NETAJI SUBHAS OPEN UNIVERSITY

B.Ed.Spl.Ed. (M.R./H.I./V.I.)-ODL

INTRODUCTION TO SENSORY DISABILITIES

(VI, HI, Deaf-Blind)

B-7

B. Ed. Spl. Ed (M. R. / H. I. / V. I)-
ODL Programme

AREA - B

B-7 : Introduction to Sensory Disabilities

(VI, HI, Deaf-Blind)

A COLLABORATIVE PROGRAMME OF
NETAJI SUBHAS OPEN UNIVERSITY
AND
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AREA - B ● CROSS DISABILITY AND INCLUSION
COURSE CODE - B7
INTRODUCTION TO SENSORY DISABILITIES (VI, HI, DEAF-BLIND)

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The Self Instructional Material (SIM) is prepared in conformity with the B.Ed.Spl. Edu.(MR/HI/VI) - ODL Programme as prepared and circulated by the Rehabilitation Council of India, New Delhi and adopted by NSOU on and from the 2015-2017 academic session.

Dr. Ashit Baran Aich
Registrar, (Acting) NSOU

Netaji Subhas Open University

From the Vice-Chancellor's Desk

Dear Students, from this Academic Session (2015-17) the Curriculum and Course Structure of B. Ed.- Special Education have been thoroughly revised as per the stipulations which featured in the Memorandum of Understanding (MoU) between the Rehabilitation Council of India (RCI) and the National Council for Teacher Education (NCTE). The newly designed course structure and syllabus is comprehensive and futuristic has, therefore, been contextualized and adopted by NSOU from the present academic session, following the directives of the aforesaid national statutory authorities.

Consequent upon the introduction of new syllabus the revision of Self Instructional Material (SIM) becomes imperative. The new syllabus was circulated by RCI for introduction in the month of June, 2015 while the new session begins in the month of July. So the difficulties of preparing the SIMs within such a short time can easily be understood. However, the School of Education of NSOU took up the challenge and put the best minds together in preparing SIM without compromising the standard and quality of such an academic package. It required many rigorous steps before printing and circulation of the entire academic package to our dear learners. Every intervening step was meticulously and methodically followed for ensuring quality in such a time bound manner.

The SIMs are prepared by eminent subject experts and edited by the senior members of the faculty specializing in the discipline concerned. Printing of the SIMs has been done with utmost care and attention. Students are the primary beneficiaries of these materials so developed. Therefore, you must go through the contents seriously and take your queries, if any, to the Counselors during Personal Contact Programs (PCPs) for clarifications. In comparison to F2F mode, the onus is on the learners in the ODL mode. So please change your mind accordingly and shrug off your old mindset of teacher dependence and spoon feeding habits immediately.

I would further urge you to go for other Open Educational Resources (OERs) - available on websites, for better understanding and gaining comprehensive mastery over the subject. From this year NSOU is also providing ICT enabled support services to the students enrolled under this University. So, in addition to the printed SIMs, the e-contents are also provided to the students to facilitate the usage and ensure more flexibility at the user end. The other ICT based support systems will be there for the benefit of the learners.

So please make the most of it and do your best in the examinations. However, any suggestion or constructive criticism regarding the SIMs and its improvement is welcome. 1 must acknowledge the contribution of all the content writers, editors and background minds at the SoE, NSOU for their respective efforts, expertise and hard work in producing the SIMs within a very short time.

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B. Ed. Spl. Ed (M. R. / H. I. / V. I)-
ODL Programme

AREA - B

B-7 : INTRODUCTION TO SENSORY DISABILITIES (VI, HI, DEAF-BLIND)

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AREA - B
B-7 : INTRODUCTION TO SENSORY DISABILITIES (VI, HI, DEAF BLIND)

B - 7 ❐ Introduction to Sensory Disabilities

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Classification

Symptoms of Deaf-Blindness

Causes of Deaf-Blindness

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1.1.1 Introduction

It is very interesting to know that 90% of the information about the world around us comes from our sight and hearing. We talk to each other, we read our bills, news papers and books, we see T.V., listen to the radio etc.

Medically there are four senses, viz., visual, auditory, gustatory and olfactory, which give special information about the environment; hence these are named as special senses. For example, visual sensation not only gives us the sensation of light but we extract much information from the scenery, e.g. soothing or repulsive, hostile or friendly and so on.

Every man has to right live independently. But some people live independently with some major impairment. This impairment varies in nature. Some are related to vision; some are auditory; mental and physical impairments are also to be counted in this nature.

1.1.2 Objectives

After going through this sub unit, the learners will be able to:

- understand the meaning of sensory disabilities
- know about the different aspects of hearing impairment
- know about the different aspects of visual impairment
- know about the different aspects of deaf- blindness

1.1.3 What is sensory impairment?

Going to details sensory impairment, we must know about two things. (1) The sensory system and (2) Receptors.

(1) The sensory system

This system is responsible for carrying different sensations resulting from stimulation of the sensory receptors by external or internal stimuli. For the purpose of perception, a

sensation is to be carried to the part of CNS (Central Nervous System) called sensorium.

(2) Receptors

The receptors associated with nervous system are called sensory receptors or neural receptors. A sensory receptor can be defined as a biological transducer which can convert (transduct) various forms of energy in action potential (AP) in the sensory nervous to which they are connected.

Medically receptors for special senses are

i) Vision : rods and cones,

ii) Hearing: hair cells,

iii) Taste : tests buds,

iv) Smell: olfactory neurones.

1.1.4 Meaning of sensory impairment

The sensory impairment means the senses that is sight, hearing, smell, touch, taste and spatial awareness, is no longer normal. Mainly the term 'sensory impairment' is used here to refer to people with either visual or hearing impairments or both - the extent of those impairments will vary from person to person. As an example, if a man wears glasses then he/ she has sight impairment, if find it hard to hear or have a hearing aid then call hearing impairment. A person does not have to have full loss of a sense to be sensory impaired.

1.1.5 Types of Sensory Impairment: Single (Hearing impairment & Visual Impairment)

The term sensory impairment encompasses visual loss (including blindness and partial sight), hearing loss (including the whole range) and multisensory impairment (which means having a diagnosed visual and hearing impairment with at least a mild loss in each modality or deaf blindness).In this context it is said that sensory impairment has two types. One is single and another is dual. Hearing impairment & Visual Impairment is under the single sensory impairment and Deaf-blindness is under dual sensory impairment.

1.1.5.1 Hearing impairment (HI)

Hearing is the ability to perceive sound. A person suffering from hearing impairment has difficulty in perceiving or identifying sound clearly due to auditory problems. So it is said that hearing impairment is hearing loss that prevents a person from totally receiving sounds through the ear. The impairment may be unilateral or bilateral. If the loss is mild, the person has difficulty hearing faint or distant speech. A person with this degree of hearing impairment may use a hearing aid to amplify sounds.

Meaning of Hearing Impairment

Hearing impairment refers to a defect in or damage to the hearing mechanism. This defect or damage may occur in any part of the ear, outer ear or middle ear or inner ear. Hearing impairment leads to hearing disability or loss of hearing. Hearing disability or loss of hearing may range of severity from mild to moderate to profound. A person may become deaf or hard of hearing depending upon the nature of impairment and the degree of hearing loss.

Classification

The degree of hearing loss can be classified five levels as listed below:

Degree of Hearing Loss	**Ability to perceive sound**
Mild	Difficult to identify soft sound such as whispering.
Moderate	Unable to hear clearly what others are saying during conversation. Hearing aids are necessary.
Moderately -severe	Unable to clearly hear loud noises such as telephone ring.
Severe	Can only hear very loud noises and sounds such as shouting or vacuum cleaner noise.
Profound	Difficult to perceive any sound.

According to impairment the two main types of hearing loss are:

Conductive hearing loss, which is the most common type and results from interference in the conduction pathways through which sound reaches the inner ear. This hearing loss usually affects the volume of sound reaching the inner ear. People

with conductive hearing loss may benefit from the surgical insertion of grommets or from hearing aids. It is commonly a temporary hearing loss.

Sensorineural hearing loss, which is caused by damage to the hair cells lining the inner ear, or the nerves that supply them. This hearing loss can range from mild to profound, and affects certain frequencies more than others. Consequently, people with sensorineural hearing loss need high quality hearing aids or cochlear implants to gain access to the spoken word and sound in the environment. It is also possible to have a mixed hearing loss, which arises from both the above.

Symptoms of Hearing Impairment

The symptoms of children with hearing impairment are:

During infancy:

1-3 months old	No response to sudden sound such as banging of door or ringing of doorbell.
4-6 months old	Unable to locate the sound source.
7-9 months old	Do not look at the person being mentioned, e.g . "Where is Papa?"
10-12 months old	No response to their names being called or frequently used words or phrases,e.g."come", "go".

During Childhood

- Delayed response to sound.
- Can not hear clearly what others are saying
- Show difficulty in locating the sound source
- Pay more than usual attention to speakers' facial expression and lip movement while listening
- Give irrelevant answers or misinterpret instructions
- Request for repetition during conversation
- Show poorer ability to understand speech in a noisy environment
- Tend to turn up the sound volume of television

- Incorrect pronunciation
- Delayed language development
- Poor attention in class
- Frequent use of gestures to express themselves, e.g. pointing to what they want
- Easily irritated as a result of communication difficulty

Parents should be alert to the possibility of hearing impairment if their child shows the above signs,and seek medical advice as soon as possible.

Causes of Hearing Impairment

Two factors are involved in various causes of hearing impairment. These are Congenital factors and Acquired factors.

Congenital factors mean those factors which are innate by birth. Such as

- Heredity
- Viral infection during pregnancy, e.g. rubella infection
- Congenital defects such as anomalies of the ear ,nose or throat
- Premature birth , birth asphyxia, excessive bilirubin etc.

Acquired factors mean those factors which are acquired after birth. Such as

- Excessive ear wax
- Eardrum perforation
- Middle ear effusion or infection
- Otoclerosis or ear ossicle dislocation
- Sequel of childhood disease such as meningitis
- Head or ear trauma
- Prolonged exposure to loud noise
- Medication that may lead to hearing damage
- Accident.

Above causes of hearing impairment are affecting the children's development in different side. Mainly problem arises in language development. Except this problem

Emotion and behaviour problem, lack of self- confidence, problems of social interaction, academic performance etc.

People who are profoundly deaf can hear nothing at all. In order to communicate spontaneously and rapidly with people, they are totally reliant on lip reading and/or sign language. People who are born deaf and lip-reading much harder to learn compared to those who became hearing impaired after they had learnt to communicate orally (with sounds).

Some diseases or circumstances can cause deafness, including:

Chicken Pox

Cytomegalovirus

Mumps

Meningitis

Sickle cell disease

AIDS- Offspring of mothers who had aids during pregnancy have a much higher risk of being deaf by the age of 16 years.

Syphilis

Lyme disease

Diabetes- Studies have shown that upto 40% of diabetes patients suffer from some kind of hearing loss.

Tuberculosis (TB)-Expert believe that the medication, streptomycin, used to treat TB may be the key risk factor

Hypothyroidism and underactive thyroid gland

Arthritis

Some Cancers

Second hand smoke exposure can increase hearing loss in teenagers

Many people globally have untreated hearing loss

The impact of hearing impairment on the child is determined by a variety of factors. Generally speaking, early treatment and training can help to minimize the developmental problems caused by hearing impairement.

1.1.5.2 Visual impairment (VI)

This term covers varying degrees of vision loss including those who are registered severely sight impaired (blind). Even the latter may have some vision, such as being able to tell the difference between light and dark. There are many conditions that cause different kinds of vision loss; the main distinction between conditions is whether the impairment is ocular (eye) or cerebral (brain).

Visual impairment is considered as the most severe and traumatic physical handicap. Since more impressions are conveyed to the brain through the eyes, the visual anomalies may influence the life of the individual in physical, mental, social, vocational and educational aspects.

Visual impairment (VI) refers to a significant functional loss of vision that cannot be corrected by medication, surgical operation, or ordinary optical lenses such as spectacles.

Meaning of Visual Impairment

It is an interesting phenomenon that visual impairment tends to evoke more awkwardness from us than any other disability. Why are we so uncomfortable about of blindness? For one thing blindness is visible. The blind person is usually not one who can easily weave himself into the fabric of a crowd. Unlike any other exceptional people he stands out. We often don't realize a person has impaired hearing until we talk to him.

There are two prevailing ways of describing visual impairment-the legal definition and the educational definition.

Legal definition of visually impaired—the legal definition involves assessment of visual acquity and field of vision. The American Medical Association (AMA) proposed the definition. This definition is now accepted by the American Foundation for the Blind (AFB) and other Blind Association in different countries.

"A legally blind person is said to be one (1) who has visual acquity20/200 or less in the better eye even with correction, (ii) whose field of vision is so restricted that it subtends an angle of 200 or less in the better eye after correction."

Visually impaired are those who suffer from either of the following conditions (Ministry of Social Welfare 1987) - a) Total absence of sight,

b) Visual acquity not exceeding 6/60 or 20/200(Snellen) in the better eye correction lenses,

c) Limitation of the field of visual subtending an angle of 20 degree or worse.

Within this broad definition, visually impaired children are differentiated into two categories, the blind and the partially seeing or low-visioned.

Educational definition of visually impaired- educationally defined, the blind child is defined as one whose visual loss indicates that he/she should be educated chiefly through the use of Braille and other tactile and auditory materials. The partially seeing child is defined as one who has some remaining useful vision and can use print and other visual materials as part of the educational programme.

Sensory Training and Mobility

In a visually impaired individual, the loss of sight is compensated by sense of touch and hearing. Sense of touch enables the persons to determine his position and direction. Hearing play a dominant role in mobility.

Explorations of an object through touch determine the definiteness of the object and help the individual to form a neat conception of them. Sense of touch also has a lot to do with reading. During his travel the smell of a gutter, the smell of smoke of a chemical industry (like paper factory, sugar factory etc.), smell of kitchen products etc. are source of information for the person to locate where he is, this leads to a greater level of confidence in mobility.

Daily living skills

These are also called as 'survival skills'. These build up confidence specially among visually impaired children. These are necessary for day to day living. Some of the common daily living skills are eating manners using toilet, dressing body hygiene, cleanliness, taking bath, washing cloth, handling money, shopping, shaving, proper use of electrical appliances, food preparation, cleaning of place, using medicine etc. learning daily living skills of a visually impared child are means of his proper social development also. These skills are difficult but not impossible to learn.

Classification

The degree of visual impairment can be classified into three levels:

Mild	• Can read relatively larger characters. • No difficulty in identifying shapes ,colours and brightness contrast
Moderate	• Can tell shapes and colours of objects and can distinguish between brightness and darkness • Can only read characters with larger size and broader strokes
Severe	• Can only distinguish more obvious changes in brightness and darkness • May not see anything(completely blind)

The visually impaired children have been classified medically which are shown in the following table:

Category/ Level	**Better Eye**	**Worse Eye**	**Percentage of Impairment**
Level D	6/9-6/18	6/24-6/36	20%
Category I	6/18-6/36	6/60-nil	40%
Category II	6/60-4/60 or Field of Vision 100-20	3/60-nil	75%
Category III	3/60-1/60 or Field of Vision 100	F.C. at 1 ft. To nil	100%
Category IV	F.C. at 1 ft. To nil or Field of Vision 100	Field of Vision 100	

There are two major categories of visually impaired children :

(i) The partially sighted are those who require large print or magnified print materials. Their visual acquity is very low (20/70 in the better eye).this means that the child sees at 20ft when a normal child sees at 70 ft. Their eyesight may be weak

due to short sightedness, long sightedness, Such astigmatis need , glaucoma or muscle detachment.

(ii) The blind are those who need to be taught through Braille or through aural methods their visual acquity may fall to 2/200.Such children must be prepared in preacademic skills like braille reading and use of cane for mobility before integration.

Symptoms of Visual Impairment

The symptoms of children with visual impairment are:

During infancy:

- Lack of eye contact
- Blinking to bright light
- Do not look at his /her hands
- Do not visually follow moving objects in front of his /her face
- Slow response to voiceless toys or parents' faces; respond only to sound
- No imitation of others' expressions and actions
- Do not actively reach out for his /her favourite toys
- Fear of gross motor activities ,such as crawling

During early childhood

- Often keep his/her head down; lack eye contact with others
- Limited facial expression and body language
- Tend to hold objects very close to the eyes when looking at them
- Abnormal responses to bright to light (gazing at light excessively or trying to avoid it)
- Often bump into objects or fall over , and get confused with directions
- Search for his/her way using hands
- May press on eyeballs with fingers
- Jerky movements of the eyeballs

Causes of Visual Impairment

Loss of vision or impairment of vision is caused due to many reasons. Injury to the eye, inherited conditions, infections etc. are the main common causes that lead to vision loss or visual impairment. Generally causes of Visually Impairment are divided into two parts. One depends on systematic conditions and another is specific eye conditions.

SYSTEMIC CONDITIONS

- Diabetes
- Hypertension (high blood pressure)
- Cerebrovascular (brain blood vessel) disease or stroke
- Atherosclerotic disease (cholesterol deposits in blood vessels, including those of the eye)
- Human immunodeficiency virus (HIV) usually due to infection with cytomegalovirus, a virus that affects the eye
- Vitamin A deficiency
- Infections involving the eyes

Some eye infections, including those caused by parasites, are more common in developing countries. Infections in a pregnant woman can affect the foetus. This type of vision loss, present from birth, is called congenital blindness.

SPECIFIC EYE CONDITIONS

- Macular degeneration-deterioration of the central part of the retina
- Cataracts-clouding of the lens of the eye
- Glaucoma-damage to the nerve connecting the eye to the brain caused by increased pressure inside the eye
- Eye injuries
- Tumours involving the eye or surrounding structures in the head and neck

Now some causes of visual impairment are discussed briefly

Injury to the eyes

- Eye injury may happen while playing or at work or due to accidents which may result in vision loss and impairment.

- The commonest cause of vision loss is injuries to the cornea.

Inherited conditions of blindness and vision impairment

- The most common cause of inherited blindness is retinitis pigmentosa.

Infections of the eyes

- The baby may be born with blindness or visual impairment if the mother has had a viral infection like German measles that is transmitted from the mother to the developing foetus during pregnancy.
- Trachoma of the eyes caused by contagious microorganism called *Chlamydia trachomatis* may also damage eye sight. This is seen in the developing and underdeveloped countries with poor water and sanitation facilities.

Amblyopia

- Generally Amblyopia means impaired vision in one eye due to lack of its use in early childhood.
- It is seen in squint or "lazy eye" since both the eyes project differently and send in different messages to the brain the brain may then turn off or suppress images from the weaker eye.This stops development of the weaker eye leading to amblyopia in that eye.

Cataract

- Cataract means clouding of part or the entire lens of the eye.
- Normally, the lens is clear to let in the light that focuses on the retina. Cataracts prevent light from easily passing through the lens, and this causes loss of vision.
- Due to cataract cloudy or blurry vision, difficulty in seeing in dimly lit areas and bright lights, colours appear faded, double vision etc. happen. This condition usually affects the elderly.
- Cataract is the leading cause of blindness in the world compared to other eye disorders.

Diabetic retinopathy

- The small blood vessels in the retina are affected due to diabetes for which impairment of vision is caused.

- This is the commonest cause of blindness and visual impairment in the United States.

Glaucoma

- Raised pressure within the eyes is caused due to Glaucoma. The increased pressure impairs vision by damaging the optic nerve.
- This may be seen in older adults and in some babies as well who are born with the condition.

Age related Macular Degeneration

- The progressive loss of the visual acuity due to damage to the macula that is the most sensitive part of the retina is called Age related Macular Degeneration or AMD.
- Due to AMD the center of the visual field appears blurry or opaque. The patient is unable to focus clearly. This mainly occurs in the elderly.
- Those who are exposed to excess sunlight and those who smoke excessively may suffer from AMD.

AIDS related visual impairment

- Viral infections of the eyes called Cytomegalovirus or CMV retinitis may cause AIDS related visual impairment.

Cancer of the eyes

- The most common eye cancer of children is called Retinoblastoma.

1.1.5.3 Dual Sensory Impairment (Deaf-Blindness)

Meaning of dual sensory impairment

It is the combination of both hearing and sight impairment. It is not necessarily a total loss of both senses - indeed the majority of dual sensory impaired people do have some degree of sight and/or hearing. Those with a less severe degree of both sight and hearing impairment may also be referred to as having a dual sensory impairment or loss. The words dual sensory impaired and deaf-blind are generally accepted as inter-changeable words.

