To create a UDL environment in general or special education classrooms, teachers need materials and methods that incorporate these three principles. Curriculum materials in an electronic format are the cornerstones of UDL and offer a great deal of flexibility. Electronic materials can be used on and manipulated by computers, making it easy to alter content to meet the needs of different students. Variations in presentation can make the same text more accessible to all students, especially those with learning disabilities. For instance, a social studies text in electronic format:
 - Can be read aloud using screen reading software (useful for students with reading problems)
 - Can include dialogue, music, sound effects, and video clips (helpful to students who learn through more sensory involvement)
 - Can be changed to different print sizes, colors, spacing, or highlighting (helpful for students to see and remember)
 - Can be printed as a personalised copy (helpful for most students)
 - Can be copied and pasted into outlining or graphic organisers (particularly useful for students who find organising information difficult).
- If traditional textbooks bog your child down, discuss using a video documentary, audio tapes, or computer programmes that cover the same material.
- If your child is struggling to complete an assignment, talk to the teacher about alternate ways to make him/her show what s/he has learnt — such as creating a website, preparing a slide show, presenting an oral report, building a model, etc.
- If a particular subject fails to spark your child's interest, try relating it to something s/he is interested in or is passionate about.

However, to meet Universal Design principles, educational processes should:

- Be accessible and fair.
- Provide flexibility in use, participation, and presentation.
- Be straightforward and consistent.
- Be explicitly presented and readily perceived.
- Provide a supportive learning environment.
- Minimise unnecessary physical effort or requirements.
- Ensure a learning space that accommodates both students and instructional methods.

Everyone has a somewhat different way of seeing and interacting with the world. Mild and moderate brain differences affect the way we learn (i.e., the way children need learning input- methods; need to engage in learning-materials and activities; and need to provide output of learning – response). Built-in flexibility in the design of curriculum, instruction, materials, and acceptable student response is paramount to quality education. This is exactly what UDL offers and if used effectively in classrooms can greatly improve student learning.

Strategies that Follow UDL Principles

Even with or without computer-based curriculum materials, you can work with your child's teachers to apply UDL principles to his/her schoolwork. These accommodations are just a few that keep the focus on material to be learnt, rather than on the method of presentation or format of response, and offer choices to students. The following strategies can be effectively employed:



A Report on the National Workshop on Inclusive Education in SSA



The national workshop on “*Promoting Inclusive Education Through Convergence*” was held in Ahmedabad- Gujarat from 19th – 20th June, 2008. The first day was devoted to technical presentations by the resource persons. The second day mainly concentrated on visits to IE related intervention sites, technical sessions by eminent NGOs and an open session. About 70 participants from 30 States/UTs participated in the workshop.

The main objectives of the workshop were:

- To update data on various aspects of IE from different States
- To expose the participants to developing inclusive practices in schools
- To share some of the best practices adopted for the visually impaired
- To inform the participants on the resource material available for the visually impaired

- To apprise participants about the teaching of children with visual impairment
- To visit inclusive schools under SSA enrolling blind children.

The workshop started with Ms. Meena Bhatt, SPD-Gujarat, SSA welcoming all the participants to the workshop. This session was followed by a presentation by Dr. Anupriya Chadha, Sr. Consultant-IE on the progress and issues in inclusive education. This was followed by a session on Good Practices in Gujarat. The SPD mentioned the initiatives taken by her state in IE. The State has identified 75608 CWSN, out of which 62411 are enrolled in schools. The State has conducted assessment camps with the help of NGOs and has provided assistive devices to 34531 CWSN. The State has also developed 232 resource rooms at the block level, with the help of which 10,000 CWSN are being benefited. Residential camps and bridge courses are also organised for CWSN. Vocational Training imparted to more than 600 CWSN in making various items

like vaseline, balm, detergent powder, incense stick, tailoring, etc. Students were taught various vocational skills as per their family background. NGOs are used for the assessment camp, RBCs, teacher training, vocational training and community awareness. The State also provides concessions to CWSN during exams and also provides scholarships and escort allowance to CWSN in collaboration with different schemes. The State has also conducted VEC training. The State plans to:

- Conduct workshops on evaluation techniques and tele-conferences
- Train ECCE workers / AIE balmitras
- Provide home-based education
- Give large print books to children with low vision.

STATE-WISE PROGRESS

Progress on Inclusive Education

1. Andhra Pradesh

- 176344 CWSN identified and 146944 enrolled. 4712 CWSN covered through AIE and 6273 CWSN covered through home-based education.
- 140639 CWSN provided aids and appliances.
- 52 NGOs involved in the IE programme.
- 218007 teachers have been provided 5-day training on IE. 633 trained through 45/90 day training.
- 650 resource teachers in place.
- 20653 schools made barrier free.

2. Assam

- 96929 CWSN have been identified and 52251, enrolled in schools. 6398 CWSN have been enrolled in EGS and 24349 are being covered through home-based education.
- 19924 CWSN have been provided aids and appliances
- 86824 teachers have been given five-day training on IE.
- 167267 teachers have been given training through the mass teacher training programmes and 1390 DIET/ BTC faculties trained through RCI foundation course.
- For barrier free access, 37659 schools and new school buildings are being equipped with ramps and handrails.



3. Bihar

- 313500 CWSN have been identified and 214374, enrolled in schools.
- 80225 CWSN provided aids and appliances.
- One day orientation programme has been organised for 160475 teachers.
- 3-day training given to 109167 teachers.
- 984 teachers have undergone three-month foundation course by RCI.
- 254 resource teachers appointed.
- 33246 schools have been provided with ramps.

4. Chhattisgarh

- 41672 CWSN have been identified and 38956, enrolled in schools. 193 CWSN being covered through home based education.
- 29968 CWSN provided aids and appliances.
- One day orientation programme has been organised for 62194 teachers.
- 3-day training given to 28491 teachers.
- 408 teachers have undergone three-month foundation course by RCI.
- 22 resource teachers appointed.
- 17761 schools have been provided with ramps.

5. Chandigarh

- 4809 CWSN identified and 4344 enrolled.
- 12 resource teachers appointed.
- 7 NGOs involved.
- The State has started teacher training on IE and 743 teachers given 3 day training, 157 teachers given 45-90 days training on IE.
- 35 schools made barrier free.

6. Daman & Diu

- 110 CWSN identified and 91 enrolled
- 11 CWSN provided assistive devices

7. Delhi

- 9800 CWSN identified and enrolled.
- 47792 teachers oriented through mass teacher training.
- 5049 CWSN provided assistive devices.
- 3611 schools made barrier free.

8. Goa

- 1696 CWSN identified, and 1544 enrolled.
- 4 NGOs involved.
- 61 teachers given 45/90 days training.
- 612 schools made barrier free.

9. Gujarat

- 75608 CWSN identified and 62411, enrolled.
- 1016 CWSN covered through EGS/AIE.
- 191044 general teachers have been provided orientation to IE issues in the 2-day mass teacher training.
- 117185 CWSN provided aids and appliances.
- 8835 teachers have been given 45/90 day training.
- 30192 schools have been provided ramps and handrails.
- 1206 resource teachers appointed.

10. Haryana

- 27275 CWSN identified and 20431, enrolled in schools. 6264 CWSN enrolled in EGS and 580 provided home-based support.
- 66000 general teachers have been provided orientation

to IE issues in the 2-day mass teacher training.

- 39625 CWSN provided aids and appliances.
- 42850 teachers have been given 5 day training.
- 9391 schools have been provided ramps and handrails.
- 70 resource teachers appointed.

11. Himachal Pradesh

- 25476 CWSN identified and 23011, enrolled. 24 CWSN are enrolled in EGS and 2045 provided home-based education.
- 9300 CWSN provided with aids and appliances
- 1092 teachers trained through the foundation course
- 19 NGOs involved
- 120 resource teachers appointed
- 6322 schools provided with ramps and handrails.

12. Jammu & Kashmir

- 34825 CWSN identified and 23080 enrolled
- 4547 CWSN provided with aids and appliances
- The State has provided 1-day training on IE to 15000 teachers. 1000 teachers have been given a 3-6 day orientation to IE
- 340 teachers trained through the foundation course
- 5 NGOs involved
- 2500 schools provided with ramps and handrails.





13. Jharkhand

- 45114 CWSN have been identified and 34893 are enrolled in schools. 95 covered through home-based education.
- 26420 aids and appliances have been provided.
- The State has provided 3-5-day training on IE to 9048 teachers. 42260 teachers have been given a 1-day orientation to IE in the mass teacher-training programme for the duration of 10-days.
- 350 resource persons have been trained through the RCI foundation course.
- 19 resource teachers appointed.
- 12396 schools made barrier free.

14. Karnataka

- 119110 CWSN identified and 97169 enrolled and 11473 covered through home-based education.
- 42776 CWSN provided aids and appliances.
- 195894 teachers oriented to IE through the 20-day refresher training.
- 15733 teachers oriented to IE for 5-days.
- 23720 teachers provided training through RCI foundation course.
- 606 resource teachers appointed.
- 54855 schools made barrier-free.

15. Kerala

- 142818 CWSN identified and 141630 enrolled in schools. 344 CWSN enrolled in EGS and 843 provided home-based education.
- 9 NGOs involved
- 20199 CWSN provided aids and appliances.
- 132000 teachers oriented to IE through the 20-day refresher training.
- 42536 teachers oriented to IE for 5-days.
- 408 resource teachers appointed.
- 13687 schools made barrier-free.

16. Madhya Pradesh

- 113023 CWSN identified and 98553 enrolled. 11553 CWSN are enrolled in EGS and 2917 provided home-based education.
- 53910 CWSN provided aids and appliances.
- 75204 teachers oriented to IE through the 20-day refresher training.
- 14466 teachers oriented to IE for 5-days.
- 3727 teachers provided training through RCI foundation course.
- 141 resource teachers appointed.
- 29222 schools made barrier free.

17. Maharashtra

- 398232 CWSN identified and 347932, enrolled. 40354 CWSN covered through EGS and 9946 through home-based education.
- 24 NGOs involved
- 83188 CWSN provided aids and appliances.
- 383082 teachers oriented to IE.
- 8446 teachers provided training through RCI foundation course.
- 938 resource teachers appointed.
- 58864 schools made barrier free.

18. Meghalaya

- 8842 CWSN identified and 6145, enrolled.
- 168 CWSN covered through home-based education.



- 4273 teachers trained through mass teacher training. 537 teachers provided 3-day orientation.
- 389 teachers provided training through 45/90 day foundation course.
- 2625 CWSN provided assistive devices.
- 481 schools made barrier free.

19. Mizoram

- 7196 CWSN identified, 4905 enrolled.
- 2196 teachers trained through mass teacher training.
- 1763 teachers provided 3-day orientation.
- 132 teachers provided training through 45/90 day foundation course.
- 893 CWSN provided assistive devices.
- 1217 schools made barrier free.
- 9 resource teachers appointed.

20. Nagaland

- 3560 CWSN identified, 2949 enrolled.
- 1862 teachers provided 3-day orientation.
- 3 NGOs involved
- 123 teachers provided training through 45/90 day foundation course.
- 471 CWSN provided assistive devices.
- 41 resource teachers appointed.

21. Orissa

- 138497 CWSN identified. Out of these, 116864 children are enrolled in schools and 2846 covered through home-based education. 6797 covered through EGS
- A total of 91286 aids and appliances have been provided to CWSN.
- 2053 teachers have been trained through foundation course.
- 108985 general teachers have been trained through mass teacher training programme.
- 98396 teachers have been imparted a 5-day training.
- 28365 schools provided with ramps and handrails.

22. Pondicherry

- 3125 CWSN identified. Out of these, 2892 enrolled in schools and 91 covered through home-based education.
- A total of 1559 aids and appliances have been provided to CWSN.
- 130 general teachers have been trained through mass teacher training.
- 266 schools provided with ramps and handrails.

23. Punjab

- 49283 CWSN identified and 24871 enrolled in schools and 1565 in EGS.
- 14700 CWSN provided assistive devices.
- 390 teachers provided training through 45/90 day foundation course.
- 2065 schools provided with ramps.
- 50 NGOs involved in the IE programme.
- 216 resource teachers appointed.

24. Rajasthan

- 261106 CWSN identified and 252125 enrolled in schools and 4975 enrolled in EGS.
- 12710 CWSN provided assistive devices.
- 3990 teachers provided training through 45/90 day foundation course.

- 58276 general teachers have been trained through mass teacher training.
- 60206 teachers have been imparted a 5-day training.
- 59115 schools provided with ramps.
- 90 NGOs involved in the IE programme.
- 172 resource teachers appointed.

25. Sikkim

- 710 CWSN identified, and 606 enrolled.
- 104 CWSN covered through home-based education.
- 62 schools made barrier free.

26. Tamil Nadu

- 118019 CWSN identified and 102636 enrolled in schools and 177 in EGS. 15206 CWSN provided home-based education.
- 69937 CWSN provided aids and appliances.
- 201604 teachers oriented to IE for 5-days.
- 34408 schools made barrier-free.
818 resource teachers appointed.

27. Tripura

- 3774 CWSN identified and 3534, enrolled in schools.
- 1334 CWSN provided aids and appliances.
- 17445 teachers oriented to IE through the 20-day refresher training.
- 4247 teachers oriented to IE for 5-days.
- 2098 schools made barrier-free.

28. Uttar Pradesh

- 269724 CWSN identified and 243098 enrolled in schools and 1819 covered through AIE.
- 152172 CWSN provided aids and appliances.
- 294049 teachers oriented to IE through the 20-day refresher training.
- 142330 teachers oriented to IE for 5-days.
- 448 teachers trained to IE through foundation course.
- 93249 schools made barrier-free.
- 1518 resource teachers appointed.

29. Uttarakhand

- 14103 CWSN identified and 11280, enrolled in schools and 423 in EGS. 1622 CWSN provided home-based education.
- 8361 CWSN provided aids and appliances.
- 28159 teachers oriented to IE through the 20-day refresher training.
- 10927 teachers provided 45/90 day foundation course.
- 6797 schools made barrier-free.
- 7 resource teachers appointed.

30. West Bengal

- A total of 199671 CWSN have been screened and 128548 have been enrolled in the schools and 9325 in EGS. 16350 being provided home-based education.
- 34707 CWSN provided aids and appliances.
- 147883 teachers have been provided intensive training on IE.
- 135981 teachers have been oriented to IE through 20-day training.
- 734 teachers provided RCI foundation course.
- 722 resource teachers appointed.
- 46421 schools have been provided with ramps.

TECHNICAL SESSIONS

Inclusion in the Indian Context: Prevailing Discourses

The first session was conducted by Dr. Anita Julka from NCERT. She started her presentation by stating that inclusive education offers an opportunity to restructure the entire school system with the particular reference to the curriculum, pedagogy, assessment and above all, the meaning of education. She then shared a case study on IE in a Kendriya Vidyalaya School. She touched upon the important parameters of IE like participation by CWSN, teacher training, peer support, etc.

She also mentioned that the accessibility of schools has to be seen both in terms of physical and pedagogical access. Some of the prevailing discourses on IE are:

- Inclusion of children with disabilities in education



reflects an approach based on individual pathology and not social pathology

- Although biology is no longer the only lens through which disability is viewed in law and policy, it continues to play a prominent role in determining programme eligibility, entitlements to benefits, and also influences access to rights and full social participation.
- A child's right to school is dependent on whether or not the child can access the school and participate in the classroom activities, rather than the obligation being on the school system becoming accessible to children with disabilities.

The stages for concept learning within the multi-grade and multilevel methodology are:

- Introduction of concepts
- Teacher Supported Groups
- Reinforcement through local materials, poetry, puppet shows, etc.
- Practice by using study materials
- Evaluation by self and by teachers

She concluded her presentation by mentioning that disability is a part of human diversity.

Developing Inclusive Practices in Schools

This presentation was followed by a presentation by Ms. Smriti Swarup, from SNDT University, Mumbai. She explained the classification of CWSN according to learning needs. Inclusion readiness comprises of:

- Attitudes
- Relationships
- Support for students
- Support for teachers
- Administrative leadership
- Curriculum
- Assessment
- Evaluation of self and programme
- Involvement of parents
- Community involvement

The most common needs observed in a class are:

- Language and Communication needs
- Academic Needs - Reading, Writing, Math
- Motivational Needs
- Personal and Social Needs
- Physical and loco motor needs

Special considerations while teaching CWSN, instructional programmes, corrective and remedial programmes, diagnostic

prescriptive teaching and including instructions were also discussed. Modifications in the general classroom and in the environment were also stated. The adaptations and modifications in the physical environment are:

- Walkways and ramps
- Doors and doorways
- Stairs and steps
- Flooring
- Playground
- Toilets

She explained that the inclusive teacher education programme should aim at:

- Addressing the individual needs of “All” children in a class
- Facilitating teaching – learning process
- Providing role model to the learners
- Social reconstruction in a context
- Attaching field relevance

Competencies of an inclusive teacher were also discussed, along with quality indicators in IE.

Assistive Technology for CWSN

The next session by Faith India was on Assistive Technology for CWSN. Assistive Technology is the new age device and software that provide support to the disabled to overcome their disability and perform their tasks in a normal environment efficiently to compete on a level playing field with their non-disabled peers.

People who can benefit from alternative computer access systems include those who:

- Have difficulty with or cannot control a keyboard,
- Find it difficult to control a mouse,
- Have repetitive strain injuries,
- Have difficulty or are unable to see the display,
- Are unable to hear auditory cues,
- Have a learning disability which makes it difficult to read or write text,
- Require simplified interfaces due to cognitive or speech impairments.



Different Assistive Technologies that help the persons with various disabilities to perform were discussed in detail. These included technologies available for people with visual impairment, hearing impairment, speech impairment, cerebral palsy, learning disabilities and intellectual impairment.

Convergence between SSA and National Institute of the Orthopaedically Handicapped

Dr. Ratnesh Kumar from NIOH Kolkatta started his presentation by mentioning the objectives of SSA, challenges for CWSN and prevalence of CWSN. He then highlighted the following areas of convergence between NIOH and SSA:

- Identification
- Timely Surgical correction
- Manpower development
- Awareness

NIOH initiatives for CWSN with SSA include providing aids and appliances, disability certification awareness, surgical correction, training to teachers and in developing material. So far, NIOH has provided 19635 tricycles, 7088 wheelchairs, 6387 crutches, 1239 walking stick and 12760 prosthetic and orthotic aids to CWSN. The presentation ended by NIOH agreeing to conduct capacity training programmes especially for the north eastern states as well as states like Punjab and J&K.