When a person has difficulties seeing and hearing then the person can be termed deaf-blind. Although it is more common to refer to someone as being deaf-blind if their combined sight and hearing loss causes difficulties for them with communication, mobility and access to information.

The combination of the two sensory impairments intensify the impact of each other, which usually means that a deaf-blind person will have difficulty, or find it impossible, to utilise and benefit fully from services for deaf people or services for blind people. Meeting the needs of deaf-blind people therefore requires a separate approach.

Deaf-blindness is a unique and extremely complex disability that often requires specialist communication methods and and systems being introduced to the person and those around them to enable communication to take place.

Deaf-blindness has adverse effects on all areas of development, in particular the language acquisition process, conceptual development, motor development, behaviour and personality of a person.

People who are deaf-blind can generally be separated into two groups:

Congenital Deaf -blindness - People who were born with a hearing and vision impairment.

This category may also include individuals who are born hearing - sighted, but who become deaf-blind through accident or illness within the first months of their lives. The important factor being that they become deaf-blind before they had the opportunity to gain formal language skills.

Acquired Deaf-blindness - People who develop deaf-blindness later in life.

Three combinations are possible :

a) Individuals who are born blind and later develop a hearing impairment.

b) Individuals who are born deaf and later develop vision impairment.

c) Individuals who are born sighted and hearing, but later develop a vision and hearing impairment.

Every deaf -blind person is an individual and may not fit neatly into any of the above categories, or use the suggested means of communication. Their situation may be complicated by the existence of other factors such as physical and/or learning disabilities etc.

Symptoms of deafblindness

Levels of hearing and sight loss vary between individuals who are deafblind.

Hearing loss

In deafblindness, hearing loss can occur from birth or may develop later after an infection or injury. In other cases, a person's hearing may gradually deteriorate over time.

Someone with impaired hearing may find that speech and other noises sound muffled and indistinct and they may not be able to follow and understand conversations, particularly when there's background noise.

A person with a hearing problem may also need to turn up the volume on the television or radio and ask others to speak loudly, slowly and more clearly.

Sight loss

A person who is deafblind may have developed a condition that gradually causes their vision to deteriorate. For example, they may have an eye condition such as:

- cataracts - cloudy patches that form on the eye's lens
- glaucoma - pressure changes inside the eye that damage the optic nerve (the nerve that transmits images from the eye to the brain)
- retinopathy - a number of eye disorders that damage the blood vessels of the retina (light-sensitive tissue at the back of the eye) and can lead to vision loss

Common symptoms of conditions that cause progressive sight loss include:

- eye pain
- blurred vision
- halos around light sources
- reduced night vision
- difficulty seeing in bright sunlight or well-lit rooms

Causes of Deaf-Blindness

There are many causes of deaf-blindness. Those that are present or occur around the time a child is born include prematurity, childbirth complications, and numerous congenital syndromes, many of which are quite rare. Deaf-blindness may also occur

later in childhood or during adulthood due to causes such as meningitis, brain injury, or inherited conditions.

Congenital deafblindness is when people are born deafblind.

Some people become deafblind later in life and this is called acquired deafblindness.

Many people who are deafblind have rare and varied causes of their sight and hearing loss. They may experience other disabilities and health conditions, meaning that diagnosis and the identification of sight and hearing loss are difficult.

Causes of deafblindness include:

- Infections during pregnancy
- Prematurity
- Rare syndromes, such as Usher and CHARGE
- Illness and accidents
- Sensory loss in old age

Many children with profound and multiple learning disabilities will experience limited communication skills and impairments of vision and hearing.

Congenital rubella syndrome is no longer a significant cause of deafblindness, but other infections during pregnancy are a factor, for example cytomegalovirus and toxoplasmosis.

One in ten babies born prematurely will develop a permanent disability such as cerebral palsy, blindness, deafness or lung disease, or a combination of these.

Illness and accidents can lead to sensory loss in children and adults, and a number of conditions lead to a loss of sight and / or hearing over time.

Sensory loss is just one more effect of old age. A hearing and vision loss may have crept up slowly on a person, so they only gradually realise something is wrong. As a result the everyday difficulties a person describes are not just to do with ageing but are the typical effects of deafblindness.

Below is a list of potential causes of deafblindness with links to websites containing additional information.

Please note that the information on these pages is for information purposes only. It should never be used for diagnostic or treatment purposes.

If you have questions regarding a medical condition, always seek the advice of your general practitioner or other qualified health professional.

Rubella

Rubella is a mild and preventable disease caused by a virus. If you catch it you may feel unwell, with swollen glands, a slight temperature, or a sore throat and rash.

But some people have no symptoms at all and so are unaware that they may be infectious and may be passing on the disease.

Rubella is very serious if a pregnant woman catches it in the early stages of her pregnancy because it can profoundly damage the development of her unborn child. It can result in deafblindness or raise the possibility of a termination.

Ensuring that children are routinely vaccinated helps to protect pregnant women and their babies.

Congenital rubella syndrome

A baby born affected by rubella is said to have congenital rubella syndrome (CRS). Many will have hearing loss, cataracts, other eye conditions, and heart problems that require significant hospital treatment and will affect the child throughout their life. A baby's brain can also be affected.

The risk of congenital rubella syndrome affecting the baby and the extent of the birth impairments it causes depends on how early in the pregnancy the mother is infected. The earlier in the pregnancy the greater the risks.

German measles is a common term used to describe rubella.

1.1.6 Let us sum up

90% of the information about the world around us comes from sight and hearing. Medically there are four senses, viz. visual, auditory, gustatory and olfactory, which give special information about the environment; hence these are named as special senses. Some people live with some major impairment which is related to vision, auditory, mental & physical. Sensory impairment has two types- Single & Dual. Hearing and visual impairment is under single sensory impairment and deaf-blindness is under dual

sensory impairment. A person suffering from hearing impairment has difficulty in perceiving or identifying sound clearly due to auditory problems which prevent a person from receiving sounds through ear. Visual impairment is considered as the most severe and traumatic physical handicap and it may influence the life of an individual in physical, mental, social, vocational and educational aspects. Dual sensory impairment is the combination of both hearing and sight impairment (Deaf-Blindness).

1.1.7 ''Check your progress''

Q.1. What are the two types of sensory impairment?

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Q.2. Which type of impairment comes under single sensory impairment?

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Q.3. What do you mean by Congenital Factors for causing Hearing Impairment?

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Q.4. What are the two conditions that cause visual impairment?

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Q.5. Write the name of two diseases which affect all types of sensory impairment?

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1.2 □ Importance of hearing

Structure

1.2.1 Introduction

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1.2.1 Introduction

"Blindness separates people from things. Deafness separates people from people." There is no better way to describe why hearing is of such great importance in our lives than the words of the philosopher Immanuel Kant. Hearing helps us to establish contact with other people, holding an intimate conversation or simply laughing together - hearing means communication and is an irreplaceable component of our social lives. An unborn child already picks up sounds, voices, and even music.

Hearing is used round the clock. It is key to communication and hence to social interaction. The ear is man's most efficient but also most sensitive sensory organ. However, proper importance is not given to it by our modern, visually-oriented world.

Considering the importance of hearing to one's career, interpersonal relationships, achievement, and safety, it is not surprising to find that the costs of hearing loss are

widespread and grave. Readiness is disrupted by noise-induced hearing loss and result in decreased effiency.

For service member, hearing is considered as the most important survival sense. Sound is often the first source of information a warrior has before direct contact with the enemy. As such, hearing is vital for both lethality and survivability. In the military, hearing is fundamental to the instruction, teamwork and reporting skills that are necessary for mission accomplishment. Moreover, hearing is essential for forging relationships and connections with friends and family, fully participating in team and community activities, and experiencing life events.

1.2.2 Objectives

After going through this subunit the learners will be able to

- know about the importance of hearing
- understand the effect of hearing in living
- know about the process of hearing
- know about the impacts of hearing loss

1.2.3 Why is hearing important?

Hearing empowers us and enriches our lives. Hearing enables us to socialise, work, interact, communicate and even relax. Good hearing also helps to keep us safe, warning us of potential danger or alerting us to someone else's distress.

Hearing is very much important for us to be able to live and participate in life more effectively. Hearing problems may lead to feelings of isolation and even depression. Our hearing provides us with an enormous source of information, which forms the bridge between the worlds and how we interact with it.

The ability to hear is an integral part of our lives. The importance of good hearing and the consequences of hearing loss are still underestimated. Due to the demographic aging of our society and the growing noise pollution in our environment, the number of people affected by hearing loss continues to rise.

1.2.4 What are the consequences of hearing loss?

Serious consequences are often faced by the people with untreated hearing loss. These range from disadvantages at work, relationship problems and social isolation, which may even lead to depression. Since the development of speech and language of children is fundamentally dependent on the sense of hearing, the consequences are severe for the children with an untreated hearing loss.

1.2.5 Effect of Hearing in living

Every part of our life is influenced by hearing. Hearing accompanies us throughout our life. Hearing enables us to communicate with others. Sounds are there with us in our daily life - some relax us, others cause stress. Much of what we hear we enjoy. There are everyday sounds we no longer even notice, and other noises we would rather just avoid. Our ears help us to communicate with other people, to listen to music or make music ourselves.

Our hearing is partly responsible for how well we sleep at night. The quality of our hearing also affects our personal relationships and happiness in our partnerships.

Two important things of hearing in living

The first important thing is that so many areas of our everyday life are influenced by hearing. that improved hearing has one benefit above all others: enhanced quality of life. Better hearing means better communication - in our relationships with our partners, as well as toward friends and family. Good hearing is not merely of benefit to ourselves : its positive effects are also directly measurable among family, relatives and partners.

The second important thing is that we are able to experience life in a more active, healthier way, and with fewer restrictions with better hearing. Stress is reduced, or may be avoided in the first place, concentration is improved, and relaxation is easier. Moreover good hearing also contributes to enhanced personal wellbeing and general health.

Healthy hearing allows us to communicate. to socialize with friends, to alert us trouble and work more effectively. Healthy hearing even helps us to relax.

So when our hearing declines which happens for most people at some point -it can feel like much of our life is going downhill. The fact is, hearing loss doesn't just affect us physically. It can impact our emotional and social health, too.

Left untreated, hearing loss is often related to:

- Negative attitudes, anger and irritability
- Stress, fatigue anred tension
- Depression
- Loneliness
- Desire to avoid social scenes
- Unsafe situations due to decreased alertness
- Lower job performance
- Trouble remembering things or following directions

Many people chalk these symptoms up to old age. But in truth, hearing loss occurs in every age group. It's especially important to catch hearing loss in children since hearing is so essential to language development and hearing skills. But adults young and old also need to watch for signs of hearing loss so that they can make the most of their quality of life.

Hearing helps us to lead our everyday lives without limitations.

1.2.6 Everyday situations that can be affected by hearing loss

Hearing is important...

... at work

- Participating in group meetings.
- Talking on the telephone.
- Following a conversation in a busy office.

... at social occasions

- Chatting to friends.
- Participating in dinner conversation at a restaurant.
- Interacting with grandchildren.
- Talking on the telephone.
- Watching TV together with others.

... for our own safety

- When walking near busy roads.
- To be able to hear sounds that alert us to danger like sirens and other traffic signals.
- So we can be alert to a cry for help.

... when we learn

- Allowing us to maintain a high level of concentration with little effort.
- So we are able to communicate with instructors.
- So we are able to register information accurately.

1.2.7 How hearing works

The ear, despite its small size, is a highly complex organ. Acting as sound filter, the ear transforms every sound audible to us into accurate information the brain can prioritise.

Each ear consists of delicate and highly complex mechanisms. In "the inner" ear, a sea of tiny sensory cells and nerve fibres pick up sound vibrations and transform them into electrical impulses for the brain to process.

The sensory cells and fibres can become damaged if the ear is exposed to strong vibrations over time. If these are unable to heal or be replaced, this can lead to permanent hearing loss.

Hearing works in six steps. These are

1. Sound funnels into the ear canal and causes the eardrum to move.
2. The eardrum vibrates with sound.
3. Sound vibrations move through the ossicles to the cochlea.
4. Sound vibrations cause the fluid in the cochlea to move.
5. Fluid movement causes the hair cells to bend. Hair cells create neural signals which are picked up by the auditory nerve. Hair cells at one end of the cochlea send low pitch sound information and hair cells at the other end send high pitch sound information.
6. The auditory nerve sends signals to the brain where they are interpreted as sounds.

1.2.8 Anatomy of the ear

The ear is made up of three parts:

- the outer ear (the external ear and the ear canal)
- the middle ear (the ear drum and three very small bones)
- the inner ear (the cochlea and auditory nerve)
- Sound travels through the air in waves resulting in a series of vibrations within the ear. The brain then interprets those signals into meaningful sounds such as speech.

Our ears are small but highly complex amplifiers.

OUTER EAR

At the end of the ear canal, the sound waves hit the ear drum. The ear drum is a thin membrane between the outer ear and middle ear.

MIDDLE EAR

The ear drum is connected directly to the hammer. The three tiny bones - hammer, anvil and stapes-are the smallest bones in human body, and transmit the mechanical vibrations of the ear drum into the inner ear.

INNER EAR

The stapes transmits the vibrations via the oral window to the inner ear. In this way, the sound waves arrive in the cochlea, which is filled with fluid.

1.2.9 Hearing Loss Impacts:

Health:

Hearing loss has been linked to feelings of social isolation, depression, and chronic disease.

Safety:

Hearing loss can cause threat so far as safety of our service members is considered since it diminishes their ability to send, receive, and respond to commands and warning signals and can result in the misinterpretation, or miscommunication, of critical information.

Quality of Life :

Hearing helps us to enjoy our life fully which helps to shape the quality of our life. The impact of hearing loss for our military personnel is not only significant on the battlefield but also at home and in their interpersonal lives. It still impedes one's ability to participate in and experience many of life's cherished moments, such as hearing a loved one's voice or laughter, participating in meaningful conversations with friends and family, hearing birds chirping or waves crashing on the beach, or enjoying one's favorite shows or sports on TV.

Mission accomplishment :

For effective operational planning and execution communication is a must. Hearing loss can disrupt communication and therefore substantially impede a service member's ability to carry out his or her mission. Miscommunication or misinterpretation of a command/order/ instruction, may happen due to hearing loss which can have dire consequences for the service member and the unit at large.

Hearing loss also contributes to a hefty economic toll. In addition to the indirect and direct costs associated with veteran compensation for hearing loss and related injuries, which accounts for billions of dollars annually, these injuries also result in expenses in the form of decreased productivity, loss of qualified service members, and recruitment and retraining costs.

1.2.10 Tips for parents

Of babies with hearing loss

- Above all, babies with hearing loss need exactly the same as all children: the love, patience and attention of their parents.
- Even when their baby is still an infant, parents should try to maintain eye contact when speaking to them. Their facial expressions and gestures should match what they are saying.
- Hearing loss in your baby should not be a taboo subject: if it is spoken about openly from early on, it is easier for the parents, and later also the child, to treat it as something natural.

When children learn to speak

- Parents should treat their children as normally as possible.

- Parents should speak as clearly as possible, maintain eye contact with their child when speaking, and teach their child to always look at the person talking to them. If the child does not understand everything they say, they should repeat what they said using different words.
- Even at a very young age, children should be encouraged to ask if there is anything they have not understood correctly.
- Parents should make sure that background noise is kept to a minimum when speaking to their child.
- If parents read picture books to young children, they should bring the pictures to life with sounds as well as reading the text provided (e.g., imitating animal noises). This will enable children to imitate sounds and learn from an early stage how to participate verbally in communal reading.

How to successfully master school life

- Parents should get to the bottom of unusual behaviour at school or concentration difficulties as soon as possible: hearing loss could be the cause.
- If opting for a mainstream school, a few points should first be clarified with the classroom teacher: the student in question should sit as close to the front as possible (for better comprehension / lip reading where applicable) and the teacher should use an FM/Roger system.
- Speech or music therapy can also provide additional support for the child. As well as enhancing the child's verbal and communication skills, this can also promote reading and writing skills.

1.2.11 Let us Sum up

Blindness separates people from things and deafness separates people from people. Hearing means communication & is an important component of our social lives. The ear is man's most efficient & sensitive sensory organ. If we consider the importance of one's career, interpersonal relationships, achievement & safety, it is not surprising to find the costs of hearing loss are widespread & grave. Operational effectiveness is decreased due to Noise Induced Hearing Loss. Sound is often the source of information a warrior has before direct contact with enemy. As such, hearing is very vital for lethality & survivality. Hearing enables us to socialise, work, interact, communicate & even relax. Safety of an individual as well as other depends on good hearing capacity. Problems

of hearing may lead to feeling of isolation & even depression. If treatment is not done for hearing loss, people may face with serious consequences like disadvantages at work, relationship problem, social problem which may lead to depression. There are two important things of hearing in living. Firstly, better hearing means better communication effects in relationship with partners, friends and family. Secondly, better hearing helps us to reduce stress, improve concentration and easy relaxation. On the other hand, effect of hearing loss is observed in our emotional & social life. Hearing helps us lead our everyday life without limitations. Impact of hearing loss is observed at work, at social occasions, safety on road & workplace and in learning practices. Our ear consists of three parts - Outer ear, Middle ear & Inner ear. Sound travels through the air in waves resulting in a sense of vibration within the ear. The brain then interprets those signals into meaningful sounds such as speech.Care is required to be taken for the children having hearing loss problem since the development of speech and language of children is fundamentally dependent on sense of hearing.

1.2.12 ‘‘Check your progress’’

Q.1 In which areas of one's career is hearing important?

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Q.2 How many steps are involved in hearing process?

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Q.3 How many parts are there in the ear?

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Q.4 Write the name of three tiny bones of middle ear.

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Q.5 Write one of the important things of hearing in living.

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1.3 □ Process of hearing & its impediment leading to different types of hearing loss

Structure

1.3.1 Introduction

1.3.2 Objectives

1.3.3 Process of Hearing

1.3.3.1 Anatomy of the Ear

- **External Ear**
- **Middle Ear**
- **Inner Ear**
- **Auditory Pathway**

1.3.3.2 Physiology of the Ear

- **Function of the External Ear**
- **Function of the Middle Ear**
- **Function of the Inner Ear**
- **Function of the Auditory Pathway**

1.3.4 Types of hearing loss

1.3.4.1 On age of onset

1.3.4.2 On the location of the problem

1.3.4.3 Nature of hearing impairment

1.3.4.4 Degree of hearing impairment

1.3.4.5 On the basis of cause

1.3.5 Impediment caused by different types of hearing loss

1.3.6 ''Check Your Progress''

1.3.1. Introduction

Hearing comes first and then speaking. Learning process of most students starts with

their hearing. One of the earliest link infants develop is between what they hear and what they see. Our speaking vocabularies depend on our hearing vocabularies (the words we understand). Hearing enables us to know more than we can say. Language acquisition and the knowledge of the world that comes with it are naturally occurring process for all students.

Deaf or hearing impaired students experience their world in a markedly different way than do their hearing peers. Without early and special help they may not acquire spoken language. For effective education and socialization speech and language are critical avenues in our society. Hearing impaired students may be cut off this processes and become isolated unless early identification is done and helped to compensate for their hearing loss by undergoing corrective medical treatment or learning to use amplification, normal ways of receiving and expressing language, or various types of assistive devices.

So, it is very much important to know the process of hearing, types of hearing loss and its impediments leading to different types of hearing loss if we want to know regarding hearing impairment.

1.3.2 Objectives

After going through this subunit the learners will be able to

- know about the Process of hearing
- know the different parts of the Ear
- state the functions of the Ear
- know about the types of hearing loss

1.3.3 Process of Hearing

Through our organ- Ear, we are able to acquire hearing, auditory perception, or audition to perceive sound by detecting vibrations, changes in the pressure of the surrounding medium through time, we may hear sound through solid, liquid, or gaseous matter. It is one of the traditional five senses; partial or total inability to hear is called hearing loss.

For humans and other vertebrates, hearing is performed primarily by the auditory system. Vibrations (mechanical waves,) are detected by the ear and transduced into

nerve impulses which are perceived by the brain (primarily in the temporal lobe). Like touch, audition requires sensitivity to the movement of molecules in the world outside the organism. Both hearing and touch are types of mechanosensation.

During hearing, sound waves enter the auditory canal and strike the eardrum, causing it to vibrate. The sound waves are concentrated by passing from a relatively large area (the eardrum) through the ossicles to a relatively small opening leading to the inner ear.