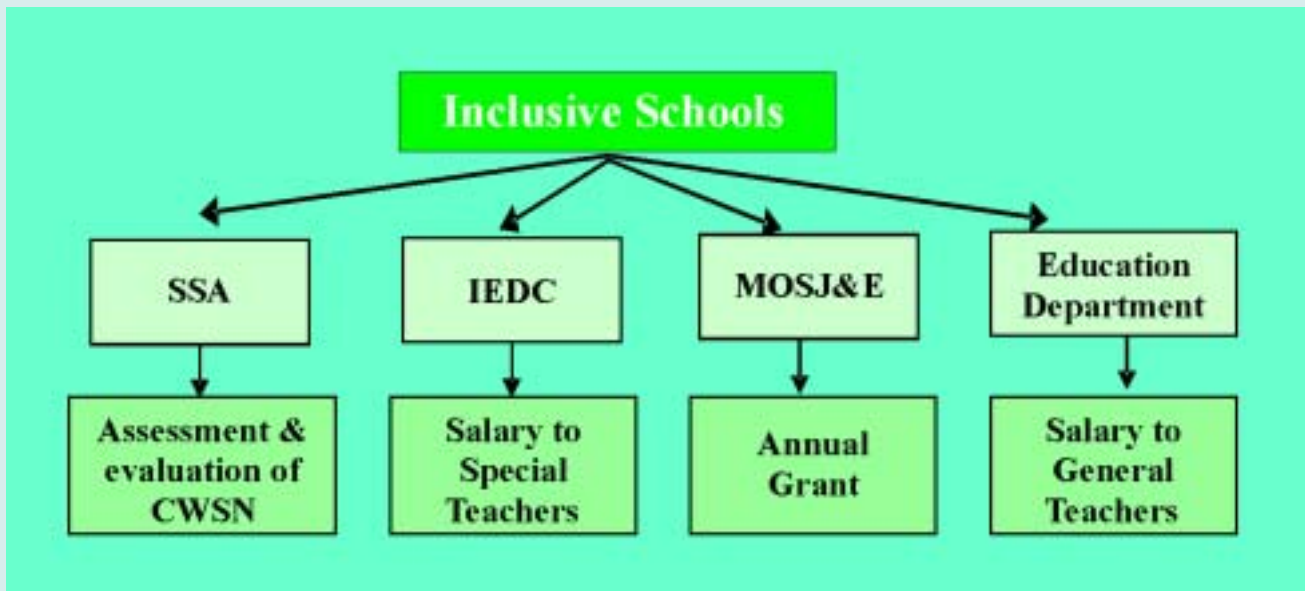
Procurement of Assistive Devices Braille Books

Shri K. Gopalan, Senior Consultant of Technical Support Group, Ed.CIL gave a presentation on the procurement procedure being followed in SSA. His presentation was mainly related to procurement of Braille books and aids and appliances for the CWSN. He referred to the Chapter IX of the Manual on Financial Management and Procurement that provides procurement procedure under SSA which is to be followed strictly. ALIMCO is providing aids and appliances to CWSN, covered under SSA, at a concessional rate of 40%, for which MHRD has entered into a Memorandum of Understanding with ALIMCO.

The aids and appliances and Braille books are to be procured at district or State levels. An annual procurement plan is to be prepared, based on the requirement and method of procurement as per the financial ceiling. The States can use the financial ceiling prevailing under various procurement procedures of the respective States. However, in case external

agencies are funding SSA, the financial ceiling prescribed by the funding agencies is to be followed. Before making any procurement, it should be ensured that sufficient budgetary provision is available in the approved Annual Work Plan and Budget. Transparency, economy and efficiency are to be maintained in all procurements.

Mainly, open tenders, limited tenders, single tender including Director General of Supply and Disposal (DGS&D) and State Government rate contract and without tender, quotations are the methods of procurement. Open tenders are to be advertised in newspapers. The standard bidding documents being used in the State Government can be used for various methods of procurement in SSA. He explained the steps involved in open tenders, limited tenders and single tender and also the important clauses of the standard bidding documents and briefed the participants on the various steps involved in the engagement of NGOs under inclusive education.



Visits to the Intervention Sites

Day- II began with visiting the following sites:

- Ramnagar Primary School- Bhavla
- Mukhya Kumaeshaaala
- Inclusive School
- Blind People’s Association

Both the schools had integrated visually impaired children and children with mental retardation. The visually impaired children had been given low vision and Braille kits by the BPA. General teachers were oriented to the teaching of the CWSN and the resource teacher visited the school twice in a week. The inclusive school visited, by the participants, is an initiative by the Gujarat Government, wherein 5 schools have been selected to operate as inclusive schools. In these schools, 60% of the children would be non-disabled and 40% would be children with special needs. This school would operate completely on the convergence model as shown below:

This school was particularly considered to be an innovation by the participants. The last visit was to the BPA, wherein services being provided to the blind as well as deaf- blind children were seen. The services mainly included Braille printing, printing of books in large print, training of teachers, parental counselling, providing of therapeutical services by the blind, software for the visually impaired, etc.

Experiences of BPA in Mainstreaming Visually Impaired Children

The next session was conducted by Shri. Bhushan Punani, Ms. Nandini Rawal and Mr. Bipin Mehta from Blind People’s Association (BPA) – Ahemdabad, Gujarat. The presentation started with an overview of the services for the visually impaired in this country.

Shri. Punani explained the coverage and expansion of IEDC under the GCERT. SSA began in Gujarat in only 4 districts. Now it covers the entire state for IE. The state has established a good linkage with the NGOs for IE implementation. Ms. Nandini Rawal began her presentation by explaining the meaning of IE. Different stages of education of children with visual impairment were explained followed by the A, B, C (Acceptance, Belonging and Community) and 4 “R”s (reading, writing, arithmetic and relationships) of IE. She further stated that 45% children with mild visual loss can be handled by general classroom teachers with minimum training, 20% children with low vision need counselling services, 15% children with low vision/blindness need resource assistance, including corrective aids, and periodical help in academic areas and 10% children with total blindness and/or additional problems require direct attention/preparatory assistance from special teachers. The services provided in inclusive schools by BPA were mentioned. Different types of strategies to be used for the education of visually impaired children and the role of itinerant teacher were also presented.

The last part of the presentation focussed on the support of BPA to SSA. This mainly comes in the form of technical support to SSA. BPA has helped SSA in holding assessment camps, providing educational kits, Braille books and low vision kits to CWSN.

The last technical session of the workshop was on Experiences of NAB, India in Mainstreaming Visually Impaired Children by Smt. Pallavi Shankar. NAB India has branches in 22 States and 65 districts. NAB India has a Braille Press and a Talking Book Centre and has recorded 5000 titles in 9 languages. She then described the various programmes under NAB India, including the IE programme. NAB has collaborated with over 100 different local NGOs in India for implementation of IE Programme. 5000 blind and low vision children predominantly in rural areas have been benefitted.

The following important services are being provided by NAB India:

1. Home and school visits of Itinerant Teachers (one or two visits per child per week) to carry out :

- Functional assessment
 - Early intervention / preparation for formal schooling
 - Training in plus curriculum
 - Family counseling
 - Remedial Teaching
 - Guidance to regular teachers and so on.
2. Braille Kits to totally blind children containing basic educational devices for writing Braille, arithmetic, geometry, etc.
3. Braille to Itinerant Teachers for transcribing tactile teaching and learning material.

4. Braille/large print textbooks.
5. Scholarship/sponsorship assistance for personal needs like uniforms, footwear, monsoon wear, winter clothing, stationery, medicines, supplementary nutrition.
6. Periodic evaluation of children especially in plus curriculum skills.
7. Periodic meetings of parents, class teachers and head masters for quality upgradation.
8. Mobilising community resources for children—readers, writers, tutors, transcribers, escorts, donors, etc.
9. Short-term need-based camps for children with specific objectives such as intensive coaching in special skills, personality development, community based teaching, P.T., sports, adventure and recreation, integration with sighted peers, etc.

She then explained the strategy of NAB India for IE in detail. The presentation ended by stating that all visually impaired children of school going age should be in school with appropriate services until they complete formal schooling as a part of the general education system.

Conclusion

The progress made by the participating States was reviewed in detail. The focus was on covering more CWSN and to provide them quality education. There was unanimity on the need to address critical issues like appointment of resource teachers, providing Braille books to the visually impaired children, mainstreaming visually impaired children, etc. Some important aspects regarding inclusive education in SSA were discussed at the workshop. These were relating to the procurement and printing of Braille books, classroom support for blind children, role of general teachers in IE, etc. Addressing these issues is perhaps vital for influencing and implementing inclusive education in SSA.



News from the States-



Day Care Centres for CWSN in SSA - Tamilnadu

Education for All has been the primary focus of the SSA programme wherein inclusive education for children with special needs and abilities is being promoted through an inclusive intervention programme. In Tamilnadu, the SSA-IE programme is being implemented in convergence with 35 NGOs in the different districts of the State. The special educators and physiotherapists are appointed by the NGOs to provide the following services for the CWSN:

- Formal and functional assessment
- Provision of assistive devices
- Inclusion in balwadis and in primary schools
- Training programmes at all levels
- Resource support through BRCs/CRCs and schools
- Multi-sectoral convergence

- Availing ID Cards and other benefits and schemes of the State
- Home based programme
- Recreation facilities
- Vocational training options.

Tamilnadu SSA-IE programme focuses on “Accommodating Diversity”, catering to children with different types of disabilities through meaningful inclusive education, facilitated by their peers, teachers, family members, community members and resource teachers.

There are different types of special needs with varying categories and degrees of severity. In such cases, support is required for the child and his/her family to carry out even the activities of daily living. Many children with cerebral palsy and mental retardation and multiple disabilities have decreased cognition, mobility and the ability to perform their

daily living activities. The parents of these children have limited options-special schools, if accessible, or home based education programmes. Even if they are compelled to include these severely disabled children in mainstream schools, they are likely to drop-out of the system for various reasons. Many parents may find that profoundly disabled children are not able to cope in the mainstream school. Teachers may not be trained enough to deal with the needs of this group of children.

Through the SSA-IE Programme, these children are being provided home-based training through trained resource teachers on a regular basis.

Objectives of the Day Care Centres [DCC]

SSA-IE scheme is providing rehabilitation-education services even to children with severe disabilities with the help of parents and the implementing NGOs by establishing Day Care Centres (DCCs).





The objectives of the SSA-IE Day Care Centres programme are:

- To enhance a holistic development of children with severe and multiple disabilities through early interventions programmes.
- To promote individualised need-based family service and rehabilitation-education programmes.
- To provide appropriate assistive devices and advice on its usage to enhance maximum independence in and around their own environments
- To provide need-based and low-cost home management programmes
- To provide opportunities to children with severe disabilities to experience social integration, with age-appropriate interactions with peers
- To promote personal, social, communication, academic and meaningful vocational learning experiences to their maximum potential.

In Tamilnadu, 276 Day Care Centres are functioning and around 3500 severe CWSN are being benefited. Each DCC caters to approximately 15-20 children with severe disabilities within the age group of 6 - 14 years. The programme includes the support of a care giver and a helper. Parents of the children are also appointed as helpers as it provides a more meaningful and sustainable approach.