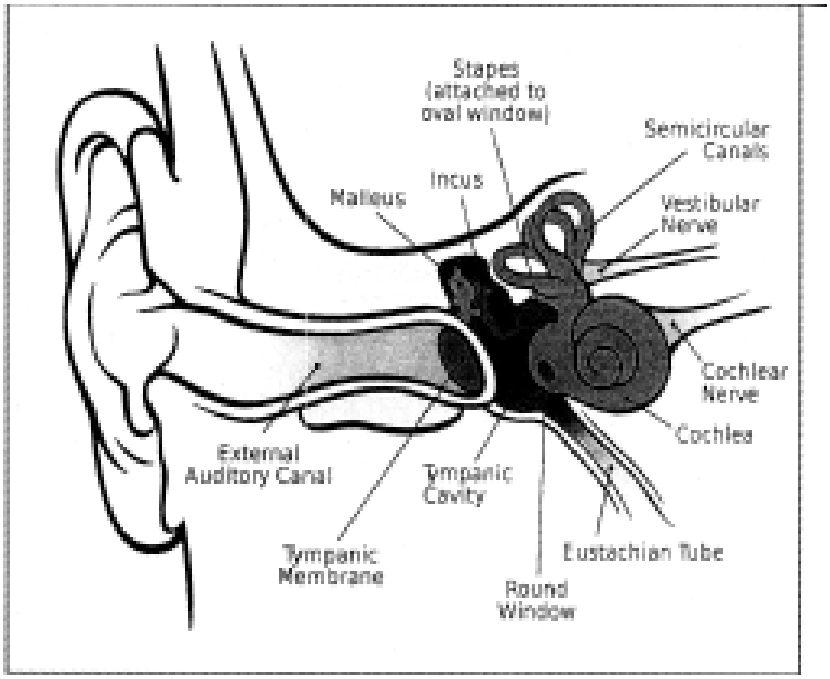


Fig 1

For knowing the hearing process it is necessary to know about the anatomy of the Ear.

Anatomy of the Ear

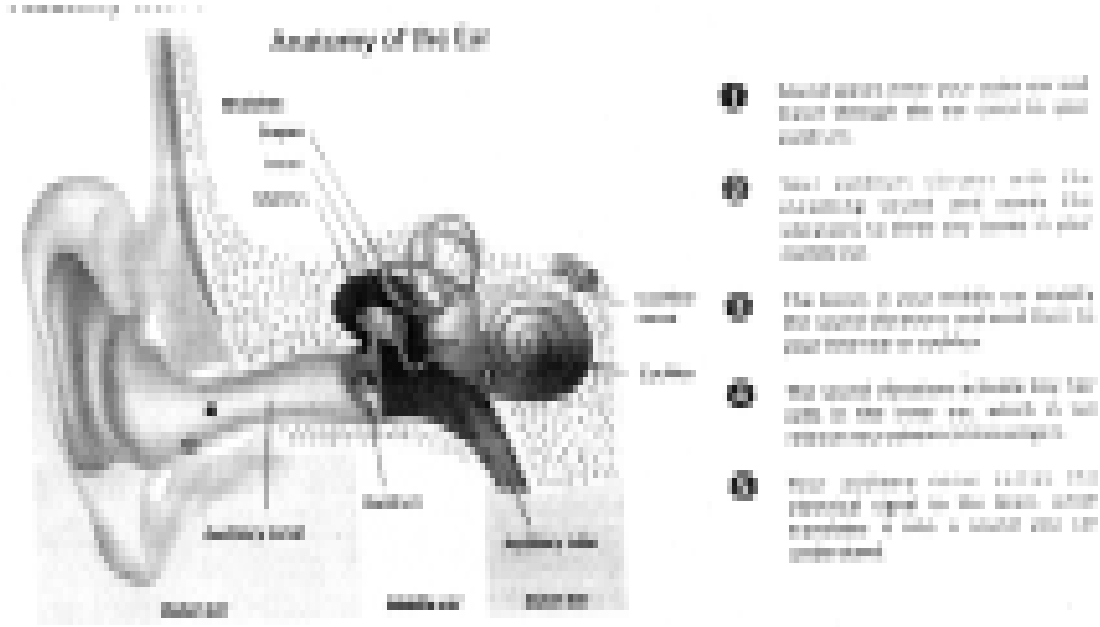
To understand properly about the hearing loss, it is necessary to first understand the anatomy of the ear. The ear has three main parts: the outer ear, the middle ear and the inner ear

External Ear

- Pinna (auricle) - collects and funnels sound into the ear canal
- Ear canal (external auditory meatus) - directs sound into the ear

Middle Ear

- Eardrum (tympanic membrane) - changes sound into vibrations
- Ossicles or Hammer, anvil and stirrup (malleus, incus and stapes) - this chain of three small bones (ossicles) transfers vibrations to the inner ear Inner Ear
- Inner ear (cochlea) - contains fluid and highly sensitive "hair" cells. These tiny hair-like structures move when stimulated by sound vibrations
- Vestibular system - contains cells that control balance
- Auditory nerve - leads from the cochlea to the brain



External Ear

The external or outer ear is the outer most portion of the ear. It has two parts-

(i) Pinna and (ii) Ear canal.

(i) Pinna (auricle)

The Pinna or Auricle is that part of the ear which we can see from outside. The pinna is of conical shaped structure and is attached to the head, on either side, at an angle of 30 to 40 degree. The various portions of pinna play an important role in human

hearing. The entire pinna or auricle is made up of an elastic cartilaginous structure and it has no bones. The pinna remains live and active due to the blood and nerve supply.

Ear canal (external auditory meatus)

The external auditory Canal/Meatus is "S" shaped tube that opens at the pinna but closed inside by the tympanic membrane or eardrum. The length of an adult auditory canal is about 25 to 40 mm and has a volume of about 2 cc. The outer two third portion of the ear canal is cartilaginous one while the inner one third portions is bony i.e., has bony base. The entire canal is lined with skin and epithelial cells. The outer portion of the ear canal also has hair follicles on the skin. A pair of glands namely cerumenous and sebaceous glands is present on the both sides of the external auditory Canal/Meatus. The ear canal carries out its functions in smooth and appropriate manner due to the blood and nerve supply.

Middle Ear

The middle ear is a small air filled cavity of about 2cc. It is located between the external ear and the inner ear. The middle ear is that portion of the ear, which plays a very vital role in "Bio medical Engineering" activities of the human ear. The middle ear has two important parts - (i) Eardrum and (ii) Ossicles.

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Eardrum (tympanic membrane)

It forms the outer wall of the middle ear cavity. The tympanic membrane is commonly known as eardrum. It is a very thin membrane and its thickness is about 1/10th mm. The normal tympanic membrane is pinkish in colour. It is roundish oval in shape. It is also concave. It has an area of about 85 to 90 sq.mm. The conical shape of the tympanic membrane transmits maximul sounds into the middle ear.

Ossicles or Hammer, anvil and stirrup (malleus, incus and stapes)

The middle ear has three small bones known as the ossicles. These three bones are the smallest bones in human body, which are joined to one another and thus form a chain. The chain is commonly known as ossicular not only transmits sound waves from the middle ear to inner ear but also helps to amplify sound.

Malleus: It is a hammer shaped bone which has two handle, its long handle is attached to the tympanic membrane and short handle is free. For its typical hammer shape, it is known as "malleus".

Incus : This is second smaller bone of the ossicular chain .It is an anvil shaped bone

with the head and two handle like structures. The head of the malleus is attached to the head of the incus. The long handle of the incus is attached to the third ossicle called Stapes, while the short handle is free.

Stapes: This is the smallest bone not only in the middle ear but also in the whole body. It is a stirrup shaped bone with a small head and an oval shapped footplate. Among all three ossicles, stapes plays very vital role in both transmission and amplification of sound waves from middle ear to inner ear.

Inner Ear

Inner ear is also known as an internal ear. It is also referred to as Bony Labyrinth as it consists of a set of complicated tubes in it. It is also called as vestibule since it has a passage to the other portions of the auditory system and brain. Both the organs of hearing as well as the organ of the balance are situated in the inner ear. The main three parts of the inner ear are Cochlea, Vestibular system and Auditory nerve.

Cochlea:

Cochlea, the organ of hearing is a snail shaped bony structure. It is made up of a twisting bony shell, which is about 1cc wide and 5 mm broad from base to apex. The cochlea is divided into three fluid-filled parts. Two canals are for the transmission of pressure and the third one is the sensitive organ of Corti, which detects pressure impulses and responds with electrical impulses which travel along the auditory nerve to the brain. It is divided lengthwise by the organ of Corti, which is the main organ of mechanical to neural transduction. Inside the organ of Corti is the basilar membrane, a structure that vibrates when waves from the middle ear propagate through the cochlear fluid - endolymph. The basilar membrane is tonotopic, so that each frequency has a characteristic place of resonance along it. Characteristic frequencies are high at the basal entrance to the cochlea, and low at the apex. Basilar membrane motion causes depolarization of the hair cells, specialized auditory receptors located within the organ of Corti.[5] While the hair cells do not produce action potentials themselves, they release neurotransmitter at synapses with the fibers of the auditory nerve, which does produce action potentials. In this way, the patterns of oscillations on the basilar membrane are converted to spatiotemporal patterns of firings which transmit information about the sound to the brainstem

Vestibular system

In most mammals, the vestibular system, is the sensory system that provides the leading contribution about the sense of balance and spatial orientation for the purpose of coordinating movement with balance. Together with the cochlea, a part of the auditory

system, it constitutes the labyrinth of the inner ear in most mammals, situated in the vestibulum in the inner ear (Figure 1). Since movements consist of rotations and translations, the vestibular system comprises two components: the semicircular canal system, which indicates rotational movements; and the otoliths, which indicates linear accelerations. The vestibular system sends signals primarily to the neural structures that control eye movements, and to the muscles that keep an animal upright. The projections to the former provide the anatomical basis of the vestibulo-ocular reflex, which is required for clear vision; and the projections to the muscles that control posture are necessary to keep an animal upright.

The brain uses information from the vestibular system in the head and from proprioception throughout the body to understand the body's dynamics and kinematics (including its position and acceleration) from moment to moment.

Auditory nerve

The cochlear nucleus in the brainstem receives the sound information from the cochlea which travels via the auditory nerve . From there, the signals are projected to the inferior colliculus in the midbrain tectum. The inferior colliculus integrates auditory input with limited input from other parts of the brain and is involved in subconscious reflexes such as the auditorystartle response.

The inferior colliculus in turn projects to the medial geniculate nucleus, a part of the thalamus where sound information is relayed to the primary auditory cortex in the temporal lobe. Sound is believed to first become consciously experienced at the primary auditory cortex. Around the primary auditory cortex lies Wernickes area, a cortical area involved in interpreting sounds that is necessary to understand spoken words.

Hearing problems may be caused due to the disturbances (such as stroke or trauma) at any of these levels, especially if the disturbance is bilateral. Auditory hallucinations or more complex difficulties in perceiving sound may also occure for the same in some instances.

1.3.4 Types of hearing loss

Hearing loss have been classified under various subgroups from various angles. Some categories are as follow:

1.3.4.1 Age of onset

Hearing impairment may occur since birth or it may be acquired at any age in life.

Thus depending on the age of onset we have two groups of hearing loss such as-

(A) Congenital hearing loss

(B) Adventitious hearing loss

(A) Congenital hearing loss

It refers to any hearing loss occurring prior to birth or at the time of birth. It may be hereditary or may develop during prenatal or natal period.

(B) Adventitious hearing loss

It means that who is born with normal hearing and has acquired speech but later lost hearing ability due to infection, disease or some damage to the hearing mechanism.

Another two types of hearing loss can be mentioned here. These are:

i) Pre-lingual hearing loss- The term pre-lingual hearing loss refers to that hearing loss developed prior or before the language development or language acquisition or language age. The hearing loss developed during the first three years of life is considered as pre-lingual.

ii) Post-lingual hearing loss- The term post-lingual hearing loss refers to that hearing loss developed after the language had developed significantly. Post-lingual hearing loss can be sudden or progressive in nature. The person with post-lingual hearing loss finds it more difficult to adjust and adapt to deafness as compared to pre-lingual deafened persons.

1.3.4.2 On the location of the problem

Hearing loss is also classified into three types depending upon the location of the hearing problem or defect. There are three types of problems-

(A) Conductive hearing loss

(B) Sensorineural hearing loss and

(C) Mixed hearing loss

(A) Conductive hearing loss

Hearing problems when are located in the outer ear and middle ear it is called Conductive hearing loss. Conductive loss of hearing is curable.

(B) Sensorineural hearing loss and

Sensorineural hearing loss takes place when hearing problems arise out of the defects in the inner ear.

(C) Mixed hearing loss

Combination of conductive loss and sensorineural loss is called Mixed hearing loss.

1.3.4.3 Nature of hearing impairment

On the basis of nature, hearing impairment can be classified as:

A) Gradual hearing impairment

B) Sudden hearing impairment

A) Gradual hearing impairment-

Gradual hearing impairment is also termed as "progressive hearing loss". This refers to a slow deterioration of hearing sensitivity with time. This may be due to any infection or hereditary disorder or aging. Conductive or mixed or sensori-neural hearing impairment can be gradual or progressive in nature.

B) Sudden hearing impairment

In Sudden hearing impairment, the patient over night may suffer partial or complete hearing loss in either one or both ears. This hearing loss results due to onetime insult to the auditory system. Usually the damage to the auditory system results in a permanent hearing loss. Sudden hearing impairment is usually always of sensori-neural type.

1.3.4.4 Degree of hearing impairment

An important consideration of any hearing loss is the degree of impairment. On the basis of degree hearing impairment classified into the following sub-groups. Hearing loss or hearing sensitivity is measured in decibels (dB).

Normal hearing sensitivity is -10 dB to 25 dB. Degree of Hearing Loss as per the Ministry of Welfare (Govt. of India), Notification No.4283HW, dt. 6.9.86 are given in the following table:

Level	Types of Impairment Impairment	dB Levels	Speech discrimination	Percentage of Impairment
I.	Mild Hearing Impairment	dB 26 to 40 dB in better ear	100% in better ear	Less than 40%
II.	Moderate Hearing Impairment	41 to 55 dB in better ear	50% to 80% in better ear	40% -50%
III.	Severe Hearing Impairment	50 to 70 dB hearing impairment in better ear	40 % to 50 %	50 % -75%
IV.	(a) Total deafness	No hearing	no discrimination	100%
	(b) Near total deafness	91 dB & above in better ear	- do-	100% 75%-100%
	(c) Profound hearing Loss	71 to 90 dB	Less than 40% in better ear	

Decibel (dB) means a unit of relative loudness of a sound. Zero decibels (0 dB) designate the point at which people with normal hearing can detect even the faintest sound. Each succeeding number of dB indicates a certain degree of hearing loss.

1.3.4.5 On the basis of cause

Hearing loss can be classified as Exogenous Hearing Impairment, Endogenous Hearing Impairment and Idiopathic hearing impairment.

(a) Exogenous Hearing Impairment

This refers to hearing loss caused by all factors other than heredity. These factors include:

- Prenatal causes (Cause before birth)
- Natal causes (Causes at the time of birth)
- Post natal causes (Causes after birth)
- Infections

- Noise
- Aging

(b) Endogenous Hearing Impairment

This includes only "heredity" as the causative factor for hearing loss. Hereditary hearing loss may be transmitted as a dominant or recessive characteristic.

(c) Idiopathic Hearing Impairment

This refers to hearing loss of an unknown pathology or cause i.e., the causes of hearing loss is unknown.

1.3.5 Impediment caused by different types of hearing loss

Due to different types of hearing loss, an individual faces various types of profound consequences life which are restricted below-

1. Socially handicapped
2. Problems in Personal & Social Development
3. Personality Problems
4. Psychological Problems
5. Linguistic Problems
6. Abnormal Emotional Behaviour

1. Socially handicapped

Hearing impaired children find it very difficult to adjust with the environment of the society. They suffer from personality disorders & slow temperament, withdrawl or submissiveness etc. They very often fail to understand what other people say due to which they face communication difficulties.

2. Problems in Personal & Social Development

Personal & social development problem is very common with the hearing impaired children. The main barrier for them for communicating with other is language-which affects the socialisation process and plays a vital role in their personal & social development. The most significant aspect of these children is their increased dependence on others which causes sense of inferiority.

3. Personality Problems

Studies show that hearing impaired children face some personality problems. Partial hearing children face more problem than the totally deaf children since partially deaf child gets more frustrated as he tries to reach the level of normals.

4. Psychological Problems

Hearing impaired children suffer from behavioural problems. They suffer from inferiority complex since they find themselves helpless in adapting to circumstances that require verbal communication. They compare themselves with their peers and also judge the attitude of society towards them. They feel that they are different from the normal children which hampers the growth and development of their personality.

5. Linguistic Problems

The deaf children face difficulty for acquisition of language since language is an auditory vocal process which leads to very slow linguistics development in them. These children have to receive visually while the normal children receive orally. They differ significantly from the normal children so far as language development is considered. These children have a limited vocabulary; they lack comprehension of complex word and words with multiple meaning and concept. Moreover, they are faced with difficulty in understanding complex structure of language and sometimes they have no language exposure.

6. Abnormal Emotional Behaviour

Young hearing impaired children very often show abnormal emotional behaviour like throwing something to attract to attention to them. Lack of comprehension may invite tension and resistance in them. They get irritated when they cannot make them understood.

1.3.6 Let us sum up

In our society, speech and language are critical avenues for effective education and socialization. To know about Hearing Impairment, it is very much essential to know the process of hearing, types of hearing loss and causes leading to different types of hearing loss.

Through our organ- Ear, we are able to acquire hearing, auditory perception, or audition to perceive sound by detecting vibrations, changes in the pressure of the surrounding medium through time, we may hear sound through solid, liquid, or gaseous matter. It is one of the traditional five senses; partial or total inability to hear is called hearing loss. To understand properly about the hearing loss, it is necessary to first understand the anatomy of the ear. The ear has three main parts:

the outer ear, the middle ear and the inner ear.

To understand properly about the hearing loss, it is necessary to first understand the anatomy of the ear. The ear has three main parts: the outer ear, the middle ear

and the inner ear. The external or outer ear is the outer most portion of the ear. It has two parts-(i) Pinna and (ii) Ear canal. The middle ear has two important parts - (i) Eardrum and (ii) Ossicles. The main three parts of the inner ear are (i) Cochlea, (ii) Vestibular system and (iii) Auditory nerve. Hearing loss has been classified under various subgroups from various angles. Some categories are as follow:

(i) On age of onset (ii) On the location of the problem (iii) Nature of hearing

impairment (iv) Degree of hearing impairment (v) On the basis of cause. Hearing loss or hearing sensitivity is measured in decibels (dB). Decibels (dB) mean a unit of relative loudness of a sound. Zero decibels (0 dB) designate the point at which people with normal hearing can detect even the faintest sound. Each succeeding number of dB indicates a certain degree of hearing loss. Normal hearing sensitivity is -10 dB to 25 dB. Due to different types of hearing loss, an individual faces various types of profound consequences which are restricted below-

1. Socially handicapped
2. Problems in Personal & Social Development
3. Personality Problems
4. Psychological Problems
5. Linguistic Problems
6. Abnormal Emotional Beh]aviour

1.3.7 ‘‘Check your of progress’’

1 How many parts are there in the Ear?

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.2 What is the function of ossicle?

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3 Write the name of main parts of the inner ear.

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4 What is the structure of cochlea?

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5 What is the value of normal hearing?

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1.4 □ Definition of hearing loss, demographics & associated terminologies: deaf/deafness/hearing impaired/disability/ handicapped

Structure

1.4.1 Introduction

1.4.2 Objectives

1.4.3 Definition of hearing loss

1.4.4 Different terminologies used in hearing impaired

1.4.5 ''Check your progress''

1.4.1 Introduction

Hearing is the main sensory pathway through which speech and verbal communication develop. A child is likely to speak incorrectly if he/she hears imperfectly. Hearing also influences learning and other aspects of maturation. So it is important for us to know about the normal hearing sensitivity .A normal hearing sensitivity means the person has no known pathology or known history of infection or any kind of disorder and without any kind of significant difficulties, is able to hear even the softest sound or whisper. Generally a normal hearing sensitivity level is -10 dB HL to 25 dB HL. the implications of an auditory impairment change due to change of situation and person. Different types of terms are used to describe the persons who are suffering from hearing problem. Speech and hearing experts generally use these terms interchangeably. This is not correct, because meaning of each term is different. So it is essential for us to know the meaning of these terminologies

1.4.2 Objectives

After going through this subunit the learners will be able to

- know the definition of hearing loss
- know about the different terminologies of hearing impairment
- know the steps involved in hearing process

1.4.3 Definition of hearing loss

Any degree of impairment of the ability to apprehend sound is called hearing loss. Hearing loss, also known as hearing impairment, is a partial or total inability to hear. It may occur in one or both ears .Hearing impaired are those in whom the sense of hearing is non functional for ordinary purposes of life. They do not hear/understand sound at all even with amplifier.