The primary focus of the DCCs is to promote individualised family service with appropriate learning experiences towards optimum independence of the child. Daily supplementary nutrition for these children is also a part of the programme.

Programmes offered at the Day Care Centres

The Day Care Centre provides training in the following areas:

Parents Counselling

The parents are provided counselling by trained teachers who often are themselves parents and serve as role models. This proves to be very useful for the other parents. Training programmes are conducted for parents, siblings and community persons as facilitators in the learning experiences of the child.





Preparatory Training

Children are given preparatory training so that they are included in the ICDS. The children above 6 years are prepared for inclusion in the primary school by developing their pre-requisite/ readiness skills as per their abilities. Appropriate transition is then undertaken into mainstream programmes, balwadis, primary schools, vocational training, etc.

Rehabilitation Education

As per the needs the children, individualised rehabilitation programmes are provided by a multi-disciplinary team. The children receive physiotherapy and speech therapy, including auditory training and speech correction exercises. Need-based aids and appliances are provided to promote their independence. Special education training is provided to the

children according to the category of disability by developing appropriate Teaching Learning Materials [TLMs] for the training.

Yoga and Group Activities

Yoga therapy is included in the programme. Simple Aasanas with appropriate modifications are taught to the children with the help of the parents, depending on the child's abilities. Group songs, action songs, plays, story telling, drawing, etc., are conducted as a part of the DCC experience.

Home Based Programme

The activities taught in the DCC are also a part of the home-based training and management, which is provided to enhance the independence of CWSN in and around their own environments.

Play Park

The children of Day Care Centre are also involved in outdoor recreational activities in the play park.

Travel allowance is provided to the children and parents, so that they can attend the centre regularly.

The parents of the day care centres are involved in various on-going activities such as:

- Awareness regarding education for CWSN
- Sports competitions
- Medical and therapeutic assessment camps for the children
- Field visits
- Children's day celebrations
- World Disabled Day celebrations and competitions
- Vocational training practice for children above 10 years
- Parents training programme.

Impact of DCC

Some of the outcomes of this initiative by the Tamilnadu SSA Society are as follows:

1. Mainstreaming of children with disabilities becomes easier through the DCC programmes
2. The early intervention programmes, helps the child's early development and effective transition to inclusion
3. Parents of the children with severe disabilities develop a positive attitude and better competency in handling the children at home.
4. Development of a conducive 2-way learning experience for peers and non-disabled children is promoted to understand and contribute to the programme
5. Parents and community members become more involved in the programmes of the Day Care Centres
6. Community awareness on disability is generated. For example, some sponsors have come forward to donate crayons, notebooks, etc, for recreation for the children of the DCCs.

Conclusion

It is evident that, by initiating the Day Care Centres, the SSA-IE programme aims to provide the much-needed resource support to varying ages of children with severe and profound disabilities, thus promoting their inclusion into society.





Current Developments by NIMH in Inclusive Education

*By V.R.P.Sheilaja Rao**

Introduction

Scholastic challenges encountered by 15% of any school population pose serious problems for school teachers. Primary teachers mostly encounter population with mild deficits and intellectual impairments manifesting educational challenges. Often they are mistaken for lack of attention, motivation or appreciation for educational learning in primary schools. Such assumptions run the risk of ignoring children who need and can be helped for entry and retention into regular schools, right from point of entry into educational setting, from pre-school years. Lack of appropriate educational assessment, programming, and lack of appropriate learning materials, makes it more difficult to identify students with mild impairments before they enter

* HOD – Department of Special Education, NIMH

primary classes. Ambulance approach only delays the process of identifying and incorporating suitable remedial and special educational strategies into the existing schooling practices.

Concept of Inclusive Education

A global phenomenon of shifting from Institutionalisation and working towards de-institutionalisation has prompted including the disabled into the community, which is the foundational principle for Inclusive Education practices in Special Education (SE).

Objectives of SE

- To check disability
- To prevent secondary effects of disability
- To prevent aggravation of at-risk conditions
- To maximise the residual potential
- To enable and empower families to cope with disability conditions and adapt a positive attitude towards rearing a child with special needs.

Inclusive Education (IE) is a system that enhances provision of appropriate support in general education system so that education of children with disabilities becomes an integral part of the regular education system. Special Education complements the above mentioned goal by working through the objectives for effective school readiness, which is an important aspect of IE.

Diversity in primary school practices can be advantageous in the context of children with learning challenges if only placement plans are carefully scheduled to accustom these children from least to most formal learning environments. But parents face difficulties when seeking entry for a challenged child, due to restricted choices.

Diversity in primary school practices can be advantageous in the context of children with learning challenges if only placement plans are carefully scheduled to accustom these children from least to most formal learning environments. But parents face difficulties when seeking entry for a challenged child, due to restricted choices. The costs are additional for a parent with a disabled child seeking admission into inclusive school. Most school managements justify the additional cost on the grounds of having to provide extra supervision and special equipment. Concept of universalisation is applicable while addressing diversity in educational provision.

INCLUSION IN INDIAN PRIMARY EDUCATION-SOME MODELS

a. Regular school with additional special educational consultative support

This model links up with a special school, to seek educational guidance from an expert for dealing with students having special needs on periodical basis. In this model, a regular school has no commitment made directly but stays committed to permit flexibility in attendance, in internal unit tests and in time lines to cover given the class curriculum.

Most of the innovations used are restricted to suit a single child rather than class group, thus making it difficult to be practiced outside regular classrooms using outside school resources. Use of creative and customised methods in teaching are designed to work towards minimising gaps in a child's learning levels rather than influencing broader changes in the existing class curriculum or educational practices.

Tips for effective support

Parents have to be deeply committed and make up for maintaining effective communication between the regular school staff, special teachers and family members. If Parents fail in their responsibility to step in effectively, this model would fail to successfully address the educational challenges of such children.

b. Resource Room Model

This model is initiated by school authorities, either by inviting consultative support for a group of students identified with educational challenges or for those who fail to strive as





expected when compared to their peer group. This model provides a facility within the regular primary school which follows the same pattern of functioning as other classes. A staff is appointed to support the special educational needs by assessing and customising the child's time schedule for the educational programme and evaluation of progress.

The school management initiates the support. Hence, if long-term support is coordinated for regular staff workshops or orienting teaching staff on innovative inclusive assessment and programming strategies, it will ensure that the child continues to remain in a regular school. Special Educators need to ensure that collaborated team support is maintained to sustain shared ownership by staff from both streams of education, within the premise of the regular school.

c. Itinerant Model in Primary School

When the schools fail to provide a platform, or when parents have limitations to fit into regular consultative support, special

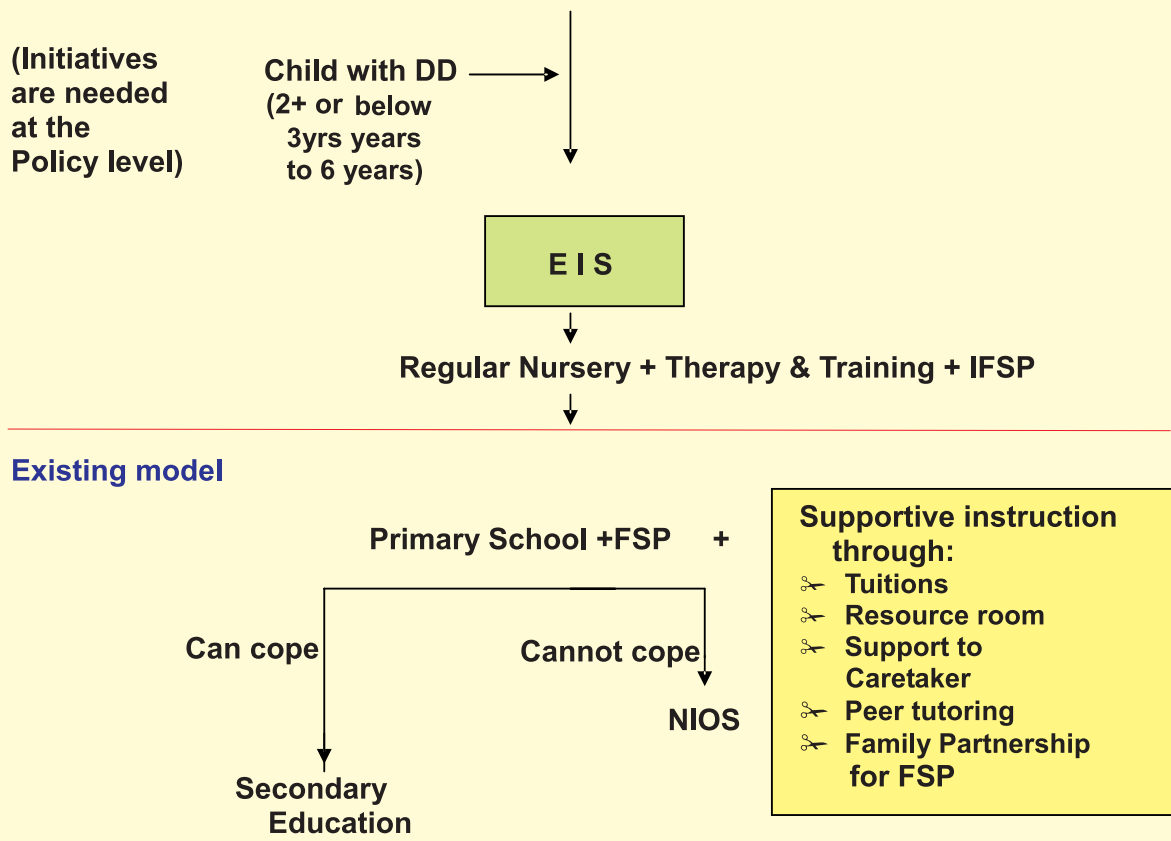
teachers initiate tutor support which mutually suits the convenience of professional and the challenged child's family. Itinerary model is customised to help the child to seek individual resource support at home or in regular school, but outside the frame of school functioning in terms of working hours or time table schedule. Trained special educators provide systematic and regular support to enable regulated exposure to appropriate concept learning skills. This is a form of private practice by special educators, where trust between the family and the professional is the only crucial factor for its success or failure.