Hearing loss exists when there is diminished sensitivity to the sounds normally heard. The people who have relative insensitivity to sound in the speech frequencies come under the terms hearing impairment or hard of hearing.

According to the increase in volume above the usual level necessary before the listener can detect it the severity of a hearing loss is categorized.

Deafness is defined as a degree of loss such that a person is unable to understand speech even in the presence of amplification. In profound deafness, even the loudest sounds produced by an audiometer (an instrument used to measure hearing by producing pure tone sounds through a range of frequencies) may not be detected. In total deafness, no sounds at all, regardless of amplification or method of production, are heard.

Description

Sound can be measured accurately. The term decibel (dB) refers to an amount of energy moving sound from its source to our ears or to a microphone. A drop of more than 10 dB in the level of sound a person can hear is significant. Sound travels through a medium like air or water as waves of compression and rare faction. These waves are collected by the external ear and cause the tympanic membrane (ear drum) to vibrate. The chain of ossicles connected to the ear drum, the incus, malleus, and stapes carries the vibration to the oval window, increasing its amplitude 20times on the way. There the energy causes a standing wave in the watery liquid (endolymph) inside the organ of Corti. (A standing wave is one that does not move. A vibrating cup of coffee will demonstrate standing waves.) The configuration of the standing wave is determined by the frequency of the sound.

Many thousands of tiny nerve fibers detect the highs and lows of the standing wave and transmit their findings to the brain, which interprets the signals as sound. To summarize, sound energy passes through the air of the external ear, the bones of the middle ear and the liquid of the inner ear. It isthen translated into nerve impulses, sent to the brain through nerves and understood there as sound.
It follows that there are five steps in the hearing process:

- air conduction through the external ear to the ear drum
- bone conduction through the middle ear to the inner ear
- water conduction to the Organ of Corti
- nerve conduction into the brain
- interpretation by the brain.

If any problems arise in the ear in these steps due to anatomy and physiology of the ear or any problems in brain then comes hearing loss.

Hearing can be interrupted in several ways at each of the five steps.

Ear wax, foreign objects, infection, and tumors can block the external ear canal. Overgrowth of the bone, a condition that occurs when the ear canal has been flushed with cold water repeatedly for years, can also narrow the passage way, making blockage and infection more likely. The ear drum is so thin a physician can see through it into the middle ear. Sharp objects, pressure from an infection in the middle ear,even a firm cuffing or slapping of the ear, can rupture it. It is also susceptible to pressure changes during scuba diving.

Several conditions can diminish the mobility of the ossicles (small bones) in the middle ear. **Otitis media** (an infection in the middle ear) occurs when fluid cannot escape into the throat because of blockage of the eustachian tube. The fluid that accumulates, whether it be pusor just mucus and dampens the motion of the ossicles. A disease called **otosclerosis** can bind the stapes in the oval window and there by cause deafness.

All the conditions mentioned so far, that occur in the external and middle ear, are causes of conductive hearing loss. The second category, sensory hearing loss, refers to damage to the Organ of Corti and the acoustic nerve. The leading cause of sensory hearing loss is prolonged exposure to loud noise. A million people have this condition, many identified during the military draft and rejected as being unfit for duty. The cause is often believed to be prolonged exposure to rock music. The other leading cause of noise induced hearing loss (NIHL)is occupational noise exposure and is ample reason for wearing ear protection on the job.

A third group of people over 65 have sensory hearing loss due to **aging**. Both NIHL and presbycusis are primarily high frequency losses. In most language, it is the high frequency sounds that define speech, so these people hear plenty of noise, they just cannot easily make out what it means. They have particular trouble selecting out speech

from background noise. Brain infections like **meningitis**, drugs such as the aminoglycoside **antibiotics** (streptomycin, gentamycin, kanamycin, tobramycin), and Meniere's disease also cause permanent sensory hearing loss. Meniere's disease combines attacks of hearing loss with attacks of vertigo. The symptoms may occur together or separately. High doses of salicylates like **aspirin** and quinine can cause a temporary high frequency loss. Prolonged high doses can lead to permanent deafness. There is a hereditary form of sensory deafness and a congenital form most often caused by rubella (German **measles**). Sudden hearing loss—at least 30dB in less than three days is most commonly caused by cochleitis, a mysterious viral infection.

The final category of hearing loss is neural. Damage to the acoustic nerve and the parts of the brain that perform hearing are the most likely to produce permanent hearing loss. Strokes, multiple sclerosis, and acoustic neuromas are all possible causes of neural hearingloss. Hearing can also be diminished by extra sounds generated by the ear, most of them from the same kinds of disorders that cause diminished hearing. These sounds are referred to as **tinnitus** and can be ringing, blowing, clicking, or anything else that no one but the patient hears.

1.4.4 Deferent terminologies used in hearing impaired

The term "hearing loss" is used whenever specific reference is being made to a hearing impairment, which is of a particular intensity magnitude. It is measurement made on an audiometer and reported in decibels (dB).

Hearing Impairment is a genetic term referring to any organic hearing problem regardless of etiology or degree. It is a deviation or change for the worse in either structure or function which is usually outside the range of normal .It generally includes a broad range of hearing disability, which ranges in severity from mildly hearing impaired to profoundly deaf.

There is often confusion over the terms **"hearing impaired," "hard of hearing," "deaf,"** and **"deafened,"** both in definition and appropriateness of use.

'**Hearing impairment', 'hearing disability'** and **'hearing handicap'** are not synonymous term.

The term **"hearing impaired"** is often used to describe people with any degree of hearing loss, from mild to profound, including those who are deaf and those who are hard of hearing. Many individuals who are deaf or hard of hearing prefer the terms "deaf" and "hard of hearing," because they consider them to be more positive than the

term “hearing impaired,” which implies a deficit or that something is wrong that makes a person less than whole.

“Deaf” usually refers to a hearing loss so severe that there is very little or no functional hearing.

“Hard of hearing” refers to a hearing loss where there may be enough residual hearing that an auditory device, such as a hearing aid or FM system, provides adequate assistance to process speech.

“Deafened” usually refers to a person who becomes deaf as an adult and, therefore, faces different challenges than those of a person who became deaf at birth or as a child.

Deaf, deafened, and hard of hearing individuals may choose to use hearing aids, cochlear implants, and/or other assistive listening devices to boost available hearing. Alternatively, or in addition, they may read lips, use sign language, sign language interpreters, and/or captioning.

People who are deaf or hard of hearing may have speech that is difficult to understand due to the inability to hear their own voice.

The term “**Deafness”** refers to hearing disabilities that preclude successful processing of linguistic information through audition, with or without a hearing aid.

The term **“hearing handicap”** refers to the effect of the hearing impairment on the person’s everyday situations and the disadvantages imposed by the impairment sufficient enough to affect one’s personal efficiency in the activities of daily living. Thus in other words, the influence of the hearing impairment is the hearing handicap. According to the definition adopted by Ministry of Social Justice and Empowerment, Govt. of India and Persons with Disability Act (P.W.D.-1995-96), “hearing handicap” refers to hearing loss of 60dB HL or more on the better ear.

1.4.5 Let us sum up

Hearing is the main source of development of speech and verbal communication. So it requires perfect hearing to develop a child properly. Normal hearing sensitivity means a person has no infection or disorder and is able to hear properly. Its level is –10dB HL to 25dB HL. Auditory impairment varies due to change of situation and person. Hearing loss means any degree of impairment. Hearing impaired person does not hear at all with the amplified speech. The severity of the hearing loss is categorized according to the increase in volume above normal level. Profound deafness means unable to detect the

loudest sounds and total deafness means no sounds at all. Unit of sound is decibel (dB). Sound energy passes through the air of the external ear, the bones of the middle ear and liquid of the inner ear. It is then translated into the nerve impulses which are sent to the brain through nerve. If any problem comes in the ear, hearing loss arises.The external ear canal can be blocked with ear wax, foreign objects, infections and tumor. Several conditions like Otitis media or otosclerosis can diminish the mobility of the ossicles in the middle ear and can cause deafness. Conductive hearing loss is caused due to all above conditions. Sensory hearing loss refers to damage to the organ of corti and acoustic nerve which is caused due to prolonged exposure to loud noise, aging, brain infection like meningities, drugs like aminoglycoside, meniere's disease, High doses of salicylate like aspirin and quinine etc. Neural hearing loss is caused due to strokes, multiple sclerosis and acoustic neuromas. Depending upon the hearing loss, different terms are –(i) hearing impaired,(ii) hard of hearing,(iii) deaf, (iv) deafened,(v) deafness and (vi)hearing handicap.

1.4.6 ''Check your progress''

1. What is the value of normal hearing sensitivity level?

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2. What is hearing loss?

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3. How many steps are involved in hearing process?

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4. What is Otitis Media?

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5. What do you mean by ‘Hard of hearing’?

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1.5 □ Challenges arising due to Congenital and acquired hearing loss

Structure

1.5.1 Introduction

1.5.2 Objectives

1.5.3 Congenital hearing loss

1.5.3.1 Congenital causes

1.5.3.2 Types of Congenital causes

1.5.4 Acquired hearing loss

1.5.4.1 Acquired Causes

1.5.5 Challenges

1.5.5.1 Impact of hearing loss

1.5.5.2 Challenges arising due to congenital hearing loss

1.5.5.3 Challenges arising due to acquired hearing loss

1.5.6 ''Check your progress''

1.5.7 References

1.5.1 Introduction

The main sensory pathway through which speech and verbal communication develop is hearing. Due to imperfect hearing a child is likely to speak incorrectly. Again, hearing also influences learning and other aspects of maturation. Our knowledge of the world around us is reduced because of hearing impairment. It also adversely affects the child's performance in learning. The types of hearing loss are discussed in previous chapter. It is seen that congenital and acquired hearing loss comes under one type of hearing loss.

1.5.2 Objectives

After going through this sub unit, the learners will be able to:

- Understand the meaning of congenital and acquired hearing loss

- Understand the types of congenital hearing loss
- Understand the impact of hearing loss
- Know the challenges arises due to congenital and acquired hearing loss

1.5.3 Congenital hearing loss

Congenital hearing loss is any hearing loss that is present at birth. The cause can be genetic and hereditary, caused by issues during pregnancy or caused from an issue during the birthing process.

The causes of hearing loss and deafness can be divided into congenital causes and acquired causes.

1.5.3.1 Congenital causes

Congenital causes may lead to hearing loss being present at or acquired soon after birth. Hearing loss can be caused by hereditary and non-hereditary genetic factors or by certain complications during pregnancy and childbirth, including:

- maternal rubella, syphilis or certain other infections during pregnancy;
- low birth weight;
- birth asphyxia (a lack of oxygen at the time of birth);
- inappropriate use of particular drugs during pregnancy, such as aminoglycosides, cytotoxic drugs, antimalarial drugs and diuretics;
- severe jaundice in the neonatal period, which can damage the hearing nerve in a newborn infant.

  Hearing loss may occur if any part of the ear is defected. It may be before birth or after birth. If it is shown in birth time then it is called congenital hearing loss. There is a range of congenital ear, nose and throat problems - some occurring alone and others as part of a syndrome. The underlying causes are varied but, as with any congenital disorder, they can be broadly divided into chromosomal abnormalities (mutations and inherited problems), diseases associated with prenatal infection, maternal drug abuse, environmental factors, iatrogenic causes and abnormalities of unknown aetiology.

1.5.3.2 Types of Congenital causes

An abnormality of the **External Ear, Middle Ear & Inner Ear** may lead to congenital hearing loss. Various types of abnormality are shown in these types. Such as:

Anotia/microtia

Anotia is the total absence of the auricle, most often with narrowing or absence of the external auditory meatus. Strictly speaking, in microtia, there is some degree of malformation of the external ear (± narrowing or absence of the external auditory meatus) in contrast to a 'small ear' which is normally formed, as seen in Down's syndrome. These conditions may be unilateral or bilateral - the latter is less common.

Macrotia

This is a large but normally formed auricle, not usually associated with functional abnormality. It is defined as an ear which is two or more standard deviations from the mean. True macrotia is rare but may be seen in association with vascular malformations, hemihypertrophy, neurofibromatosis and secondary to haemangioma. It is more conspicuous if the ear is prominent too. Surgical correction can be carried out. The Antia-Buch technique, which involves freeing the helical flap and repositioning it, is the most commonly used procedure.

External auditory meatus atresia

Congenital atresia of the external auditory canal is caused by a failure of canalisation of the epithelial plug portion of the first bronchial cleft. This results in the formation of a membranous or bony (or both) plate at the level of the tympanic membrane. There may be associated ossicular malformations.

Abnormalities of the middle ear

In the absence of other problems, hearing loss associated with these abnormalities is often picked up during the course of routine infant and childhood audiological assessments. More specialist assessment and management is carried out in the ENT department.

Tympanic membrane abnormalities

The tympanic membrane may be small (eg, congenital rubella syndrome), distorted (eg, VATER syndrome [**V**ertebral anomalies, **A**nal atresia, **T**racheo-oesophageal fistula, (o) **E**sophageal atresia and **R**enal anomalies and radial dysplasia]) or replaced by fibrous tissue or a bony plate.

Ossicular abnormalities

- There are a number of different ossicular abnormalities, which may affect one or more of the ossicles.
- There may be absence of part or all of these bones and there can also be varying degrees of fusion.
- The associated intratympanic muscles are often affected and there can be an aberrant course of the facial nerve.
- Surgery can go some way towards correcting this.

Abnormalities of the tympanic cavity

Congenital cholesteatoma (2-3% of all cholesteatomas)

It is usually unilateral, may be bilateral, and presents as conductive hearing loss. The tympanic membrane is intact and overlies a white mass (this varies from a small pearl size to filling the entire middle ear) which can act as a source of infection. CT scanning to assess the lesion is advisable as this will dictate the surgical approach.

Vascular abnormalities

These include the presence in the middle-ear cavity of internal carotid artery aneurysms, jugular bulb abnormalities and very rare cases of an anomalous internal carotid artery. These vascular abnormalities tend to present with limited functional problems but a pulsatile red, smooth mass may be seen behind the tympanic membrane on examination. Their presence should be confirmed in a specialist unit, as it will have implications in considering any future intervention in.

Congenital perilymph fistula

This may occur, linking the perilymphatic space of the inner ear to the middle-ear cavity. There are often associated deformities. Children present with fluctuating and progressive sensorineural hearing loss ± tinnitus, vertigo and, occasionally, recurring meningitis. Diagnosis is confirmed on CT scanning and surgical correction can be carried out.

Abnormalities of the inner ear

The inner ear is the collection of structures within the bony labyrinth: the semicircular canals, the vestibule and the cochlea. Congenital abnormalities here are rare and will result in deafness in addition to possible dizziness, and account for up to 20% of children with sensorineural hearing loss.

People with abnormalities of the inner ear are at increased risk of developing recurrent meningitis or a perilymphatic fistula. Middle-ear infections should therefore be treated aggressively. There is also increased risk of developing cerebrospinal fluid leaks after minor head injuries and therefore it is advisable to avoid contact sports.

These deformities are typically classified according to embryonic developmental stages.

Any of the structures can be involved.

Cochleosaccular dysplasia is probably the most common form of inner-ear congenital deformity and is characterised by a collapse of the cochlear duct and saccule.

1.5.4 Acquired hearing loss

Acquired hearing loss is a hearing loss that appears after birth. The hearing loss can occur at any time in one's life due to illness or injury. The problems may occur in any part of the ear. Following are examples of conditions that can cause acquired hearing loss in children:

1.5.4.1 Acquired causes

Following are the acquired causes which may lead to hearing loss at any age :

- infectious diseases such as meningitis, measles and mumps, Encephalitis,
- Chicken pox, Flue;
- chronic ear infections;
- collection of fluid in the ear (otitis media);
- use of particular drugs, such as some antibiotic and antimalarial medicines;
- injury to the head or ear;
- excessive noise, including occupational noise such as that from machinery and explosions, and recreational noise such as that from personal audio devices, concerts, nightclubs, bars and sporting events;
- ageing, in particular due to degeneration of sensory cells;
- wax or foreign bodies blocking the ear canal.

Chronic otitis media is the leading cause of hearing loss among children,

In the previous unit it is known that on the location of the problem, hearing loss is also classified into three types. These are

- Conductive loss

- Sensorineural hearing loss and
- Mixed hearing loss

These three types of hearing losses are common for congenital hearing loss and acquired hearing loss. It can vary in degrees of severity and occur in all age groups; however, the elderly are most commonly the hearing impaired. Hearing is broken up into two different parts:

- The conduction of the sound and
- The nerve processing of the sound.

On the basis of anatomy and the place of problem the distinction is made.

- **Conductive Loss:** Problems with sound waves travelling to the cochlear (the external and middle ear)
- **Sensorineural Loss:** Nerve related problems involving the cochlear and the inner ear
- **Mixed hearing loss:** Is a combination of both conductive and sensorineural hearing loss at the same time. Both the middle and inner ear are involved.

1.5.5 Challenges

Hearing and speech are essential tools of learning, playing and developing social skills for a child. Children learn to communicate by imitating the sounds they hear. If they have a hearing loss which is undetected and untreated, they can miss much of the speech and language around them. This results in delayed speech/language development, social problems and academic difficulties. These children score a relatively low score on IQ testing. In general their performance in academic subjects of the school is also poor. They face difficulty in personal-social adjustment.

1.5.5.1 Impact of hearing loss

Functional impact

Individual's poor ability to communicate with others is one of the main impacts of hearing loss. Spoken language development is often delayed in children with deafness.

On the academic performance of children hearing loss and ear diseases such as otitis media can have a significantly adverse effect. However, when opportunities are provided for people with hearing loss to communicate, they can participate on an equal basis

with others. The communication may be through spoken/-written language or through sign language.

Social and emotional impact

Limited access to services and exclusion from communication can have a significant impact on everyday life, causing feelings of loneliness, isolation and frustration, particularly among older people with hearing loss.

If a person with congenital deafness has not been given the opportunity to learn sign language as a child, he or she may feel excluded from social interaction.

Economic impact

Children with hearing loss and deafness rarely receive any schooling in developing countries. Adults with hearing loss also have a much higher unemployment rate. A higher percentage of people with hearing loss among those who are employed, are in the lower grades of employment compared with the general workforce. Unemployment rates among this group will decrease by improving access to education and vocational rehabilitation services, and raising awareness especially among employers about the needs of people with hearing loss.

Hearing loss substantially affects social and economic development in communities and countries also in addition to the economic impact of hearing loss at an individual level.

1.5.5.2 Challenges arising due to congenital hearing loss

In congenital hearing loss child has not acquired the basic language and speech patterns which are required in intellectual functioning, academic success and social adjustment.

Congenital hearing loss is associated with certain behavioural problems. In adapting to circumstances that requires verbal communication the H.I (hearing impaired) children feel invariable inferior and helpless. They have a poor self concept which damages the development of personality (Loeb and Saregiani, 1986).

Language development of the congenitally deaf children differs markedly from that of the normal. In fact, the normal child learns the language, but the HI child is taught language. They process language and linguistic utterances visually.

In congenital hearing loss cognitive functioning also does not develop. They face difficulty in understanding abstracts concepts. They possess poor comprehension ability because of limited vocabulary.

In case of congenital hearing loss of mild or moderate level, child can achieve his/her goal with the help of proper guidance, treatment and use of proper devices. But in case of severe or profound level child cannot progress according to his/her goals.

In case of congenital sensori-neural hearing loss, child faces many problems in various areas such as academic, social etc.

1.5.5.3 Challenges arising due to acquired hearing loss

In addition to the challenges discussed in the case of congenital hearing loss, acquired hearing loss children may face following challenges.

Acquired hearing loss is of two types- (i) Pre-lingual and (ii) Post-lingual. If a child suffers from hearing loss before he/she has achieved basic competency in his or her primary language (i.e. occurring before age 3 years (Schein, 1987) then it is called Pre lingual hearing loss. Whereas post lingual hearing loss is that which occurs after the basic acquisition of language i.e.in later childhood or adulthood (Vernon and Andrews, 1990).

At the age of one year or a little more, a child with normal hearing begins to speak and he or she acquires many pre-verbal skills (skills that are learned by the child before acquiring speech and language). Also develops a significant amount of receptive language (understanding of language) in the first year of life. A child with hearing impairment does not get a chance to learn many of the pre-verbal skills (for e.g. imitation of voice) since the development of these skill is related to hearing and thus begins to lag behind average children of the same age.

As the development of many of the pre-verbal skills (for e.g. imitation of voice) is related to hearing ,a child with hearing impairment does not get a chance to learn these skills and thus begins to lag behind average children of the same age. After the stage of learning basic language if a child develops a hearing loss he or she would have an advantage over a child who has had hearing loss pre-lingually. However, children with post –lingual hearing loss is at risk for losing language and speech skills that they have acquired if proper care is not taken for him in advance.

1.5.6 Let us sum up

Speech and verbal communication of a child is developed on the basis of hearing capacity. Effect of poor hearing may affect his speaking, learning and performance. Congenital hearing loss is any hearing loss being present or acquired soon after the birth due to

genetic factors or by certain complication during pregnancy and child birth. An abnormality of the external ear, middle ear and inner ear may lead to congenital hearing loss. Acquired hearing loss is a hearing loss that appears after birth which may occur at any time in any part of the ear due to illness or injury. Hearing loss is classified into three types – (i) Conductive loss, (ii) Sensorineural loss and (iii) Mixed hearing loss. If a child is having any hearing loss problem which is not detected and treated, then there may be great impact which may result in delayed speech/ language development, social problems and academic difficulties. He may face personal – social adjustment. Moreover, there may be functional impact, emotional impact as well as economic impact on his life due to this. In addition to different impacts of hearing loss at an individual level, hearing loss substantially affects the social and economic development in communities and countries. In congenital hearing loss, child does not acquire language and speech patterns which are required in intellectual functioning, academic success and social adjustment. Due to this he/she suffers from inferiority complex and feels helpless which affects his/ her day to day life. Acquired hearing loss is of two types – (i) Pre- lingual and (ii) Post- lingual. Pre- lingual hearing loss is that which occurs before the child has achieved basic competency in his/ her primary language. Post- lingual hearing loss is that which occurs after the basic acquisition of language. Apart from speaking at the age of one year, a normal hearing child acquire many pre- verbal skills which is not possible for a child with hearing loss and thus lag behind the average child of his age. However, child with post –lingual hearing loss is at risk for loosing language and speech skills that acquired if proper care is not taken for him in time.

1.5.6 ''Check your progress''

1. What do you mean by congenital hearing loss?

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2. Write two types of abnormality for congenital causes.

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3. What do you mean by tympanic membrane abnormality?

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4. What is the leading cause of hearing loss among children?

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5. Write down one challenge arising due to acquired hearing loss?

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1.5.7 References

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Unit : 2 □ Impact of Hearing Loss

Unit : 2.1 □ Characteristics of learners with hearing loss and impact of different degree of hearing impairment on communication.

Structure

2.1.1 Introduction:

2.1.2 Objective:

2.1.3 What are Symptoms of children with Hearing Impairment?

2.1.4 Characteristics of learners with Hearing Loss.

2. 1.5 Characteristics of learners.

2.1.5.1 ''Check your progress'' - 1

2.1.6 Impact of different degree of Hearing Impairment on communication.

2.1.6.1 Importance of Hearing:

2.1.6.2 The process of hearing:

2.1.6.3 Types of Hearing Loss:

2.1.7 Let us Sum Up

2.1.7.1 ''Check your progress''

2.1.8 Answer to Check Your Progress.

2.1.9 Unit-End Exercises

2.1.1 Introduction

Hearing is the ability to perceive sound. A person suffering from hearing impairment has difficulty in perceiving or identifying sound clearly due to auditory problems. The impairment may be unilateral or bilateral ears. Due to this problem child can face problem in verbal communication skill and It can affect several development areas personal-social, cognitive and academic.

2.1.2 Objective:

- To understand symptom of hearing loss during infancy and child hood.
- To understand characteristics of learners having hearing loss.
- To understand different degrees and communication of hearing loss.
- To understand, and address the challenge in educating student with hearing loss.
- To understand different terminology in hearing loss.

2.1.3 What are the symptoms of children with hearing impairment?

During infancy:

- 1-3 months old no response to sudden sound such as banging of door or ringing of doorbell.
- 4-6 months old unable to locate the sound source.
- 7-9 months old do not look at the person being mentioned, e.g. "Where is Uncle Joy?"
- 10-12 months old no response to their names being called or frequently used words or phrases.

During childhood:

- Delayed response to sound
- Cannot hear clearly what others are saying
- Show difficulty in locating the sound source
- Pay more than usual attention to speaker's facial expression and lip movement while listening.
- Give irrelevant answers or misinterpret instructions
- Request for repetition during conversation
- Show poorer ability to understand speech in a noisy environment
- Tend to turn up the sound volume of television
- Incorrect pronunciation

- Delayed language development
- Poor attention in class
- Frequent use of gestures to express themselves, e.g. pointing to what they want
- Easily irritated as a result of communication difficulty.

2.1.4 Characteristics of learners with hearing loss

- Deaf/Deafness refers to a person who has a profound hearing loss and uses sign language.
- Hard of hearing refers to a person with a hearing loss who relies on residual hearing to communicate through speaking and lip-reading.
- Hearing impaired is a general term used to describe any deviation from normal hearing, whether permanent or fluctuating, and ranging from mild hearing loss to profound deafness.
- Residua! hearing refers to the hearing that remains after a person has experienced a hearing loss. It is suggested that greater the hearing loss, the lesser the residual hearing.

2.1.5 Characteristics of learners:

- Language and speech- The ability to learn language and speech is the most severely affected area of development of hearing impairment.
- Intellectual ability- Thinking process of normal and deaf children are found to be similar. Also cognitive abilities of deaf children are essentially unimpaired expect in those cases which involve language experience. But deaf children are retarded in intellectual task which requires verbal skill and highly performance in non-verbal intelligence.
- Academic Performance- Hearing impaired children are frequently handicapped in various degree of hearing loss and it effect on educational performance and particularly and particular handicapped in reading which relies heavily upon language skill.
- Adjustment of social interaction Our social interaction, depends upon communication. So deaf children have communication problems that's why they have problem of social interaction such children live in a world of isolation and

from a group of their own an association of the deaf for their common interest and interaction.

- Behavioral problem- Deaf learners feel invariably inferior and helpless in adapting to circumstances that require verbal communication. So regard non-verbal communication absence of verbal/they have poor self concept which damages the development of personality.
- Socially handicapped - Learners with hearing loss can not adjust with society because they suffer from communication difficulty and fail to understand what others hearing people say.
- Problem in personal and social development- Language becomes a barrier for deaf learner for purpose of communication with others so this affects the socialization process and plays a vital role in the personal and social development of hearing loss learner.
- Personality problem- Hearing difficulty may create more personality problem because a deaf learner is more frustrated as he/she tries to reach the level of the normal and a totally deaf child seems reconciled to his take.

2.1.5.1 ''Check your progress'' - 1

l) During infancy what are the symptoms of children with hearing impairment?

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2) What is hard of hearing?

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3) What is deafness?

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4) What is Residual hearing?

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5) What is Hearing impairment?

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6) Mention any three characteristics of learners with hearing loss?

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2.1.6 Impact of different degree of hearing impairment on communication.

Hearing impairment results from a number of causes and is usually characterized by the type and degree of hearing loss. Type of hearing loss is related to the site of the disorder within the auditory system, and degree of loss is related to the extent that the disorder is infringing on normal function. Defining both the type and degree of hearing loss is a cornerstone of audiology.

2.1.6.1. Importance of Hearing:

The sense of hearing is essential as:

- It is the foundation for development of verbal language
- It helps the person to live effectively in the environment
- It helps in better communication even over long distances.

2.1.6.2 The process of hearing:

- The physical processing of hearing occurs in three groups of structures, commonly known as the outer, middle, and inner ears.

- The outer ear has three main components: the auricle, the ear canal or meatus, and the outer layer of the eardrum or tympanic membrane. The outer ear serves to collect and resonate sound, assist in sound localization, and function as a protective mechanism for the middle ear.
- The middle ear is an air-filled space located within the temporal bone of the skull. It contains the ossicular chain, which consists of three contiguous bones suspended in space, linking the tympanic membrane to the oval window of the cochlea. The middle ear structures act as an impedance matching device, providing a bridge between the airborne pressure waves striking the tympanic membrane and the fluid-borne traveling waves of the cochlea.
- The inner ear contains the cochlea, which is the sensory end organ of hearing. The cochlea consists of fluid-tilled membranous channels within a spiral canal that encircles a bony central core. The sound waves, transformed into mechanical energy by the middle ear, set the fluid of the cochlea into motion in a manner consistent with their intensity and frequency. Waves of fluid motion impinge on the membranous labyrinth and set off a chain of events that result in neural impulses being generated at the VHIth cranial nerve which is perceived by the auditory cortex in the temporal lobe in the brain.
- Impediment to sound across any of the three structures can result in loss in hearing acuity called as hearing loss.

2.1.6.3 Types of hearing loss:

According to anatomical origin, hearing loss are of three major types :

- **Conductive hearing loss** - pertaining to the outer and middle ear
- **Sensorineural hearing loss** - pertaining to the inner ear only.
- **Mixed hearing loss** -pertaining to the outer/middle and inner ear.

According to the perceived loudness, hearing loss can be categorized as :

- **Hearing sensitivity loss**
- **Suprathreshold hearing disorders**
- **Functional hearing loss**

Hearing sensitivity loss is the most common form of hearing disorder. It is characterized by a reduction in the sensitivity of the auditory mechanism so that sounds need to be of higher intensity than normal before they are perceived by the listener.

Suprathreshold disorders are less common, may or may not include hearing sensitivity loss, and often result in reduced ability to perceive speech properly.

Functional hearing loss is the exaggeration or fabrication of a hearing loss. In addition to type of loss, a hearing disorder can be described in terms of time of onset, time course, and whether one or both ears is involved.

A hearing disorder can be described by the time of onset:

- **Congenital:** present at birth
- **Acquired:** obtained after birth
- **Adventitious:** not congenital; acquired after birth; coming by chance/accidental
- Hearing disorder can also be described by its time course:
- **Acute:** of sudden onset and short duration
- **Chronic:** of long duration **Sudden:** having a rapid onset
- **Gradual:** occurring in small degrees
- **Temporary:** of limited duration
- **Permanent:** irreversible
- **Progressive:** advancing in degree
- **Fluctuating:** aperiodic change in degree

In addition, hearing disorder can be described by the number of ears involved:

- **Unilateral: pertaining to one ear only**
- **Bilateral: pertaining to both ears**

Sensitivity Loss

Degree of hearing sensitivity loss is commonly defined on the basis of the audiogram.Normal sensitivity ranges from -10 to +25dBHL. All other classifications are based on generally accepted terminology. These terms might be used to describe the pure-tone thresholds at specific frequencies, or they might be used to describe the puretone average or threshold for speech recognition. Pure-tone average is the mean of thresholds at 500, 1000, and 2000 Hz.

General guideline for describing degree of hearing loss

Degree of loss Range (in dB HL)	
Normal	-10 to 25
Mild	26 to 40
Moderate	41 to 55
Moderately severe	56 to 70
Severe	71 to 90
Profound	>90

dB level	Type of Impairment	Ability *to perceive sound*	Speech discrimination	Communication
0 to 25 dB HL	Normal Hearing	Normal	Normal	Speech is normal and normal pattern of development with good auditory perceptive skills.
26-40 dB HL	Mild Hearing Loss	Difficult to identify soft sound such as	100% better ear whispering and others.	Speech and language developments are within normal limits. May exhibit occasional auditory perception problems some educational retardation likely.
“41-55 dBHL	Moderate Hearing Loss	Unable to hear clearly what others are saying during conversation. Hearing aids are necessary.	50% to 80% better ear	Language development and speech are mildly affected. Difficulty with rarely used words, minor differences in meaning of words and idioms, defective articulation but still intelligible speech loss quality and inflection almost normal. Reading and writing delayed. Vocabulary training, reading and writing to be special attended train addition to schooling.
56-70 dB HL	Moderatey-Severe Hearing	Unable to clearly hear loud noises such as telephone ring Severe	40% to 50% better ear	Grammar, vocabulary, articulation and voice are affected understand in loud speech .Early speech is unintelligible. Even with hearing aids show difficulty in understanding. Reading and writing need special assistance.
71-90 dBHL	Severe Hearing Loss	Can only hear very loud noises and sounds such as shouting or vacuum cleaner noise.	No discrimination	Speech and language donot developments spontaneously. Sound produced very loudly at a distance of 1ft. and near of the ear. The voice will be high-pitched and articulation distorted.
>90 dB HL	Profound Hearing Loss	Difficult to perceive any sound	No discrimination	They donot rely on hearing for their communication. Language and speech develop only by training and they are educationally deaf. Communicate mostly through gestures, voice, inflection, articulation greatly affected. Required regular speech and language training regarding subject’s expert.

2.1.7 Let us Sum Up

- Hearing ability suffer it leads from hearing difficulty.
- Problem will be unilateral and bilateral.
- Symptom of hearing loss infancy or it will be childhood.
- It will be several characterstics hearing loss and also learner activities
- It will be impact in different egree of hearing loss and it affected communiction of speech and language.

2.1.7.1 ‘‘Check Your Progress’’ - 2

l) What is the difference between normal hearing communication and profound hearing loss communication?

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2) What is the meaning of Unilateral and Bilateral hearing loss?

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3) According to anatomical origin how many type of hearing loss are there?

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4) Mention the type of physical processing of hearing?

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5) Where is the Ossicular chain situated?

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6) What is the name of VIIIth crenial nerve in brain?

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7) Write the full form of the P.T.A.

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2.1.8 Answer to Check Your Check Progress

''Check Your Check Progress'' - 1

1) 1-3 months old No response to sudden sound such as banging of door or ringing of doorbell.
   4-6 months old Unable to locate the sound source.
   7-9 months old do not look at the person being mentioned, e.g. "Where is Uncle Joy?" 10-12 months old No response to their names being called or frequently used words or phrases, e.g. "No".
2) Hard of hearing refers to a person with a hearing loss who relies on residual hearing to communicate through speaking and lip-reading.
3) Deaf/Deafness refers to a person who has a profound hearing loss and uses sign language.
4) Residual hearing refers to the hearing that remains after a person has experienced a hearing loss. It is suggested that greater the hearing loss, the lesser the residual hearing.
5) Hearing impaired is a general term used to describe any deviation from normal hearing, whether permanent or fluctuating, and ranging from mild hearing loss to profound deafness.

6) **Academic Performance-** Hearing impaired children are frequently handicapped in various degree of hearing loss and it effect on educational performance and particularly and particular handicapped in reading which relies heavily upon language skill.

Adjustment of social- Our social inter action depend upon communication so deaf children have communication problems that's why it should have problem of social inter action such children live in a world of isolation and from a group of their own ,an association of the deaf for their common interest and interaction.

Behavioral problem- Deaf learners feel invariable inferior and helpless in adapting to circumstances that require verbal communication. So regard non-verbal communication absence of verbal they have poor self poor concept which damages the development of personality.

''Check Your Progress'' - 2

1) In normal hearing communication speech is normal and normal pattern of development with good auditory perceptive skills. In profound hearing loss donot rely on hearing for their communication. Language and speech develop only by training and they are educationally deaf. Communicate mostly through gestures, voice, inflection, articulation greatly affected. Required regular speech and language training regarding subject's expert.
2) Unilateral means pertaining to one ear only and Bilateral means pertaining to both ears.
3) There are of three major types of hearing loss. These are

- Conductive hearing loss - pertaining to the outer and middle ear
- Sensorineural hearing loss - pertaining to the inner ear only.
- Mixed hearing loss - pertaining to the outer/middle and inner ear.

4) There are three physical processing of hearing.Outer Ear,MiddIe Ear and Inner Ear.
5) Middle Ear.
6) Auditory nerve is VIIIth crenial nerve in brain.
7) Pure Tone Audiometry.

2.1.9 Unit End Exercises

1. Discuss the details about characteristics with of learner/ksf hearing loss
2. Discuss the details about different type of hearing impairmet and their communication.

Unit : 2.2 □ Language and communication issues attributable to hearing loss and need for early Intervention

Structure

2.2.1 Introduction:

2.2.2 Objective:

2.2.3 Language issues attributable to hearing loss.

2.2.3.1 ‘‘Check your progress’’ - 1

2.2.3.2 Deafness creates language issues attributable to hearing loss.

2.2.3.3 Different degree of hearing loss and Language issues attributable

2 2.3.4 ‘‘Check your progress’’ - 2

2 2.3.5 Different degree of hearing loss and on communication issues attributable

2 2.3.6 ‘‘Check your progress’’ - 3

2.2.4 Early intervention

2.2.4.1 Early Intervention for the Identified Population

2.2.4.2 ‘‘Check Your Progress’’ - 4

2.2.5 Let us Sum Up

2.2.6 Answer to Check Your Progress

2.2.7 Unit End Exercise

2.2.1 Introduction

Man is a social animal, without society human just being is like animal. So human interaction with society with the help of verbal interaction and that involves speech, language and communication. Speech, language and communication depend upon our

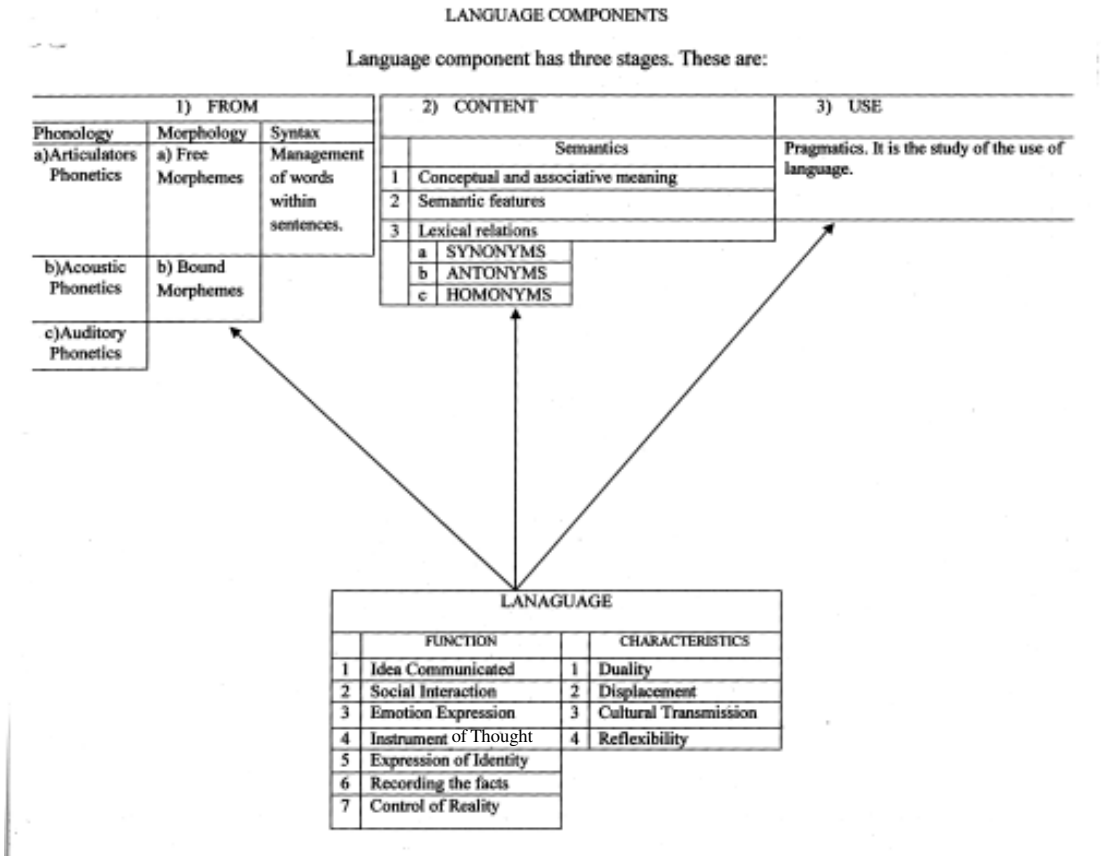
hearing ability which is to perceive the sound about nature. But if suffering from hearing ability it has difficulty to perceiv the sound about nature and it affects verbal interaction and also affects speech, language and communication. Due to this problem child can face problems in several development areas these are personal-social, cognitive and academic. You will realize that language and communication are the two of such concepts and also including speech which are core issue in the special education. Hence a clear and descriptive idea of language and communication issues attributable to hearing loss and need for early intervention is necessary to know it in a better way as a teacher trainee and also as a human being.