INNOVATIONS AT NIMH

Assessment and Training Materials

Study materials of common interest to students from both groups with and without disability have been developed. Teacher manuals for benefit of special and regular teachers have been designed by the Staff of NIMH – Department of

INCLUSIVE MODEL



Special Education to coordinate within the regular school setting for inclusion. This includes an Assessment Tool named – Grade Level Assessment Tool, and a Manual titled “Teaching learners with educational problems in Primary Schools”. This helps to assess the child on primary curriculum in subjects – English, Hindi and Mathematics, class-wise across 1st to 4th standards. Software packages have also been developed that address the need for concept teaching across academic, language and community skills topics.

Teaching Learning Materials

Manuals also have been developed to teach foundational academic concepts to help a challenged learner build pre-requisite skills for primary level concepts that help learn higher concepts in later school years. Focus is given to adapt functionally relevant teaching strategies that ensure the child’s

learning to transcend and generalise for real life application. A simplified guide, with set of workbooks and flip charts has been developed for common use by regular and special teachers. These materials help as guides to develop teaching learning materials using locally available raw materials.

Adaptive Kits

Simple kits that consist adaptations for enabling children who have challenges in writing, poor dexterity skills or poor reading attention / listening attention, have been developed.

Rationale for adopting Family Support Plan in India

1. In India, shift has mainly been possible in institutional approaches, with no or marginal shift in curricular approaches. Adaptations are important to meet the functional needs of CWSN.



The Story of Aman

The Spastic Society of Tamilnadu with the support of the SSA-IE programme, identified 4 blocks of Thiruvallur district to initiate the activities of DCC. Later, this programme was extended to 1 zone in Chennai [Perambur]. All the DCCs in Thiruvallur district were established in the respective Block Resource Centres of Meenjur, Puzhal, Sholavaram and Kadambathur.

4 years old Aman with mental retardation and visual problems is attending the Day Care Centre regularly, for the past 8 months. When Aman first came to the centre, she was very slow in her learning capacity. She also had some behavioural problems. Aman also showed delayed milestones and repeated everything that was said to her. Her training programme included exercises for eye-hand co-ordination with puzzles, tracing, pointing at things, etc. Parents, along with the child, cooperated well and she gradually improved in many areas after coming to the Day Care Centre. Aman was gradually introduced to simple letters, numbers writing, and reading, arranging numbers in order, matching objects, etc. She was encouraged to involve in group and other activities to improve her social interaction. Songs, story telling and many other activities were taught in the group. Parents were also trained to conduct and follow up all these activities at home. Aman has shown marked improvement in learning and her behaviour problems have also reduced considerably.

Aman is now able to write numbers from 1-30 independently. She can also identify alphabets, count objects, read 3 letter words and do colouring. Her parents are now planning to enroll her in the mainstream school this academic year.

2. In the Indian context, disabled person's ownership still stays with their family. Thus their support is essential in all stages of training throughout lifetime.
3. The existing practices in special education have scope for only Dyad (only involves child and teacher) interactional patterns in educational procedures rather than Triad relationships to promote partnership between family, spouse and child.
4. Limited contact between home and school restricts scope of generalising learnt skills.
5. Minimum scope to utilise strengths of the family, which can otherwise provide significant support to fill the gaps in training of the child.

Adaptation of Family Support Plan (FSP) is seen as a natural choice to adapt procedures not only while working with younger age groups, but also with older age groups. In the absence of policy support to enhance family involvement within the special education programmes, an effort was made to formalise procedures to document family support programmes and measure their impact on the child's training and vice versa. Based on the experiences in special education practices, particularly in pre-service training for special teachers, efforts have begun to adapt the concept of FSP, to translate IEP goals to suit family needs and promote their involvement. Samples of formats used in IEP are presented for referral, which are applicable in working with all severity levels and age groups. Along with an Interview Schedule and IEP, Part I, II & III of the FSP is also used to assess the child.

Recommended Model for IE

The flow chart on IE is self explanatory, which recommends additional support for children with special needs for entering into regular schools. Without support for therapeutic facilities and special education resource, the reality of operationalising "education for all" is far from becoming a reality. There is either a need to incorporate in-service teacher training inputs in special education or compulsorily appoint teachers from Special Education background. A concerted effort to provide continuing on-site resource support to CWSN is important to develop a model for Primary Inclusive Education in developing countries.





Prayaas is a 10 year old boy with autism. He attends class 5 in a mainstream school in Chennai. Despite being non-verbal and having difficulty with socialisation, he continues to do very well in school. His mother Varsha, relies on an innovative new software called SLATE to keep him stay focussed and abreast of his lessons. In consultation with Prayaas' teachers, she converts all his textbook lessons into a digital format using this software. These digital textbooks are then used to reinforce lessons taught in class as well as for independent study.

SLATE has been used to create digital textbooks for 12 year old Ramesh, a non-verbal child with cerebral palsy and poor fine motor skills. These replace his regular textbooks as he is much more comfortable accessing his lessons independently on his laptop. Because his digital textbooks are a word-by-word conversion of his regular textbooks and are filled with exciting pictures and interactivity, his other classmates have been requesting teachers for copies for their own use.

SLATE is software that has been designed specifically to aid teachers in an inclusive education environment in Indian schools. SLATE is a software that can take care of the academic and communication needs of children with disabilities - ranging from cerebral palsy to autism to hearing impairment to name a few – in a mainstream school context. Even better, this software is equally useful for all the other students without disabilities in the same classroom.

What is SLATE?

SLATE is a software, that can be used to create or edit multimedia text, quickly. It has powerful array of features that allows a teacher to create a lesson, and then seamlessly link it to another image, movie, music and / or presentation files that are stored on his or her computer. Appropriate parts of this lesson can also be linked directly to internet sites. SLATE also has a built-in text-to-speech facility and can record and edit sounds and voices.

The content once created can be accessed in many different ways to cater to the varied profiles of the children in any classroom. This means that all children, disabled or not, can use SLATE. An intuitive interface design ensures that SLATE can be learnt in less than 3 hours. What sets

SLATE apart from other educational products is:

1. It allows the teacher to create customised content based on specific needs, as against having to work with off-the-shelf content that cannot be modified.
2. It is designed specifically for the Indian market in terms of affordability and additionally provides a vast built-in picture library for the Indian cultural context.
3. Its ability to create multilingual content.

SLATE is designed for early learners and children in the age bracket 5 - 13 years.

SLATE in the Classroom

SLATE enables a teacher to create new content or enrich existing content available in textbooks by converting them



into full color, interactive multimedia text. With SLATE, a teacher can navigate the student through a lesson in different routes. For example, the progress through the lesson can be linear or lateral - this is useful for children who need to dwell on a point or need it to be reinforced or clarified further. Lessons created this way can be accessed by every single child in an inclusive classroom –or be used as independent study material. It is this attribute, of conforming to the tenets of universal design that makes SLATE such an attractive solution for inclusion.

The following are some screenshots from a lesson on Plant Reproduction for class-V created on SLATE. This uses the script from the textbook with no modifications.

One of the biggest reasons for SLATE’s effectiveness in the classroom is the coming of age of the internet. Finding an appropriate image to illustrate a concept is now as easy as snapping one’s fingers. This has made it easy to Slate (a term that refers to the converting of information into the

SLATE format) lessons in all subjects, except Math. A second reason is that, because the number of pages is no longer a constraint, lessons can be broken down into smaller units and taught, concept by concept. And finally the fact that the textbook script can be adhered to, means that every time a child goes through a lesson, s/he is getting better prepared for the exam.

Studies have shown that using picture symbols as prompts and reminders and interactivity go a long way in helping children with concept-learning and reinforcement. SLATE has features that provide both. Interestingly, it has been observed that teachers also teach better with picture prompts and interactivity. Years of testing and implementing user feedback has shown that Indian teachers prefer focussed content (in other words, information that stays with the point and does not ‘distract’ the student). SLATE provides the ability to use appropriate images and provide interactivity exactly where it is needed.



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SLATE comes with built-in templates for the teacher to create tests based on the lesson that has been taught. These are Fill in the Blanks, Match the Following and Objective Type Questions formats. Teachers can also monitor the collective or each individual student's level of comprehension through reports for the purpose. At an administrative level, it is possible to view the frequency and patterns of usage of lessons by teachers, as well as students, through automatic reports generated on SLATE.

SLATE for Communication

SLATE has also been developed because there was absolutely no communication aid designed specifically to suit the needs of children in India. All available products were designed for children in Europe or the United States of America. Years of research has led to the development of the picture library to meet the communication needs of children in the Indian setting. The SLATE picture library currently consists of 1500 words used in everyday conversation. These picture words are designed specifically to appeal to early learners. The software also enables non-verbal students to use the *message area* to communicate with teachers and peers.

Students with cerebral palsy who have mobility as well as speech issues can use one of the onscreen typewriters to independently communicate, as well as write notes and do homework. It is this duality of functions that makes SLATE an ideal tool for a student with disability in school. Once familiar with Slate, a nonverbal student can seamlessly move from communication chart to lessons and back independently.



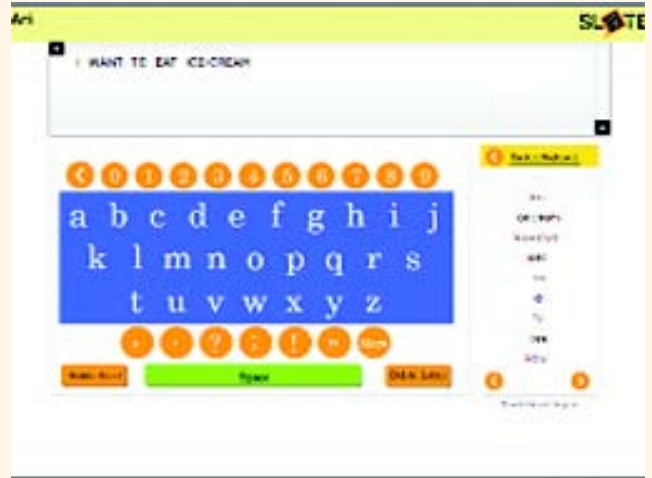
SLATE for Language and Literacy

Concept teaching cuts across abilities. From helping the hearing impaired to learn “visual” spellings, to slow learners who need repetition and reinforcement, to autism where some children are visual learners, SLATE allows children to absorb information at their own level and pace. Multilingual content can be created using SLATE. Combined with a picture symbol library, this becomes an ideal vehicle for building vocabulary in any language. SLATE supports animation and comes with a built-in library of a 100 animated picture words. These are primarily verbs or action words.

In the last few months, the Slate team has been working with the Association of People with Disabilities (APD), Bangalore, to create a basic vocabulary and concept book

Requirements

- Pentium III 600 MHZ
- 128 MB RAM
- 300 MB Hard Disk space
- Windows 2000 or later
- Pointing device
- Standard VGA that supports 1024 x 768 resolution
- Standard Sound



for classes 1 and 2. Typically, children with disabilities enter APD with little or no prior schooling. Teachers are then expected to work with them and provide them with a basic set of words and concepts which will enable them to cope with all the lessons that follow. SLATE also helps children with disabilities to achieve a certain level of comprehension, without the other children in the mainstream classroom being shortchanged. With the newly developed vocabulary books within SLATE, CWSN can acquire words with relative degree of independence.

Archiving with Slate

One of the biggest benefits of this software is that all digitised lessons, whether or not created on SLATE can be organised and archived here. Teachers have to no longer create cumbersome systems of folders and naming conventions to organise their lessons. Once a lesson is created and archived into SLATE, it can be used by teachers and students for many years to come.

All features in SLATE can be used by children with disabilities and equally by the non-disabled children in mainstream schools. The effort in the end is to create a

product in the disability space that conforms to the Principles of Universal Design- equitable, flexible, simple and intuitive. The development team has ensured that SLATE runs on systems as basic as Windows 2000 with 300MB Hard Disk space and 128MB RAM to the latest configurations on Windows Vista. Efforts are underway to make SLATE compatible with the Apple Macintosh Operating Systems.

Conclusion

The development of SLATE is now complete and the SLATE team has embarked on an early user programme which will oversee the implementation of SLATE in selected inclusive schools in 5 cities across India. The results of this user testing will be incorporated into the final version of SLATE, which will then be available by early 2009.

One big reason to embrace new technology such as digitised textbooks and communication books is that today's children are actually more comfortable with it. It is definitely the way they think and is certainly a big part of their future. Teachers have to recognise and accept this and, if required, think the way children think.



Interventions for Individuals with Autism Spectrum Disorders

*By Ms. Indu Chaswal**



Autism Spectrum Disorders is a term used for a group of neuro-behavioural syndromes that are characterised by impairments in language and communication, and social interactions accompanied by repetitive, restricted and rigid patterns of interests and behaviours. The term spectrum implies to a range of symptoms, varying from mild difficulty in social –communication deficits, to severe learning difficulties.

Interventions for children and young adolescents with Autism need to be in tune with the specific learning styles of Autism. There are tremendous individual differences among people who share the label of Autism. As the organic deficits in autism are not reversible, the goals of teaching programmes need to be practical and not a struggle to make them normal. In this article, we shall first discuss the learning styles in Autism and then the well-known intervention strategies.

THE LEARNING STYLES IN AUTISM

Focus on Details

People with Autism are known to be very good at observing minute details, particularly visual details. They note changes in their environment and often the changes become more important than other vital aspects of the situation. For example, more cognitive details would be something like getting fixated to number plates, STD Codes, telephone numbers, birth dates, etc. Sensory details include things like preoccupation with feeling textures, noticing streetlights or focusing on zebra crossing patterns and missing out the changing traffic signal. In other words, they have difficulty in prioritising the relevance of details.

Distractibility

As mentioned above, autistics may notice irrelevant details and therefore, their attention is affected. For example, when a teacher is teaching, the child with autism may be distracted by a chalk stick piece that breaks and falls on the floor. The child may want to clean the floor or just gaze at the chalk powder on the floor. Display charts on the walls in the classroom can also be very distractive.

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Concrete versus Abstract Thinking

Individuals with autism, no matter how able they are, have difficulty in understanding symbolic or abstract language and concepts. Therefore jokes, reprimands, threats, idioms and ridicule are not well understood.

Organising and Sequencing

Organising is a process that needs integration of several elements to achieve a pre-determined goal. For example, a child needs to collect all the necessary material before completing an assignment. This is difficult for persons with autism.

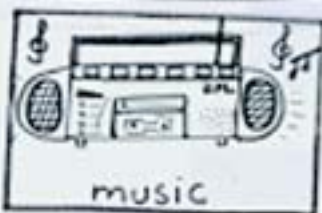
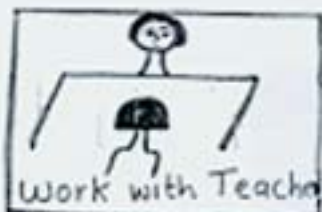
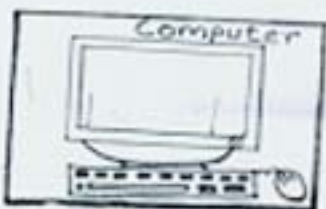
Similarly, sequencing or performing a task in steps beginning with the first step to the accomplishment of the task is difficult. They may repeat the same step over and over again or may get stuck at a particular step.

Generalization

Children and adults with autism often have difficulty in transferring a skill learnt in one situation to another situation. For example, if the child has learnt to brush his/her teeth with a green toothbrush s/he may have difficulty in switching to another colour.

* Director of Education, Action for Autism

Abhishek's Schedule



Structuring
Time

(TEACCH
APPROACH)

- Over or under stimulation in one or more sensory channels is seen in Autism due to difficulties in processing and integration of sensory information

INTERVENTION STRATEGIES

Treatment and Education of Autistic and Communication Handicap Children (TEACCH)

The fundamental of this programme is Structured Teaching. The term Structured refers to a visually clear environment in which the individual with Autism sees and understands what is expected from him/her and what s/he can expect. Structure provides predictability for the person, reduces anxiety and impulsiveness and helps in moving towards independence.

Essentially, Structure is provided in the following three areas-

1. Physical organization or space
2. Time
3. Activities

Structure in Physical Organisation

This means setting visually predictable physical environment that tells the person what to do WHERE. Physical support in an inclusive environment includes well-labelled walls in the school, noise levels and let the child with autism know where the comfort or safe zone is. Other visual cues can be colour-coded study materials, free time areas to be cut off with symbols and classroom rules written for those who can read.

Structure in Time

People with Autism benefit from visual schedules. These tell the individual what will happen when and in what sequence. In other words visual schedules are a form of visual communication and are similar to class time-tables provided in all schools. Here these are made visually clearer by placing pictures that denote an activity from a left top right or a top to bottom pattern. Visual schedules can have objects, pictures, line drawings or text as visual cues denoting activities.

Visual schedules help in transition, break rigidities, and provide flexibility and predictability.

Structure in Activities

Traditional education techniques may not be very effective

Time

Many individuals with Autism have difficulties with various aspects of time- beginning, middle, end, terms like forever, and now, then, etc. The more able individuals have difficulties in coping with time management.

Visual versus Auditory Learners

While most typically developing children follow a language based teaching-learning pattern, autistic children are visual learners and they rely a lot on visual information to make sense of the word.

Neuro-behavioural Patterns

- These include impulsivity and anxiety.
- Sensory and perceptual issues



- Clocks with stickers to mark time for a particular activity
- Picture instructions to teach independence.
- Block building or beading picture instructions showing a color sequence to be followed.

TEACCH therefore targets on critical areas in executive functioning, engagement, communication and independent functioning. It can be tailored to individual needs of the person with autism. This programme can be applied for all ages from pre-school to adults.

Augmentative and Alternative Communication Systems (AAC)

The AAC Systems are designed not only for persons without speech, but also for those with limited and deviant speech patterns. Such systems are not meant to merely replace spoken language but to facilitate verbalisations in a consistently effective manner.

The Picture Exchange Communication System

Developed at Delaware, USA, by the Pyramidal Consultants, this is a very well known, studied and widely acclaimed AAC system. The child learns to give a picture of the desired item to a communicative partner and in exchange gets the item. The PECS Training takes place in six phases and, starting from a simple exchange of a picture card, it moves to the final phases in which the child learns to make comments through a strip of picture or word cards. The training is simple and professionals, as well as parents, can be easily trained in PECS. This system emphasises on child initiated communication by giving a card and the communicative partner, on receiving the card, first names the item and then delivers it. For example, if the child gives a card having the picture of chips to the communicative partner, the partner will say chips before giving the chips to the child. Studies have revealed that children receiving PECS Training have a higher chance of developing speech.

Starting from a Physical Exchange of a single card across the table, the child learns to get the card over a distance and move to the communicative partner, discriminate between the desired item and non-desired item cards, use a PECS folder with many cards to choose from, make a sentence strip to ask for a desired item and also make comments with picture communication system.

for individuals with autism especially when introducing a new task. Structuring activities means making it visually clear to a person as to how an activity needs to be done to completion. A work system needs to be evolved that answers the following questions-

- What task or activity the person is supposed to engage in?
- How much work or how many tasks to be done?
- How to progress?
- What happens next?

For example, if in a class, the child has to do one-page writing, the questions can be answered like this-

The sentence to be copied written on the first line tells the child what to do. Placing dots or bullets in the margin of each line indicates how many times it is to be copied.

A red line drawn when the sentences are done, indicates when the work ends. An instruction in the form of a picture card of a swing indicates that after the writing is done, the child can go to swing

Other visual supports that can be used are:

- Calendars to mark important events that are coming up, to prepare for change.