2.2.2 Objective

- To understand meaning of communication
- To know about different communication system, language and communication
- To know about different degrees of hearing loss and type.
- To understand to given in formation while language issue of hearing loss
- To understand able to given in formation while communication issue of hearing loss
- To understand the need for early intervention of hearing loss

2.2.3 Language issues attributable to hearing loss.

Language is a part of human life. It gives words to our thought, voice to our idea and expression to our feelings. It is a rich and varied human ability one we'can use without a thought that children seems to acquire automatically and that linguists have discovered to be complex yet describe. According to Chomsky, Language is a set of(finite or infinite) sentences, each finite in length and constructed out of a finite set of elements.



LANGUAGE COMPONENTS

2.2.3.1 ''Check your progress'' - 1

What is Languge? Mention the component of language?

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2.2.3.2 To see how deafness creates language issues attributable to hearing loss.

Speech is an oral manifestation of language. Speech refers to the actual production of sounds making words. These sounds are produced by the coordination of facial muscles and the flow of air through the human voice box (larynx). Language refers to our complex system of symbol used to communicate. Man is the talkative animal that lives in language as a fish lives in water. Speaking is natural activity for a human being. Moreover, the spoken word is the foundation of, all languages. While comparing the various aspects of language, one can conclude that ear language (spoken/oral aspect) and another is

eye language (writing language). Ear language (spoken aspect) or oral language is the means of communication among people and it is used in daily life because it is the medium for conversation. Deaf student cannot perceive the sound about nature with the help of ear that's why they are already delayed to ear language which is oral language in spoken aspect. The hearing-loss-children do not learn to listen immediate. After they are provided with the amplification and exposure to speech and language training and with best possible amplification language learning for the hearing-loss-child is possible. This is the major concern of hearing impairment. The system to process speech and language is in place but required raw material for it to enable any processing is inadequate. How to revive the broken link between hearing and speaking? This question may be answered predominantly in two ways:

1) One way to restore the link between hearing and speaking (and language) is to provide the child with ACE (Appropriate Continuous and Early) amplification with training.
2) Another answer is to bypass the link between speaking and hearing by providing the child with ENR (Early Natural Rich) exposure to sign language.

The issue of these two answers and their mid points is complex, multi-faceted and challenging.

2.2.3.3 Different degree of hearing loss and Language issues attributable

Hearing Level (dB)	Degree of Hearing Loss	Type	Missed Sounds	Language issues attributable
0-25	Normal	Normal	Normal	Normal
26-40	Mild	Conductive Sensorineural	25% - 40% speech signal, distant sounds, unvoiced consonants, plurals and tenses.	Misses 50% of class discussions, has problems in suppressing background noise.
41 -55	Moderate	Conductive/ Sensorineural	50% - 80% speech signal	Articulation deficit, limited vocabulary, learning dysfunction.
56-70	Moderately Severe	Sensorineural Mixed	100% of speech information	Delayed language syntax, atonal voice, reduced speech intelligi-bility
71 -90	Severe	Sensorineural Mixed	Ail speech sounds, can hear loud environmental noises	Speech not developed or deteriorates, learning deficits
>90	Profound	Sensorineural Mixed	All speech sounds, only feels vibrations	Speech not developed or deteriorates, learning deficits

2.2.3.4 ‘‘Check your progress’’ - 2

1) What is the meaning of Ear language?

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2) What is the meaning of Eye language?

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3) What is the difference between children with mild hearing loss and those with profound hearing loss on language issues?

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2.2.3.5 Different degree of hearing loss and communication issues

We use the word communication very commonly and casually. What does it mean? Communication is an intentional two way complex process of sending message from one end to the other via a channel.

Have a look at the following examples :

1. Bulti writes a letter to Rishl.
2. Runa is unfolding the story of Shrikrishna through her Bharatnatyam.
3. Ananya saw red light at the signal and stopped her car.
4. Ashoke waves ‘bye’ to Prabir.
5. Saikat says, “Kishore please go to the bank”.
6. Triptesh opens the door when the bell rings.
7. Mita teaches her students the ‘Properties of Air’ using the Indian Sign Language.
8. Sujata listens to the radio.

Which of these are examples of communicative events?

Yes, all the 8 are examples of communication. So Communication is a two way process of transfer of a message from one end to the other through a channel.

What happens in these 8 events, do fit into our definition of communication?

Now let us try to identify whether all events can be called language?

You are very sure of 1, 5, and 8 for being examples of language.

What about 7?

Indian Sign Language, (as suggested by its name) is a language and hence communication example number 7 must be categorized along with 1, 5, 8.

What about other examples 1, 2, 3, 4, 6 are communicative events but not examples of language.

Linguistic communication can take place through following three modes of communication:

1) Aural / Oral (listening / speaking)
2) Visual / Graphical (Reading / Writing)
3) Visual / Manual (Sign Language)

Again have a look at the list and point out the examples where speech is involved. Yes, 5 and are examples of speech.

While comparing the various aspects of language, one can conclude that ear language (spoken/oral aspect) and another is eye language (writing language) Oral language is the means of communication. So communication is a complex two ways and intentional process of passing the message from one end to the other using a channel

<table>
<tr><td rowspan="2">Encoder</td><td>Message</td><td rowspan="2">Decoder</td></tr>
<tr><td>Channel</td></tr>
</table>

Communication development and behavioral skills are influenced by a child's ability to hear. When hearing loss goes undetected or is detected late (after 6 months of age), language and speech development can be delayed. This delay can affect a child's social interactions, emotional development and academic performance.

dB level	Type of Impairment	Communication issues attributable
-0 to 25 dB HL	Normal Hearing	Speech and language normal and normal pattern of development with good auditory perceptive skills.
26-40 dB HL	Mild Hearing Loss	Speech and language developments are within normal limits. May exhibit occasional auditory perception problems some educational retardation likely.
41-55 dBHL	Moderate Hearing Loss	Language development and speech are mildly affected. Difficulty with rarely used words, minor differences in meaning of words and idioms, defective articulation but still intelligible speech loss quality and inflection almost normal. Reading and writing delayed. Vocabulary training, reading and writing to be special attended train addition to schooling.
56-70 dB HL	Moderately-Severe Hearing	Grammar, vocabulary, articulation and voice are affected understand in loud speech .Early speech is unintelligible. Even with hearing aids show difficulty in understanding. Reading and writing need special assistance.
7 1-90 dBHL	Severe Hearing Loss	Speech and language do not develop spontaneously. Sound produced very loudly at a distance of 1ft. and near the ear. The voice will be high-pitched and articulation distorted.
>90 dB HL	Profound Hearing Loss	They do not rely on hearing for their communication. Language and speech develop only by training and they are educationally deaf. Communicate mostly through gestures, voice, inflection, articulation greatly affected. Required regular speech and language training regarding subject's expert.

2.2.3.6 ''Check your progress'' - 3

l) What is communication, speech and language?

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2) Mention the mode of linguistic communication?

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3) What is the difference between children with normal heaing and those with profound hearing loss on communication Issue?

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2.2.4 Early intervention

Many services and *programmes* will be available to you soon after your child's hearing loss is found. When a child's hearing loss is identified soon after birth, families and professionals can make sure the child gets *intervention services* at an early age. Here, the term *intervention* services include any programme; service, help or information given to families whose children have a hearing loss.Such intervention services will help children with hearing loss to develop communication and language skills. There are many types of intervention services to consider. We will talk about *early intervention* and about *communication* and *language.* Some of the services provided to children with hearing loss and their families focus on these topics.So early intervention services and choices it means communication and languages available for you and your child.

"Early intervention" means getting started as early as possible to address the individual needs of a child with disabilities. This is done to enhance the infant or toddler's development, to minimize the potential for developmental delay, and to enhance the family's capacity to meet the child's needs. Early intervention is a *system of services* established by the states through grants from the federal government to help eligible children from birth until their third birthday.

If your child was born with a hearing loss or has developed one before turning three, you may want to get in touch with personnel in the early intervention system in your area. The hospital staff may have already connected you with these services. If not, you may wish to ask your child's doctor.

Early intervention may be of help to your child and your family in many ways, including learning to communicate with each other. Early intervention programme will be assigned a *service coordinator* to help you understand the intervention system and make sure that your child gets the services to which he or she is entitled.

Valuable service systems available to you and your family are:

- ***State services*** such as early intervention (for eligible children up to the third birthday) and special education and related services (for eligible preschoolers and school-aged children).
- ***Organizations specializing*** *in hearing loss and deafness* that provide information and support.
- ***Resource and information centers*** that can offer information about national and state resources and education rights.
- ***Parent groups*** in which you can talk with other parents who also have children with hearing impairments or deafness.

2.2.4.1-Early Intervention for the Identified Population

The services/facilities available for early intervention in the country are covered under the following:

- Medical intervention
- Aids, appliances and cochlear implant.
- Auditory and speech-language training.

i) **Medical intervention-** There are two conditions that require medical intervention in school children. 1) Remove the wax.

2) Otitis media.

Otolaryn go legists being available only at the hospitals, the doctor manages the ear/ conductive hearing problem at the primary center. Anganwadi workers and other grass root level health workers are trained to handle acute ear pain, foreign body in the ear canal, etc. There are about 600 district hospitals in the country but not all may have ENT specialists or infrastructure for audiological assessment. The scenario is expected to improve as made budgetary provisions to meet the deficiencies and a 'medical kit' for grass root workers to attend to the ear problems.

ii) Aids, appliances and cochlear implant- Fitting appropriate hearing aids are a crucial step in initiating successful intervention especially in children with pre-lingual hearing impairment.

The status of availability of 'state-of-art 'hearing aids of all styles, makes and models (digital and analog) in the Indian market have improved to a great extent with the liberalization of the import policies. It is estimated that about 1.85 lakh hearing aids are distributed/sold annually. Of these, about 1.25 lakh body level aids are distributed under the ADIP scheme. The rest are either assembled or imported for sale in the country.

The Scheme of Assistance to Disabled Persons (ADIP) of Ministry of Social Justice and Empowerment. Government of India, provides Rs. 8,000 per aid per ear for the beneficiary. Binaural aids are provided to school- going children which may be replaced with new hearing aids every two years. Income for eligibility for fully and partially subsidized aids currently is Rs.6, 500 p.m. and Rs.6, 501 to Rs.10, 000 p.m. respectively. Solar battery chargers with two AA rechargeable batteries are also included for the beneficiaries. The cost of hearing aids is reimbursed for employees under ESI and CGHS schemes. Some of the State Governments have also made provision for distribution of free/subsidized hearing aids.

Cochlear implant is not an option by choice, but in terms of candidacy and cost (varying from Rs.5 lakhs to Rs.10 lakhs). Among the elite hearing impaired, cochlear implant is picking up well, especially in the prelingually deaf. Marketing strategies and the outcome of cochlear implant in the implanted children seem to have contributed to the popularity. Three popular brands of cochlear implant (Nucleus, Medel and Clarion) are marketed in the country. INS Ashwini Hospital, Mumbai have made provision for free cochlear implant for their beneficiaries.

Certain corporate houses also have donated funds to some private hospitals to help the economically weaker section. The outcome of cochlear implant is good (especially with the pediatric population) wherever a team of professionals is involved.

The network of hearing aid dealers of the major hearing aid manufacturers in the country have provision to supply the spares for the hearing aids (such as cords for body level aids, prebent tubes for BTE aids) as well the repair of the hearing aid. Repair facilities are available at the major training institutes, some NGOs and private practitioners. *Directory of Services* published by AYJNIHH. Mumbai provides more information on this issue.

The ear mould is the final link between the hearing aid and the ear. Custom made ear moulds are prepared only at institutions in cities and by some NGOs and private

practitioners. District Disability Rehabilitation Centers (DDRC) of Ministry of Social Justice and Empowerment has facilities for custom ear mould (website: *www.socialjustice.nic.in).* Facilities to make soft ear molds are available at some centers and with the hearing aid manufacturers/distributors.

(iii) Auditory and speech-language training- Available services are comparatively more in the urban than the rural sector; the caregivers from the latter sector can avail of demonstration therapy, with the objective of facilitating home training. Several early intervention centers run by parent groups continue to offer quality services. Special educators are also involved in auditory/speech language training though it remains the domain of the speech-language pathologists/audiologists.

Recognizing the importance of auditory/speech-language training for the cochlear implant recipients, the team approach has had a positive impact on the caregivers. An increasing number of special educators and caregivers have benefited from the workshops/training programmes in auditory/ verbal therapy organized by the manufacturers/ distributors of cochlear implants. A certificate course for the caregivers (of children with developmental disabilities) has been launched by AIISH, Mysore in collaboration with the RCI. To meet the special needs of the age group 0 to 5 years, orientation programmes of one-month duration aimed at manpower development are conducted at seven centers across the country by AYJNIHH, Mumbai in collaboration with Balavidyalaya, Chennai.

Availability of affordable educational material such as picture story books, puzzles, audio/video tapes, educational toys, attractive stationery items has improved due to the access, through internet, to pictures/material. Indigenously developed software and websites are also available for auditory training and speech-language training.

2.2.4.2 ''Check your progress'' - 4

l) What is Early Identification?

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2) What are the valuable services of early identification?

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3) What are the facilities available for early identification of hearing loss?

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4) What is full from of D.D.R.C./A.I.I.S.H./R.C.I./A.Y.J.N.I.H.H.?

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2.2.5 Let us Sum Up

- Human interaction with the help of verbal interaction and it involves speech, language and communication.
- These systems depend upon our hearing ability which perceives the sound about nature.
- Language is a part of human life and it three stages Form, Content, Use.
- Student with hearing loss cannot perceive the sound about the nature with the help of ear that's why delay ear language.
- With the help of best amplification system language learning may be provided children with hearing loss. But it depends on different degrees of hearing loss. So it is the. issue of language attributable.
- This language issue impact of communication issues of children with hearing loss and it also depends on type of hearing impairment.
- Early identification means hearing loss identified soon after birth in valuable service system.
- Early identification of hearing loss services are
  - Medical intervention
  - Aids, appliances and cochlear implant.
  - Auditory and speech-language training

2.2.6 Answer to ''Check Your Progress''

''Check your progress'' - 1

1. Acc to Chomsky, Language is a set of (finite or infinite) sentences, each finite in length and constructed out of a finite set of elements. There are three components of language from, content and use.

''Check your progress'' - 2

1) Ear language means spoken oral language

2) Eye language means written languages

3) In case of mild hearing Loss 50% of class discussions is missed on language issues. They have problems suppressing background noise and is missed 25% - 40% speech signal, distant sounds, unvoiced consonants, plurals and tenses. In profound loss causes only is felt a vibration speech is not developed or learners face learning deficits.

''Check your progress'' - 3

1) Communication is an intentional two way complex process of sending message from one end to the other via a channel.

   Speech is an oral and verbal manifestation of language.

   Language is a set of (finite or infinite) sentences, each finite in length and constructed out of a I finite set of elements. There are three component of language from, content and use.

2) Linguistic communication can take place through three modes these are

   - Aural / Oral (listening / speaking)
   - Visual / Graphical (Reading / Writing)
   - Visual / Manual (Sign Language)

3) In normal hearing causes communication issues like speech and language are normal and pattern of development is normal good auditory perceptive skills while in case of profound hearing loss they do not rely on hearing for their communication. Language and speech develop only by training and they are educationally deaf. They communicate mostly through gestures. Voice, inflection, articulation are greatly affected. Regular speech and language training are required with the help of subject's export.

''Check your progress'' - 4

1) Early intervention means getting started as early as possible to address the individual needs of a child with disabilities.

2) There are many valuable service of early intervention. These are

   - *Slate services* such as early intervention for eligible children and also up special education and related services for eligible preschoolers and school-aged children.
   - *Organizations specializing in hearing loss and deafness* that provide information and support.
   - *Resource and information centers* that can offer information about national and state resources and education rights.
   - *Parent groups,* in which one can talk with other parents who also have children with hearing impairments or deafness.

3) The facilities available for early intervention in the country are covered under the following:

   (i) Medical intervention (ii) Aids, appliances and cochlear implant, (iii) Auditory and speech-language training.

4) D.D.R.C.-District Disability Rehabilitation Centers

   A.I.I.S.H.-A11 India Institute of Speech and Hearing.

   R.C.I.-Rehabilitation Council of India

   A.Y.J.N.I.H.H.-Ali Yavar Jung National Institute for Hearing Handicapped

2.2.7 Unit End Exercise.

1. Discuss the details about language attributable of hearing loss student.
2. Discuss the details about communication attributable of hearing loss student.
3. What is early intervention? Who are the service provides of early intervention Explain in details.
4. What is language? Discuss the details of language components.

Unit: 2.3 □ Communication options, preferences and facilitators of individuals with hearing loss.

Structure

2.3.1 Introduction

2.3.2 Objective

2.3.3 Communication System

2.3.3.1 ''Check Your Progress'' - 1

2.3.4 Communication Option.

2.3.4.1 Communication Options Available for Use by Children with Hearing Loss

2.3.4.2 ''Check your progress'' - 2

2.3.5 Communication Preferences of individual of hearing loss.

2.3.5.1 ''Check your Progress'' - 3

2.3.6 Communication facilitators of individual of hearing loss.

2.3.6.1 ''Check your progress''-4

2.3.7 Let us Sum-up

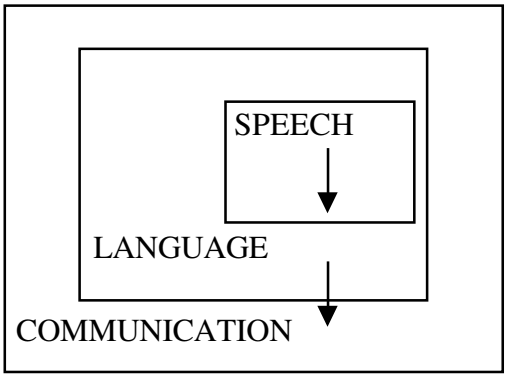
2.3.8 Answer to Check Your Progress

2.3.9 Unit End Exercises

2.3.1 Introduction

Communication is the process of exchanging and sharing information through idea and opinions. Most often this exchange is via language. Language consists of symbol ordered in particular sequences for the purpose of conveying information. The symbol of language mainly consisting of used communication can be carried out in different ways. The term communication is often used to include only the spoken word that is speech and hearing. A communication option, mode, modality, or method is the *means* by which the child and family receive and express language. The choice of a communication modality that facilitates language development and allows the child who is hard of hearing or deaf to readily engage in communication interchanges with

family and caregivers is a primary issue throughout childhood. So in this unit we know about the communication options, preferences and facilitators of individual of hearing loss.

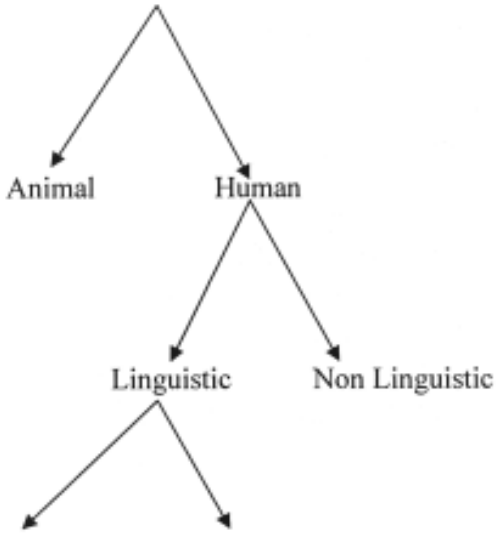


2.3.2 Objective

The Student-Teacher will be able to understand

- the meaning of communication option
- the different communication system modes and method.
- the communication option available for children with hearing impairment.
- the communication preferences available for children with hearing impairment,
- the communication facilitators available for children with hearing impairment,

2.3.3 Communication System



	Modes (Four modes)		Methods (Three methods)
1	Aural/Oral(Listening/Speaking)	1	Oralism
2	Visual/Graphical(Reding/Writing)	2	Total Communication
3	Visual/Manual(Sign Language)	3	Education Bilingualism
4	Speeech reading		

Modes : There are four modes of linguistic communication. These are

Aural/Oral (Listening/Speaking) mode is the common mode used for communication by hearing population. It develops automatically and naturally in the non-impaired and it is acquired in early years in life and its basic purpose is for routine communication.

Visual/Graphical (Reading/Writing) mode is the mode secondary mode because it is a learnt skill as against the acquired skill of aural/oral mode. It is learnt, formally and is command is acquired in later years of life and its purpose is official/educational.

Visual/Manual (Sign Language) used by people with hearing impaired and is not a mear collection of signs but a rule governed language with its own grammar.

Speech reading is fourth mode and play supportive roles to the earlier modes. It does not have the potential to carry the message in totally, hence cannot function on its own independently.