A social story for a child who finds it difficult to get a haircut

I get my haircut when my hair grows long. The barber cuts my hair. I go to the barbershop to get my haircut. Sometimes I may have to wait because others also are waiting for the haircut. The barber wants me to sit straight on the chair while he cuts my hair. I wear a cape around my neck and water may be sprayed on my hair and face. It is OK. After the haircut, I look smart and mama buys me a chocolate.

In this story there are sentences that are descriptive and explain the situation, perspective sentences that explain expectations from others and directive sentences that mention the expected responses. There are no negative instructions like 'do not move when on the chair.'

Facilitated Communication

It has been seen that many people with Autism have difficulties related to tactile sense and motor planning. This affects their skills of writing. But they can read and spell. When another person provides an external support by holding their hand to provide a firm grip, they can move their fingers on a keyboard to type or even use alphabet boards.

Through this form of Facilitated Communication, some individuals have expressed themselves in a very explicit manner. However, the system is subjected to controversies like – Is the typing guided? Or is the facilitator's own anxiety making him/her to unconsciously guide the autistic person?

Other AAC Systems include:

- Speech therapy
- Sign language
- Choice boards
- Assistive technology, including hi-tech devices like computers, voice boxes. Low-tech devices include vibrating pencils to write.

Applied Behaviour Analysis

Applied Behaviour Analysis (ABA) is the science of applying experimentally derived principles of behaviour to improve socially significant behaviour. ABA takes what we know about behaviour and uses it to bring about a positive change (Applied). Behaviours are defined in observable and measurable terms in order to assess change over time.

The principles of ABA have been around for quite some

time, and have myriad uses outside the scope of teaching children with autism. Practically speaking, it is based on the principle of operant conditioning that says that a behaviour is more likely to be repeated in similar situations when the consequence is a desired one and less likely to be repeated if the consequence is undesirable. The procedures used are – reinforcement, punishment, extinction, shaping, chaining and differential reinforcement.

One of the seminal works on applied behaviour analysis has outlined the following six essential elements of the programme:

- The programme must be applied. The behaviours that one chooses to focus upon should have some social significance.
- The programme must be behavioural. The environment and physical events should be recorded with precision.
- The programme must be analytic. There should be clear and convincing evidence, through carefully collected data, that the intervention is responsible for a change in a behaviour.
- The programme must be technological. The techniques that one uses should be described completely enough to allow for duplication by another individual.
- The programme must be conceptually systematic. There should be relevance to established and accepted principles (for example, the principle of operant conditioning).
- The programme must be effective. The programme should seek to change the targetted behaviour to a meaningful degree.



Social Stories

A social story is a short story written in a special style and format. It explains social situations, and provides social cues and responses that are expected from the person. The topic is selected according to the specific difficulty that the individual with Autism is facing. The stories can be written by parents, professionals as well as peers. More able individuals can read the story, for others it can be read in words that the child can understand. Illustrations and symbols can be useful.

Sensory Integration Therapy

This therapy helps in proper processing and integration of information coming through the sense for use in every day

life. A well informed Occupational Therapist first conducts an assessment to prepare a sensory profile of the child and then prepares a sensory diet that include activities to meet the sensory needs of the child.

There are many other known interventions like the GREENSPAN Floor time, Sonrise, Higashi and Miller Methods. There are often debates on which method is the most suitable. The best method is always the one that is culture friendly, cost effective, possible to be adopted and adapted to meet the needs of the child, family and the school. Therefore, taking in the best possible from all the methods and following an Eclectic Approach is often most useful.

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Assessment of Learning Disability

By Bharati Kapoor*



Learning Disabilities (LD) have been called the Hidden Handicaps because they are difficult to identify and assess. Assessment of children with LDs is important if they are to be placed in the inclusive education programme. The process involves an interview and a series of different types of tests. The procedures for assessing learning disabilities are varied. Whenever one has reason to suspect that the child may possess some form of Learning Disability, the first thing that one has to do is have a comprehensive assessment. This assessment needs to be carried out by a multi-disciplinary team, ideally comprising a paediatrician,

a clinical psychologist, a special educator, and, if needed, a speech therapist.

Stages of Diagnosis

- Adequate history capturing pre-natal, natal, infancy and childhood information. It should cover the medical history, the family history, the educational history.
- Detailed report from the teacher: If possible meet the teacher and gather the information or request the teacher to fill up a questionnaire.

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- Examination and testing of the student by competent professionals, including a pediatrician, an eye specialist, an audiologist and a psychologist or a psychiatrist.
- Counselling of the child and the parents regarding the problem and the prognosis of the problem. Do tell the parents that LD can only be managed and not cured. Apprise them that it is a long process, but it is necessary.
- Evolve an appropriate management plan. This would consist of drawing up an Individualised Education Plan (IEP).

Kinds of Assessment

Formal assessment

This consists of formal standardised tests such as I.Q. tests, tests for vision and hearing etc. Please remember these tests are to be administered only by trained professionals. Some of the tests that are used for testing intelligence are:

The Wechsler Adult Intelligence Scale–Revised (WAIS-R), or the newer version WAIS-III, are widely used to assess cognitive functioning and to determine levels of intellectual abilities. In addition, specific measures should be included in the test battery to assess:

- Short and long term memory;
- Receptive and expressive language;
- Verbal and non-verbal abstract reasoning or logic;
- Attention span;
- Visual perceptual abilities including various spatial tasks;
- Sequencing, right-left orientation and fine motor dexterity;
- And organizational and planning skills.

Malin's Intelligence Scale for Indian Children (MISIC) the Indian adaptation is most commonly used along with Ravens Progressive Matrices or may be Draw a Man test. Seguin Form board too is used wherever necessary. A remedial teacher only guides parents to competent professionals and does not try to administer these tests.

Informal assessment

These include teacher made tests or tests that you may make yourself to test the various skills of a learning disabled child.

These include:

- i. Evaluation of assignment
- ii. Stories written by children
- iii. Answers to test questions
- iv. Observation of the child's problems in pronunciation, articulation and dialect.

Informal Assessment Tools

If, after an IQ test has been conducted, concerns remain about a child not performing at grade level, a series of tests, designed to measure specific information processing and academic skills, need to be conducted. These may not be formal tests, but may be informal assessment tools. These are tools that can be developed or adapted from innumerable books, including text books

These information processing tests consist of Auditory Processing, including auditory discrimination, auditory memory and auditory sequencing as well as Visual Processing, including visual discrimination, visual memory and visual sequencing. They also encompass visuo-motor skills and verbal directions. Academic skills, such as word and sentence reading, comprehension, vocabulary and spelling, numerical ability, also need to be tested. This will determine patterns of learning and performance problems associated with reading.

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Formal criterion referenced spelling lists can be used. The advantage of those lists is that they can be used as group tests also. They are invaluable for use as a classroom tool to identify children in classrooms. There is a pressing need for these tools to be developed in regional languages like Hindi and Punjabi too.

General aspects of learning can also be measured and used to determine the level at which individuals might be expected to apply adaptive strategies. A number of relatively new assessment technologies are able to evaluate a learner's ability to recognise and represent meaning in different forms. These new technologies are also able to identify an individual's tendencies to learn from his/her mistakes. Results from these types of tests provide important information about the adaptive nature of learners.

Other Assessments to be Performed are

- Reading assessment: Reading cards devised by Orient Longman or DAV education board can be used.
- Spelling Assessment: There are formal as well as criterion referenced tests for Spelling assessment
- Arithmetic skills: Class tests or informal tests are the best, although formal tests too are available.
- Comprehension: Use reading cards or extracts from graded readers. Avoid syllabus books.
- Handwriting and copy writing: Informal testing, check pencil grip, pressure applied, time taken, facial expression, etc.

- Another important factor to check here is motivation and parental attitude.

Important things to remember while performing an assessment:

1. Please remember to refer the child to a professional for the formal tests of IQ, etc.
2. To rule out visual and hearing deficits, refer the child to professionals in the field.
3. Check for Attention Deficit Hyperactive Disorder or other co-morbid conditions.
4. Try to get the teacher's assessments of the child's ability. Send a teacher referral form or interview the teacher yourself.
5. Please remember at all times that you are dealing with the future of the child you are assessing. Before considering other things, it is extremely important that you consider your skills. Consider the fatigue factor before you go further, since if you or the child is fatigued you will not get the correct result.

Methods or Procedures to be Used

- Develop a rapport /good relationship with the child. Chat informally, appreciate dress or books, etc. find out child's interest.
- Build confidence in the child. Reassure the child that nothing shall be discussed with his/her parents or anyone unless s/he gives permission.
- Motivate the child before starting the assessment.
- Give proper clear instructions to the child before beginning the assessment.
- Find out the likes and dislikes of the child.
- Ask questions like, "If a fairy gave you three wishes, what would you ask for?"
- Collect as much information as possible about the child. Send teacher referral form to the teacher.
- Help parents fill the case details form, so that you can observe their reactions.
- Observe the child's behaviour with his/her parents.
- During assessment, observe the child's test behaviour.

Assessment is basically a tool that helps identify the needs of a learning disabled child. It's main function is to assess where to place the child for remediation.



New Trends in Assessment of Children with LD

The International Centre for the Enhancement of Learning Potential (ICELP) was established with the goal of continuing and expanding the educational and psychological work initiated by Prof. Feuerstein. The work of the ICELP is based on the theories of Structural Cognitive Modifiability and Mediated Learning Experience, which serve as a basis for the three applied systems: (i) the Learning Potential Assessment Device (LPAD), (ii) Instrumental Enrichment (IE) cognitive intervention programme, and (iii) Shaping Modifying Environment.

Prof. Feuerstein has developed an alternate method of testing and teaching. He has developed a thinking skills programme called Instrumental Enrichment Programme (IE) that improves a person's thinking process. His belief is that people are not born with fixed intelligence. His work has established that people have the potential to change and modify themselves when they are provided with the right kind of interaction. According to him, interaction or "Mediated Learning," helps the learner to develop the art of how to learn and become an independent learner. The mediator identifies the cognitive deficits and the learner is helped to correct and redevelop his thinking process. The instruments are a set of paper and pencil exercises. Each instrument deals with a different type of thinking skill. The tasks vary in their level of complexity and modality (written or graphic).