Methods: There are three methods of linguistic communication. These are

One mode (out of the two) and one type of language (out of two) can be selected and the combination of these two is called the methods of communication. There are three methods of communication possible.

Oralism- Oralism is philosophy which desires to develop verbal language through aural/oral mode. Modern oralists believe that that attempts should be made to break through the barrier to communication caused by deafness.

Total communication- Total communication in simple words means the use of sign as well as speech in order to develop spoken language of the deaf children. Garretson (1976) defines total communication in the following way a philosophy incorporating appropriate aural, manual and oral modes of communication in order to ensure effective communication with and among hearing impaired persons.

Education Bilingualism- Education Bilingualism is generally considered to be a reaction against oralism as well as total communication. Bilingualism with total communication that oralism can never work with profound deaf students but it is equally critical of total communication that combining sign with verbal language will bring speech to child. So fundamentally the bilingual approach is that the first language of all deaf children could be the sign language which belongs to deaf community of the concerned

2.3.3.1 ‘‘Check your progress’’ - 1

1. Metion any two modes of linguistic communication?

   .....

   .....

2. Mention any two methods of linguistic communication?

   .....

   .....

3. What is total communication?

   .....

   .....

4. What are the meanings of Aural and oral?

   .....

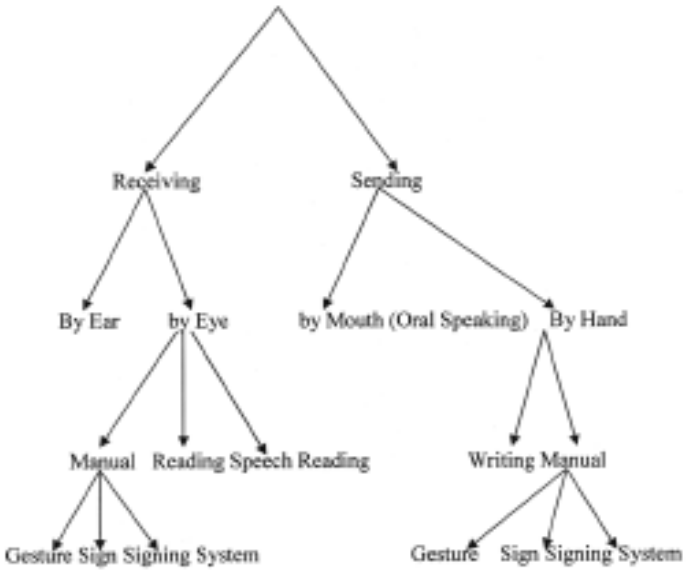
   .....

5. What is oralism?

   .....

   .....

2.3.4 Communication Option



2.3.4.1 Communication Options Available for Use by Children with Hearing Loss

Option/Feature	Familial Role	Amplification
Auditory-Verbal Maximizes use of residual hearing to develop spoken language. Auditory channel is primary input mode exclusively during language learning experiences and therapeutic intervention. The stricts use of visual cues, speech reading and signs. Provides only auditory training	Serve as spoken language models Provide abundant opportunities for spoken language learning through Auditory- Verbal techniques in the home environment. Seek professionals support from those knowledgeable in AV approach. Ensure appropriate audiologist management. Monitor rigorously the performance of amplification/cochlear implant technology. Desire mainstream educational setting & inclusion in hearing community as primary goal.	Provide early amplification Provide maximum audibility across the speech -frequency range Promote consistent use of hearing aids. FM systems and/or Cochlear Implant
Auditory-Oral Maximizes use of residual hearing *and* speech reading to develop spoken language. Use of both auditory and speech reading encouraged during language learning and therapeutic experiences. Provides both auditory and speech reading training	Serve as spoken language models Provide abundant opportunities for spoken language learning using auditory and speech reading input in the home environment. Arrange for appropriate Auditory -Oral programs/professionals. Ensure appropriate audiology management. Monitor rigorously the performance of amplification/ cocblear implant technology. Desire mainstream educational setting & inclusion in hearing community as primary goal.	Provide early amplification Provide maximum audibility across the speech-frequency range Promote consistent use of hearing aids, FM systems and/or Cochlear Implant.

Cued Speech Makes spoken language visible through use of specific hand shapes, positions and lip reading (i.e., cues).	Learn and become fluent in Cued Speech Provide abundant opportunities for spoken language learning cueing all communication interactions with the child in the home environment. Support use of Cued Speech by early intervention personnel, teachers and all others communicating regularly with child. Arrange for appropriate educational settings or Cued Speech transl iterator Determine desire for child to use amplification or cochlear implant technology.	Amplification not necessary for spoken language acquisition Provide maximum audibility across the speech-frequency range when family desires child to use amplification or cochlear implant
Manually Coded English (MCE) Uses sign system and finger spelling to represent spoken English. Often used in conjunction with Total Communication and Simultaneous Communication.	Learn and become fluent in manual sign system (MCE). Arrange for appropriate educational settings. Professionals who are fluent users of MCE system used by the child or interpreter.	Amplification not necessary Provide maximum audibility across the speech-frequency range when family desires child to use amplification or cochlear implant
Total Communication Uses multiple methods simultaneously (manual, oral, auditory) Uses MCE system	Learn and become fluent in manual sign system (MCE). Encourage speech reading and use of audition in combination with sign (MCE). Arrange for appropriate educational setting/TC professionals who are fluent in TC and support use of sign, speech reading and audition. Ensure appropriate audiologist management.	Provide amplification early amplification Provide maximum audibility across the speech-frequency range Promote consistent use of hearing aids, FM systems and/or Cochlear implant.
Simultaneous Communication Use sign system and finger spelling and speech. Does not require use of audition.	Learn and become fluent in manual sign system. Encourage speech and sign. Arrange for appropriate educational setting; may be the same as TC. Ensure appropriate audiology management when required.	Amplification not generally used for communication as part of approach.

Bilingual-Bicultural (Bi-Bi) Philosophy of language learning: first ASL, second spoken languag (e.g., English) Combines ASL and form of spoken language (MCE, Cued Speech) Opportunities for experiences in Deaf and hearing communities.	Learn and become fluent in ASL Ensure regular interaction with members of Deaf and hearina culture/community Arrange for appropriate educational setting in program supporting Bi-Bi philosophy.	Amplification not required for visual language learning. Amplification/CI may be used for alerting, warning, awareness of environmental sounds and for support of spoken language development

2.3.4.2 ''Check your progress'' - 2

1. Mention any two communication options availablechildren with hearing impairment?

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2. What is cuae speech?

   .....

   .....

3. What is full from of A.V.T.?

   .....

   .....

2.3.5 Communication Preferences of individual of hearing loss.

Hearing—Listening capability of our hearing system. So speech, language and communication these systems depend upon our hearing ability which perceives the sound about nature. But if suffering from hearing disability it has difficulty to perceive the sound about nature and it affects verbal interaction and also affects speech, language and communication. Due to this problem child can face problem in several development areas. These are personal-social, cognitive and academic.

Conversation – The use of speech and/or sign for informal exchange of views, ideas or information.

Alphabetic Principle – The use of letters and letter combinations to represent phonemes and/or signs in a system of writing.

Vocabulary – The words we must know to communicate effectively.

Fluency – The ability to read a text quickly and accurately with ease and expression.
Comprehension - The process of constructing meaning from print.

Writing – Communicating through the use of written symbols.

Gesture – It is the meaning of a movement of parts of the body especially a hand or the head to express an idea or meaning.

Singing- It is a large body literature and also composes hand shapes, locations and motions. Addition facial expression and also classifier is a specific hand shapes that can represent a particular person and project.

Facial expression- It is facial literature use to non-verbal communication to facial express.

2.3.5.1 ‘‘Check your progress’’ - 3

1. What is conversation?

   .....

   .....

2. What is gesture?

   .....

   .....

3. What is singing?

   .....

   .....

4. What if facial expression?

   .....

   .....

2.3.6. Communication facilitators of individual of hearing loss.

The Selection of a Communication Option for Children with hearing loss.		
SL.NO	Facilitators	Consideration
1	Language used in the home	Spoken Bilingual (use of 2 spoken languages) Visual (ASL) Combination of visual and spoken (bilingual)
2	Family Involvement	Abundant opportunities for language learning and communication in the home. Level of participation in intervention Home situation/ family membership and other demographic factors Consistency in learning & using MCE. ASL. cued speech Socio-economic circumstances Work schedules
3	Age of Identification & Intervention	Before 6 to 11 months of age After 6 to 11 months of age
4	Literacy	Speech perception Development of phonological awareness
5	Community resources	Availability of certified AV therapists; auditory-oral therapists, sign language interpreters, ASL community, transliterations etc. Availability of El (Educational Intervention)programs that use above approaches
6	Hearing status	Degree of hearing loss Stability of hearing loss Repeated episodes of OME(Ottis Media Infection)
7	Hearing Aids & Cochlear Implants	Consistent use of Hearing Aids/FM system Cochlear implant candidacy Financial constraints related to acquiring assistive device technology Expectations regarding benefits of device
8	Speech Intelligibility	Access to acoustic speech features through hearing aids/cochlear implant Speech therapy
9	Presence of additional disabilities	Visual Motor Cognitive Attention/Behaviour
10	Availability of later educational options	Mainstream with support services Self contained classroom Special school Residential facility

2.3.6.1 ''Check your progress''- 4

1. Mention any three communication facilitators of individual with hearing loss?

   .....

   .....

2.3.7 Let us Sum Up

- Communication is a complex, two way intentional process of transferring a message from one end to the other.
- There exist several communication systems which could be classifld into human versus animal communication and linguistic versus non-linguistic communication.
- There are four modes of linguistic communication (listening/speaking, reading/ writing/ sign language/ system, speech reading)
- There are three methods of communication existing in the education of the deaf and oralism, T.C. and Educational Bilingualism
- Communication Option of children with hearing loss
- Communication of preferences for children with hearing loss
- Communication facilitators of children with hearing loss

2.3.8 Answer to Check Your Progress

''Check your progress'' - 1

1. Aural/Oral (Listening/Speaking), Visual/Graphical (Reding/Writing), Visual/ Manual (Sign Language) and Speech reading
2. Oralism, Total Communication and Education Bilingualism
3. Total communication in simple words means the use of sign as well as speech in order to develop spoken language of the deaf children. Garretson (1976) defines total communication in the way of philosophy incorporating appropriate aural, manual and oral modes of communication in order to ensure effective communication with and among hearing impaired persons.
4. The meaning of aural listen ear and oral means verbally,

5. Oralism is philosophy which desires to develop verbal language through aural/ oral mode that's called as oralism.

''Check your progress''-2

1. Auditory- Verbal, Auditory-Oral and Total Communication
2. *Cued speech* is spoken language visible through use of specific hand shapes, positions and lip reading i.e., cues.
3. Auditory Verbal Therapy.

''Check your progress''-3

1. The conversation is use of speech and/or sign for informal exchange of views, ideas or information.
2. It is the meaning of a movement of parts of the body especially a hand or the head to express an idea or meaning.
3. It is a large body literature and also comprises hand shapes, locations and motions. Addition facial expression and also classifier is a specific hand shapes that can represent a particular person and project.
4. It is facial literature use to non-verbal communication to facial express.

''Check your progress'' - 4

1. Language used in the home, family involvement, age of identification & intervention and literacy.

2.3.9. Unit End Exercises

1. What is communication? Describe the details of communication system.
2. Describe the details of the communication option/feature available for children with hearing impairement and their family role.
3. Describe the details about communication preferences and facilators of individual with hearing loss.

Unit : 2.4 ◘ Issues & measures in literacy development and scholastic achievement of students with hearing loss

Structure

2.4.1 Introduction

2.4.2 Objective

2.4.3 Literacy development students with hearing loss.

2.4.3.1 ‘‘Check your progress’’ - 1

2.4.4 Issue of literacy development of students with hearing loss.

2.4.4.1 ‘‘Check your progress’’ - 2

2.4.5 Measures for literacy development of students with hearing loss.

2.4.5.1 Tips to develop literacy Skills in students with Hearing Impairment

2.4.5.2 Reading activity: Step-1 (Unseen/ in experienced passage)

2.4.5.3 Reading activities Step- II

2.4.5.4 Does and don’ts for better reading activities:

2.4.5.5 Writing:

2.4.5.5.1 ‘‘Check your progress’’ - 3

2.4.6 Scholastic achievement of students with Hearing Loss.

2.4.6.1 ‘‘Check your progress’’ - 4

2.4.7 Let us Sum Up

2.4.8 Answer to Check Your Progress

2.4.9 Unit End Exercises.

2.4.1 Introduction:

Literacy skills are essential for succeeding in our today’s society. Everyday examples include accessing the Internet or messages via e-mail; reading instructional manuals for the workplace, for computers, for cars, directions at work, for travel, or for taking

medications; and for leisure activities such as reading the newspaper or enjoying a magazine or a book. Literacy is also the key to functioning effectively in school. For most individuals the foundation for reading proficiency begins in infancy, advances with formal reading instruction in school, and continues to increase as the result of quality educational, social and recreational experiences throughout one's lifetime but without well-developed literacy skills students cannot participate fully in classroom learning. Students are at much greater risk for school failure and lifelong problems with employment, social adjustment, and personal autonomy so literacy skills are vital at a national level. But the problems are galore for administrators, educators, and families who work or live with students who are deaf or hard of hearing for the purpose of methods of instruction. Hearing loss has nothing to do directly with literacy development and functioning; in most of the cases of deafness, literacy does get negatively impacted. This is due to basic inadequacies of language and communication. In this part we are going to see what are the issues & measures in literacy development and scholastic achievement of students with hearing loss.

2.4.2 Objective

The student and teacher will be able to-

- understand issue of literacy development of students with hearing loss.
- understand issue of literacy development in reading writing steps in hearing impaired student.
- under stand measures for literacy development of students with hearing loss.
- understand scholastic achievement of students with hearing loss.

2.4.3 Literary development of students with hearing loss.

The development of literacy hearing impairment children is not a multifaceted issue. It is possible to find a good number of parallels to literacy development in their hearing peers. Current millennium still reports that children with hearing loss are often severely delayed when compared to hearing children, especially in earlier development. Adolescents with hearing loss are still seen to have multifaceted problems involving literacy (reading and writing) and language that can influence their attitude to their ability to access and use academic information. This also has implications for how they regard academic information and whether they are willing to apply it. If adolescents with hearing loss are able to access and use academic information sufficiently, they

will be able to fulfil a more significant role in society, as well as *01* to study and work well. The acquisition of academic information will enable adolescents with hearing loss to function in such a way that they will be able to maintain their independence and improve their knowledge base throughout their education years. According to Briggle (2005) some class activities that are beneficial to hearing impaired or deaf children includes:

1) Time to explore writing, drawing, books and environmental print
2) Story time translated in to sign
3) Journal writing using invented spelling.

Like hearing peers,hearing impaired or deaf children should have the opportunity to participate in literacy events. They should also use written language in many ways that are typical to their hearing peers. According to Briggle (2005) and Williams (1994) the teacher should provide them with the opportunity of demonstrating the following uses of languages in signed or spoken from:

1) To interact socially with peers and adults while writing.
2) To provide information about written text.
3) To label written creations.
4) To monitor the construction of text.
5) To request assistance with writing tasks from adults and peers,
6) To challenge others' knowledge of literacy, and
7) To evaluate literary works.

2.4.3.1 ''Check your progress'' - 1

1. What is the multifacctd problem children with hearing impairment?

   .....

   .....

   .....

2.4.4. Issue of literacy development of students with hearing loss.

Children with hearing loss now compete favourably with hearing peers in some issues. The following areas are

1) Children with hearing loss who evidence language delays also demonstrate significant delays in development of theory of mind. So theory of mind development is dependen child's opportunity for social interaction auditory comprehension, ver on a communication and play.

2) Oral language acquisition remains a challenge for children with hearing loss and also affects in reading. (Easterbrooks & Baker, 2002). Reading outcomes are well below average for 96% of children with hearing loss, most reaching only fourth to sixth grade proficiency (Karchmer, M.A. & Mitchell.R.E.2003). The 19th International Congress on Education of the Deaf (ICED) brought together 1,067 teachers, administrators, and researchers from 46 countries to address topics in education. The publication resulting from the conference noted that while academic outcomes improve with more hearing peers, social language use and the ability to make friends with hearing peers remain as problems for children with hearing loss in mainstream educat.onal settings (Leigh, G & Power, D 2004).

3) Sensory-motor concerns are related about literacy development of students with hearing loss. Children with sensoy neural hearing loss appear to experience higher rate difficulty with vestibular processing when compared with their typically developing peers, resulting in delays and/or compensatory strategies in their development , motor skills, such as balance, coordination, and body and spatial awareness (Suarez e 2007).

4) Kluwin, T.M. Stinson, M.S. and Colarossi, G.M.(2002) identified four main areas issue of concern for children with hearing loss when compared with hearing peers. They are :

   a. Social skills,

   b. Interaction/participation,

   c. Sociometric status/acceptance,

   d. Affective functioning.

5) Another and most important issue differences between normal and children with hearing loss. Children with hearing loss have been consistently documente areas of balance, complex motor sequencing, sensory, and vestibular processing.

6) Children with hearing loss are more likely to experience co-morbid diagnoses, such as apraxia and attention disorders and also auditory deprivation may lead development of specific motor and language skills that share common cortical processes.

7) Literacy (reading and writing) issue is traditionally regarded as the most important skill area needed to obtain academic information and also involved it the communication of thoughts and process of learning through conversation, reading, writing and the conceptualization of the reading process.

8) The educational outcomes for hearing impairment^ in secondary schools in normal mainstreaming after leave the school prepared to live and function independently should be able to independent living skills, employment readiness, and a set of 'learning how to learn' skills.

2.4.4.1 <u>''Check your progress'' - 2</u>

1. What do/mean by vestibular processing?

   .....

   .....

2. Mention any two issue literacy development of students with hearing loss?

   .....

   .....

2.4.5. Measures for literacy development of students with hearing loss.

Language based reception / expression of ideas and thoughts achieved by the medium of a shared script, which reflect shared language, context and the world knowledge. This means, reading / writing is not mere understanding and creation of script. Reading / writing is not conversion of spoken thoughts into a graphical thought. It is understanding and creation of independent thoughts. Sharing the script in itself is extremely essential but is not the only essential prerequisite in the process of writing

(and reading). Writing is much more than penning down a set of alphabets on paper. For example, read the following sentence:

Ich bin Lehrerin Van Beruf

This sentence uses Roman (English) script, which you already know. Could you understand the meaning? No, because sharing a script with the writer is not enough for you as a reader. You do not share German language with the writer and hence meaning is inaccessible for you. If a sentence is:

I am a teacher by profession

You will be able to read (understand) the sentence because you not only know the script but also share the language. Thus reading and writing is not possible without the adequate, age appropriate knowledge of the language for which the script is used. Hearing loss impacts language development and language functioning. As a result, very often the student with hearing loss has inadequate language. This inadequacy of language in turn impacts the literacy skills of the student with hearing loss.

2.4.5.1. Tips to develop Measures for literacy Skills in Students with Hearing Impairment

Literacy means independent reading (comprehension and not mere loud pronunciation of the text) and independent writing (expression of thought and not mere copying or penning down memorized lines). Student with hearing impairment have to be taken from guided / assisted literacy skills to independent literacy skills. Languages in the first point are true with literacy and literacy is experience and context bound. If it is developed through pleasurable activities / games / exercises students / with hearing impairment learn it more readily. The best method to develop reading / writing in student with hearing loss is to expose them to written material which is graded as per their levels. This material should be able to take them one step ahead in complexity. Reading / writing material may include readymade and custom-made materials like:

- Text books (of all the school end examination boards);
- Story books / comic books;
- News paper, magazines;
- Personalized notes to teachers / parents / classmates;
- Captioned movies;
- Greeting cards;

- Advertisements
- Manuals of phones, ovens, washing machines etc;
- SMS text messages;
- Rules of games;
- Road maps;
- Recipes;
- Railway / airplane / bus tickets:
- Matter on packed food / grocery;
- Menu card
- Joke books;
- Encyclopedia;
- Bill boards / banners / hoardings;
- Instruction boards at gardens, theatres etc.;
- Telephone / electricity bills;
- Purchase receipts;
- Registers and records;
- Specially created albums with written material;
- Specially created scrap books / experience books;
- Specially created vocal books;
- Daily diary etc.

Although reading and writing are closely linked but these cues are separate process.

2.4.5.2. Reading activity: Step-1 (Unseen/ in experienced passage)

- Sit with the student.
- Read a particular number of lines as per the level of the students and either read together silently or let the student read after you.
- Discuss the matter and encourage him / her to ask, answer, describe, comment, agree / disagree etc. on the matter and it will be produced on total communication system.