The programme helps the students to think clearly and precisely, motivate themselves, increase their level of vocabulary, improve academic skills, gain confidence and become qualitative and independent learners.

Assessment today is moving away from the earlier rigidity to a more sensitive and humane approach. It ranges from testing through traditional games to programmes based on Professor Reuven Feuerstein's Learning Potential Assessment Device (LPAD), which believes that intelligence is not a rigid quantity, but is flexible and can be modified through proper interventions. Even the testing environment is changing. Though part of testing is conducted traditionally in the class room, a lot of it is also done in relaxed conditions, in the playground.

Some of traditional games used for assessment for LD are great predictors of the handedness, concentration, flexibility of the body, reaction time, sequencing abilities, and team playing abilities of the child. In the picture while one teacher is conducting the game, there are three others who are watching and writing the observations. These observations are very useful in setting our remedial targets for the visuo-motor skill areas as well as social and emotional skill areas that we need to target for each child.

Besides, play and games also help in de-stressing the child during assessments. S/he begins to view the tester as an ally and not just an adult who is merely giving instructions.

To gain an insight into the child's way of learning, group testing is more useful than just individual testing. So specially, if one wants to test the child's modality of learning, sometimes a group test with 3-4 members can better serve the purpose than just an individual test.

Please remember that assessment is used mainly for placement in a remedial programme. In no way is it to be used for labelling a child. If the child cannot be referred to a remedial programme, it is better not to do an assessment. Sometimes an assessment can cause a greater problem than the Learning Disability itself, specially, if it is used to label a child, without giving appropriate help to the child. Hence, assessment should be done in a non-threatening environment using joyful methods to obtain reliable and authentic information about the child with the key objective to observe the child in totality.

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Role of ICT in Inclusive Education - AADI Experience

By Ms. Kajali Roy*



The introduction of ICT promises to bring about revolutionary changes in the field of Education. ICT provides tools that help the school's operation and management. It is an instrument that makes teaching more effective and stimulating. Through specific applications such as Distance Education as well as by means of adequate Computer Aided Learning (CAL) programmes, ICT promises a new perspective in the way IE is handled in schools.

ICT creates a stimulating learning environment, particularly for the acquisition of reading and writing skills. Students can work in mixed teams, children with special needs with those without special needs, immigrants with their indigenous peers. By participating, the low self-esteem of children with special needs increases, they feel they can offer and hence they are worth more.

Role of Information Technology in Education

Teaching aids in the form of audio-visual aids for reinforcement of basic concepts, multimedia-based software to teach number and language skills and interactive software are some examples of this

Written communication has been made easy by accessing programmes like MS word through keyboard, mouse and alternate switches and trackballs, joystick, etc. Composing text using picture / word / phrase grids are some options available.

Leisure Skills through drawing, painting and games as well as Internet access are good options.

E- Communication through internet has made global communication very easy. Special software and hardware are useful tools.

Research shows that pupils with sight problems, with hearing problems, with corporal problems, with dyslexia have managed through the aid of computers. The use of CAL programmes that take into consideration modern learning theories, the learner's autonomy, the creative engagement of learners as well as the different learning styles of users can aid students with learning difficulties to make optimum use of computer resources to control the pace and direction of their learning.

In general, the role of ICT is very important for children with special needs. For example, children with visual difficulties may be helped by special magnification software. Screen readers can offer access to a wide range of information sources including the Internet. Some pupils in your class may have problems in accessing the curriculum due to learning difficulties with reading, writing, spelling or numeracy, visual or hearing problems, emotional or behavioural problems. ICT can, in many cases, help to alleviate the problems.

For pupils who find handwriting difficult or impossible, the

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Action for Ability Development and Inclusion (AADI) is an inclusive school, working with children from diverse social, cultural and economic backgrounds as well as different abilities, covering around 60 such children. The school has on its roll non-disabled children as well some students with disabilities.



use of a keyboard might enable them to record their work more easily. Speech-to-text software is readily available now and has a high rate of accuracy. Pupils with visual problems can be helped through the use of different coloured screens and fonts; icons and screen menus can be enlarged to suit their needs. For those with co-ordination difficulties, mouse speed and number of clicks to open a document can be varied as can the use of the mouse. This article specifically focuses on use of ICT/CAL for children with special needs by the AADI school.

Action for Ability Development and Inclusion (AADI) is an inclusive school, working with children from diverse social, cultural and economic backgrounds as well as different abilities, covering around 60 such children. The school has on its roll non-disabled children as well some students with disabilities. It mainly caters to children with neurological deficiencies - autism, speech, hearing and learning difficulties. Besides experiential and other methods of teaching, the computer has been used as an effective mode of teaching and learning in the school.

The computer is used to reinforce the concepts taught in the class and while doing so the students also learn how to use the computer and its different software. For example, the students' concept of counting objects is reinforced through computer games. Their ability to focus and concentrate increases when doing the same activity on the computer. In fact, some students who may not show consistency in counting objects due to physical and attention difficulties learn to count better through computer activities.

Likewise, the students, who are at picture and sight-word learning level, match pictures with sight-words on computer in the form of a game. Similarly they identify objects in pictures, name them or match the picture with the initial alphabet. Once they learn to locate the letters of the alphabet on the keyboard, they start typing the letters, whole words and even start copying sentences. Many students go on to writing essays, letters, etc. Therefore, the otherwise very demanding skills of reading and writing, become enjoyable through the use of computer. Thus, computer comes about as a writing aid and a means of self-expression.

The biggest advantage that the computer has over humans is the consistency and predictability. This is of great help for students who have attention difficulty and autism. Computer is also useful for developing independent learning skills for all the students.

Students who have speech difficulties use alternate communication methods like gestures, pointing, and use of picture/alphabet/word in their communication book, which are customized for each child. There are special softwares available for making such communication books. The computer is probably the most dramatic example of a communication device that can make a big difference in the lives of people with cerebral palsy. Equipped with a computer and voice synthesiser, a child or adult with cerebral palsy can communicate successfully with others. For example, a child who is unable to speak or write but can make head movements may be able to control a computer using a special light pointer that is attached to a headband.

Children with low vision, who find it difficult to read from textbooks and also from blackboard because of the small font size, are able to read comfortably when the text is typed/ scanned on a computer with increased font size. Students who are not able to use keyboard and mouse due to physical difficulties are able to access the computer through special switches, track-ball and certain adaptations like use of wedge, key-guard. Further adaptations can be made to make use of these devices easier.

Status of Special Computer Hardware and Software in India

- Accessibility options available in all Microsoft computers are useful for some students.
- Interactive CDs (educational and games) available in the market not only help to learn any concept easily but also help to increase concentration span.
- Individual initiatives from institutes like IICP (Kolkata) and Vidya Sagar (Chennai) have developed special software like Sanyog, ITCP/ Pictorial, SLATE, and IPSC (described below) in collaboration with IITs and others. Similarly certain customised hardware has been developed to fulfill specific needs.

Sanyog

This is a tool to facilitate language development and communication supported by IIT Kharagpur and Media Lab Asia. It is an iconic education and communication tool in Indian Languages for children with special needs. It is a Visual language tool that uses intuitive icons. It is capable of generating grammatically correct natural language sentences from the selected icons. The tense, aspect, mood and other grammatical features of the sentence can be modified. After that, the generated sentence can be spoken out using an inbuilt TTS system. Currently, this tool is available in Hindi, English and Bengali languages. Frequently used sentences can be stored and easily displayed. The icon sets can be easily customised by the user. It also has the feature of visual soft-keyboard with intelligent word prediction, which facilitates free speech through spelling. This software can be used through indigenous access switches.

Indian Picture Symbol for Communication (IPSC)

This software consists of culturally and linguistically appropriate picture symbols for communication, developed



by IICP (Indian Institute of Cerebral Palsy), Kolkata. It has a library of culturally appropriate picture icons to make communication boards. The picture icons and font size can be easily increased / decreased according to each child's requirement.

Slate

This software also consists of culturally and linguistically appropriate picture symbols for communication, developed

Children with low vision, who find it difficult to read from textbooks and also from blackboard because of the small font size, are able to read comfortably when the text is typed/scanned on a computer with increased font size. Students who are not able to use keyboard and mouse due to physical difficulties are able to access the computer through special switches, track-ball and certain adaptations like use of wedge, key-guard. Further adaptations can be made to make use of these devices easier.

A Success Story

Chinky is a 12 years old girl with cerebral palsy, a non-verbal child with very little attention span and poor hand-function due to neuro-motor problem. She joined AADI at the age of 10. The use of interactive software (initially games), helped her to improve her attention level and eye-hand coordination very rapidly. Today she is able to type and write with less effort and better feedback, using a normal keyboard with accessibility options which has really boosted her confidence. In her own words “I can write very well just like my text-book”, She can type continuously till 50, count, add and subtract till 20, tell the date and day on a calendar and type names of colours, fruits, vegetables, days and months in Hindi. She can also copy written text in complete sentences. She is learning to type her own experiences and feelings, so that one day she is able to communicate well by typing.

by Vidyasagar, Chennai. It too has a library of culturally appropriate picture icons (black and white, as well as coloured) to make communication boards. The picture icons and font size can be easily increased / decreased according to each child’s requirement. It can also be used to make presentations like PowerPoint, after scanning pictures from any textbook or pictures downloaded from the internet to explain any basic concept or reinforce any concept audio-visually in a class.

Software programmes often come with facilities, whereby teachers can set different levels for each pupil. This is very

useful for those with learning difficulties. Not only does it mean they are using the same programme as their peers but it means they can set themselves targets to work towards. These programmes are bright and attractive and make use of multimedia, which appeal to those who need stimulus from more than one sense. They can be used regularly for reinforcement as often as a child needs in order to grasp the concept. Since technology has permeated every aspect of our lives, it becomes extremely crucial for the schools to make appropriate use of the existing technology infrastructure so as to create an effective teaching-learning mechanism.