- Explain new concepts with the help of real object and dramatization.
- Show similar and smaller examples of sentence types.
- Ask questions to ensure he / she has not missed the details.
- Link the information with previous knowledge.
- Repeat the steps with next few lines.

2.4.5.3-Reading activity Step- II

In step I we made the student with hearing impairment read the lines first and then explained the content. In **step II** the teacher first develops the context by telling what the lines are about in. Explain a few concepts discuss with the child and then let him / her read the lines. **Both step I and step I and step II are** good tools of learning and both have strengths and hence students should be exposed to both.

2.4.5.4. Dos and Don'ts for better reading activities:

- Reading material should not restrict to word level, it should be in sentence form and key word could be highlighted with underline, colouring etc.
- Never work on vocabulary lists without context.
- Never over-do speech correction while the focus of the activity is reading.
- Be tolerant of mistakes. When students hesitate going on to complex level.
- Reading does not always mean understanding every bit of the written matter. Overall understanding too helps many times.
- In pre-school level Children should be encouraged the habit of scanning picture books, flipping comic books, sitting together to read magazines etc. This builds readiness before the child starts learning the actual reading.
- Link reading activities with school subjects. Reading activities can be used in both the ways to reinforce learnt knowledge or to build readiness for the knowledge to be learnt. This is important for student/with hearing loss since it helps him/her in understanding school subjects and also in developing reading.

2.4.5.5-Writing:

(1) To provide ample opportunity to the child to write his/her own thought.

(2) Link development of writing with reading, listening - speaking (or signing), context and experiences. Teachers always want to make tasks simpler for students and simplest way to make tasks simpler is to link it with meaning and context. Teaching writing for that matter, teaching anything without context or pragmatic background cannot have good results in the long run.

(3) In order to facilitate learning use of feedback is an essential factor. This in turn needs to be responded with feedback comprising

- Clear
- In detail
- Indicative of higher expectation
- Appropriate
- Immediate
- In writing
- Consistent
- Objective
- Pro-active

(4) Writing should be enjoyable and communication oriented rather than task-oriented.

(5) Develop the habit of self-editing. Many times, looking at the writings of the children one can hardly know his / her current level of language competency. The teacher is confused about whether an error committed by the student is an error of accidence or is an outcome of incorrect knowledge of language. If the children are made to edit their own writing, correcting their inner language structures becomes possible. Initially teachers can mark the sentences, parts where modification is required. This can work as a clue to help him/her edit the overall write up.

(6) Carry out assessment of writing. Separate writing assessment needs to be carried out by the teachers on regular basis. Assessment of language or assessment of language text book cannot be considered as writing assessment. There is a difference between assessment of language through writing and assessment of writing. Like any other ideal assessment, writing assessment too has to be carried out systematically, consistently and objectively.

(7) Involve parents in the process of writing development. As said earlier, writing needs to be developed in connection with context and real life situations. Home environment is rich from this point of view. Providing training to parents on follow up activities on development of writing is highly recommended.

2.4.5.5.1 ''Check your progress'' - 3

1. Mention the steps of reading activity for students with earing impairment?
   .....
   .....
   .....
2. What is literacy?
   .....
   .....
   .....
3. Name two ways for developing reading skill of children with hearing impairment?
   .....
   .....
   .....

2.4.6 Scholastic achievement of students with Hearing Loss.

The scholastic achievement of students with hearing loss is one of the most important determinants of recipient's quality of life after schooling. The scholastic achievement of students with hearing loss attending the mainstream schools and to compare their scholastic performance to their normal hearing peers. So scholastic performance in mainstream school is a most important factor. The factors are:

- **Language and speech-** The ability to learn language and speech is the highest development of children hearing impaired.
- **Intellectual ability-** Process of thinking of deaf children and that normal peers are found to be (& similar also cognitive abilities and develop verbal intelligence.
- **Academic Performance-** Hearing impaired children are frequently handicapped in various degree of hearing loss and it affects educational performance and particularly reading which relies heavily upon language skill. So after scholastic achievement hearing loss student can develop the academic performance.

- **Adjustment of social** Our social inter action depends upon communication. So deaf children have communication problems. That's why it should have problem of social inter action. Such children live in a world of isolation and form a group of their own, an association of the deaf for their common interest and interaction. So after scholastic achievement student with hearing loss can develop on adjustment in social inter-action.
- **Behavioural problem-** Deaf learners feel invariably inferior and helpless in adapting to circumstances that require verbal communication. So regard non-verbal communication absence of verbal they have poor self poor concept which damages the development of personality but with the help of mainstream education which is scholastic achievement they develop the personality and is reduced the problem behaviour regard various social academic aspect.
- **Socially handicapped** - Learners with hearing loss cannot adjust with society because they suffer from communication difficulty and fail to understand what others hearing people say. But after scholastic achievement with the help of mainstream they develop communication skill and mixing the oral social which is social of communication and reduced of socially handicapped.
- **Problem in personal and social development-** Language becomes a barrier for deaf learner for purpose of communication with others. So this affects the socialization process and plays a vital role in the personal and social development of hearing loss learner. So with the help of scholastic achievement in mainstream in regular class room it develops the normal peer acceptance and reduces the problem in personal.
- **Personality problem-** Hearing difficulty may create personality problem. A becomes deaf learners more frustrated as he/she tries to reach the level of the normal and a totally deaf child seems reconciled to his fate But given well provided adequate facility of language and communication regard literacy development in regular school they develop their personal adjustment and well developed scholastic achievement in hearing impaired studens.
- **Provided in natural and social environment-**For a child with hearing loss to scholastic achieve developmental synchrony even development across the developmental domains programs need to provide a richer, more natural social environment and consistent exposure to hearing peers who can model age-appropriate language and social development.

- **Mainstream Placement-** Another choice commonly made for children with hearing loss is mainstream placement. The term *mainstreaming* is used to refer to the placement of regular education classes based on their skill level. Mainstream education does seek to educate the "whole child" and provide exposure to many preschool programmes. However, many schools turn to more directive teaching models by kindergarten wherein children sit at desks, teachers instruct, and children acquire facts, skills, and concepts through drill and practice.

2.4.6.1 ''Check your progress''-4

1. Mention any two issue scholastic achievement of students with Hearing Loss?

   .....

   .....

   .....

2.4.7 Let us Sum Up

- Hearing loss is a disability which affects literacy and it is a multifaceted issue.
- Literacy issue is the most important skill area to obtain academic information of hearing impaired studens.
- Literacy issue depends on communication and communication is the most significant process.
- After literacy development students with hearing loss should achieve in the respected of different formal area in mainstream placement.

2.4.8 Answer to ''Check Your Progress''

''Check your Progress'' - 1

1. The multifaceted problem children with hearing impairment involvement literacy issue which are reading, writing and also language that can influence their attitude to their ability to access and use academic information.

''Check your progress'' - 2

1. Vestibular processing means the areas of balance motor coordination, complex motor sequencing.

2. Children with hearing loss who evidence language delays also demonstrate significant delays in development of theory of mind so theory of mind development is dependent on a child's opportunity for social interaction auditory comprehension, verbal communication and play.

Sensory motor concerns are also related about issue literacy development of students with hearing loss. Children with sensor neural hearing loss appear to experience higher rates of difficulty with vestibular processing when compared with their typically developing peers, resulting in delays and/or compensatory strategies in their development of gross motor skills, such as balance, coordination, and body and spatial awareness.

''Check your progress'' - 3

1. Class room situation and teachers should develop the contents of text books.
2. Literacy means independent reading (comprehension and not mere loud pronunciation of the text) and
3.

- Discuss the matter and encourage him / her to ask, answer, describe, comment, agree / disagree etc. on the matter and it will be produced on total communication system.
- Explain new concepts with the help of real object and dramatization.
- Show similar and smaller examples of sentence types.

''Check your progress'' - 4

1. Language and speech- The ability to learn language and speech is the mostly development of the hearing impairment.

Academic Performance- Hearing impaired children are frequently handicapped in various degree of hearing loss and its effect on educational performance and particularly and particular handicapped in reading which relies heavily upon language skill so after scholastic achievement hearing loss student can develop the academic performance.

2.4.9 Unit End Exercises.

1. Describe the details about issue of literacy development and scholastic achievement of students with hearing loss.

Unit : 2.5 □ Restoring techniques using human (interpreter) & technological support (hearing devices)

Structure

2.5-1 Introduction

2.5-2 Objective

2.5.3 Students who are hard of hearing face obstacles in most areas of their lives

2.5.4 Restoring Techniques Using Human Support

- **2.5.4.1 ‘‘Check your Progress’’ - 1**
- **2.5.4.2 Description and facts**
- **2.5.4.3 Possible Barriers.**
- **2.5.4.4 Interaction with an individual with Hearing Impairment.**
- **2.5.4.5 ‘‘Check your progress’’ - 2**

2.5.5 Restoring Techniques Using Technological Support (Hearing Device)

- **2.5.5.1 Amplification options**
- **2.5.5.2 Types of hearing aids**
- **2.5.5.3 Behind-the-Ear Aids**
- **2.5.5.4 In-the-Ear Aids**
- **2.5.5.5 In-the-Canal Aids**
- **2.5.5.6 Body Aids**
- **2.5.5.7 Bone Vibrator Aid**
- **2.5.5.8 Cochlear Implants:**
- **2.5.5.9 FM Systems**
- **2.5.5.10 ‘‘Check your progress’’-3**

2.5.6 Auditory Training

- **2.5.6.1 Important**
- **2.5.6.2 When Start Auditory Training**

2.5.6.3 Pre requisite issue for auditory training

2.5.6.4 Conditioning Sounds

2.5.6.5 Stages of Auditory Training

2.5.6.6 Auditory Training Material

2.5.6.7 ''Check your progress'' - 4

2.5.7 Let us Sum Up

2.5.8 Answer to ''Check Your Progress''

2.5.9 Unit End Exexcises

2.5.10 References

2.5.1. Introduction

The modern world presents many challenges of very different types. Our senses are constantly being assailed with new sensations, environments, and experiences. We have to develop coping strategies that allow us to move with confidence and deal with these challenges without becoming overwhelmed. For many of us, that is a significant task. For others, particularly those with a disability, it is a monumental challenge. Deafness is often described as 'the silent disability' because it is not noticed, not visible and not discussed, yet it is a condition growing in importance and prevalence. People who are hearing impaired and hard of hearing face many challenging hearing environments every day. They face obstacles in most areas of their lives. These are education settings, the workplace and social situations.

- In education settings, miscommunication can result in poor grades. Educators can be unaware that students have not heard the correct instructions, and mislabel children with hearing loss as 'lazy' or 'stupid.'
- In the workplace, people with hearing loss have more difficulty in finding employment and struggle with certain practical aspects, such as attending group meetings or answering the telephone.
- In social situations, hearing people cannot see that a person with hearing loss has difficulty hearing others, and also forget that hearing aids and cochlear implants are only aids. They need to be constantly reminded to consider the hearing difficulty, which can be tiring, frustrating and embarrassing. It can become easier

for a person with hearing loss to withdraw from social events and isolate themselves.

2.5.2. Objective:

The student -teacher able will be able to understand-

- Restoring techniques using human (interpreter).
- Restoring techniques using Technological Support (Hearing Device).
- Auditory training.

2.5.3. Student who are hard of hearing face obstacles in most areas of their lives

Deafness refers to the inability to hear, either totally or partially. Symptoms may be mild. moderate, severe or profound. Deafness may occur at birth or may be acquired due to various diseases, infections and or ageing. There are various strategies to enable these people to compensate for their deafness so that they can communicate with human interpreter such as lip-reading, sign language and use hearing devices such as hearing aids and also cochlear implant. When they use lip-reading, sign language and use hearing devices that means loss of normal hearing (normal hearing is restored) and using the restoring technique (human interpreter) &technological support (hearing device) and also auditory training. So restoring techniques are

(1) Human interpreter (lip-reading, sign language, communication worker)

(2) Technical support (hearing device/amplification option)

(3) Auditory training.

2.5.4. Restoring Techniques Using Human Support:

- Attract the student's attention before speaking and make sure you are facing him/ her.
- Speak clearly; but avoid speaking artificially slowly, exaggerating your lips, or shouting as this affects the natural rhythm of speech.
- Make use of natural gesture and facial expression as a clue to meaning.

- Make sure that there is adequate light on your face. Do not stand with your back to windows.
- Position the student so that he/she can lip-read you easily and see the projector or board and as much of the class as possible if there is to be a group discussion.
- Make use of visual material, i.e. handouts, key vocabulary, diagrams, written instructions.
- Indicate when you are changing the subject.
- Check comprehension; encourage and direct questions.
- Keep background noise to a minimum.
- Write important new words on the board to fix their form.
- If using DVD/video for teaching purposes, be aware that the student will not be able to follow the soundtrack and will need to borrow the DVD/video or have access to subtitles or a transcript.
- Direct the student towards any relevant course materials on Blackboard.
- Ensure that members of the group raise their hand before speaking, so that the deaf student is alerted to a change of speaker.
- Do not allow more than one person to speak at a time.
- Be aware that a deaf person cannot read or take notes at the same time as lip-reading-allow time for a student to look at the relevant section of a handout, then make sure you have his or her attention before you comment on it.

Lip speakers are useful for those who do not use sign language but who find a tutor or lecturer difficult to lip-read. A lip speaker repeats the words of the speaker without voice. They produce clearly the shape of words, the flow, rhythm and phrasing of natural speech and repeat the stress as used by the speaker. The lip speaker also uses facial expression, natural gesture and finger spelling (if requested) to aid the lip reader's understanding. Lip speakers are used by people who use lip-reading extensively and who have a good command of English language.

Interpreters are used by students who prefer to communicate through British Sign Language (BSL) or Sign Supported English. The interpreter will translate what is said by the lecturer or tutor into sign and will provide a voice over for the deaf student's own signed contribution if required. It is helpful to employ an interpreter who has some knowledge of the subject matter, especially if the vocabulary is highly specialized.

Communication Support Workers provide an interpreting service and may also provide a lip speaking or note-taking service and a voice-over for the deaf student's contributions, but will not yet have reached interpreter level (They will usually be qualified to Level I/II Certificate in BSL).

2.5.4.1 ''Check your progress'' - 1

1. Mention any four restoring techniques using humans support?

   .....

   .....

2. Write the full form of BSL?

   .....

   .....

2.5.4.2. Description And Facts

A student with hearing impairment may be hard to recognize in the classroom. Some students use hearing aids and have learned to lip-read or sign. Arperson with no hearing is deaf. "Hard of hearing'' defines a hearing impairment in which the sense of hearing, although diminished, is functional. The following list describes some facts about individuals with hearing impairment:

- Not all people with hearing impairment are good lip readers. Lip reading skill has no correlation to a person's intelligence.
- Not all people with hearing impairment know how to sign. Not all students with hearing impairment use interpreters. Some prefer to communicate through lip reading and some prefer sign language.
- A hearing aid does not correct hearing loss like glasses correct vision problems. Most persons with hearing impairment have sensory neural hearing losses and the clarity of speech is affected. The hearing aid does not make speech more clear; it merely amplifies the sound.
- Many people with hearing impairments are easily understood. Others cannot monitor the volume and tone of their speech and may be initially hard to understand.
- Students who have hearing impairment, just like students who do not have hearing impairment, vary to some degree in their communication skills.

2.5.4.3. Possible Barriers:

- Lack of interpreters or people who understand sign language
- Decreased awareness of auditory cues in communication

2.5.4.4. Interaction with An Individual with Hearing Impairment :

Each and every student is functionally different. So interactions with an individual with hearing impairment following suggestion are that:

- Get the individual's attention before speaking.
- Look at the individual when you speak.
- Do not block the area around your mouth as it may inhibit lip reading.
- Speak naturally and clearly. Slowing down slightly may help. Do not exaggerate lip movement and do not shout.
- Try to avoid standing in front of windows or other light sources. The glare from behind makes it difficult to read lips and other facial expressions.
- Do not hesitate to ask the student to repeat if you do not understand. If repeating does not work, use a pen and paper. Communication is the goal; the method is unimportant.
- If a student is using an interpreter, speak directly to the student, not the interpreter.
- Short sentences are easier to understand than longer sentences with several clauses.
- If the student does not understand, try repeating, and if the student still does not understand, rephrase a thought or use a different word order rather than repeating the same words.
- It is impossible to lip-read a word that the student has never seen before. If time permits, it helps to write the word and then let him or her see how it looks on the lips.
- Facial expressions, gestures and other body language help convey the message.
- If a sign language interpreter is present, request him or her to interpret - even for social and non-academic conversations.

2.5.4.5 ''Check your progress'' - 2

1. Mention any two facts of hearing loss?

   .....

   .....

2. Mention any five ways of interactions with an individual having hearing impairment?

.....

.....

2.5.5. Restoring Techniques Using Technological Support (Hearing Device)

If you think you might have hearing loss and could benefit from a hearing aid, visit your physician, who may refer you to an otolaryngologist or audiologist. An otolaryngologist is a physician who specializes in ear, nose, and throat disorders and will investigate the cause of the hearing loss. An audiologist is a hearing health professional who identifies and measures hearing loss and will perform a hearing test to assess the type and degree of loss.

Aural Rehabilitation: The professional efforts designed to help a person with hearing loss. This includes services and procedures for lessening or compensating for hearing impairment and specifically involves facilitating adequate receptive and expressive communication. (ASHA, 1984; WHO, 2000).

2.5.5.1-Amplification options

The most important tool to help the hearing impaired person surmount the hearing handicap is a hearing aid or educational amplification unit. No system of amplification can restore hearing, but it can make useful residual hearing which could not otherwise be reached. Using amplifications the clients will be able to achieve goals unattainable without it.

2.5.5.2-Types of hearing aids:

All hearing aids consist of four basic parts:

1. Microphone - picks up the sound and sends it to the amplifier
2. Amplifier - makes the sound louder
3. Receiver - sends the amplified sound into the ear canal
4. Battery - supplies the power to the hearing aid

2.5.5.3-Behind-the-Ear Aids

The behind-the-ear (BTE) hearing aid is the device most used by children. The components are all contained in a plastic case which sits behind the ear. The case is connected to an earmould by a piece of clear plastic tubing. The earmould is specially designed to fit inside of the user's ear. A BTE hearing aid may be used with any degree of hearing loss and can be very flexible for use with a telephone or assistive listening device.

2.5.5.4-In-the-Ear Aids

The in-the-ear (ITE) hearing aid is smaller than the BTE hearing aid. All of the components fit inside of the plastic case which is made to fit the user's ear. The ITE hearing aid is not always the most appropriate choice for pediatric amplification because the aid must be replaced as the child grows.

2.5.5.5-ln-thc-Canal Aids

The in-the-canal (ITC) hearing aid is even smaller than the 1TE hearing aid, fitting entirely inside of the ear canal. The ITC is used primarily with mild-to-moderate hearing losses. It is not recommended for pediatric use because of its size, and because it must also be replaced as the child grows.

2.5.5.6-Body Aids

A body aid consists of a rectangular case and an earmould. The rectangular case contains the microphone, amplifier, and batteries and may fit into a pocket or "fannypack". There is a cord which connects the case to the button receiver. The button receiver is snapped into an earmould which is placed in the ear. The body aid is often used by people who have a severe-to-profound hearing loss.

2.5.5.7-Bone Vibrator Aid

The bone vibrator hearing aid is primarily used by patients with conductive losses, or those who cannot wear traditional hearing aids, such as patients with atretic or microtic ears. The vibrator sits on the mastoid bone and is held in place by a headband.

2.5.5.8-Cochlear Implants:

This is not a hearing aid but an implantable device, which stimulates the auditory nerve directly with help of intra-cochlear electrodes. The cochlear implant is a relatively new

device. It consists of internal parts, which go under the skin behind the ear and in the cochlea, and external parts worn behind the ear and on the body. The internal component, which is inserted during a surgical procedure, is made up of an electrode array, a receiver, and a magnet. The electrodes are inserted into the cochlea and the receiver and magnet are set into the bone behind the ear. The external component is made up of a transmitter coil, a microphone, and a speech processor. Both the transmitter coil and microphone are worn behind the ear, while the speech processor may be fit into a pocket or fanny pack. There are several criteria which a child must meet in order to be considered an implant candidate. The child must have a severe-to-profound bilateral loss, and receive little or no benefit from hearing aids. Medical, psychological, and educational status are also taken into consideration prior to implantation.

2.5.5.9 FM Systems

FM systems, or auditory trainers, are primarily used in the school setting; however, they may be useful in a variety of listening situations. The system consists of two parts: a transmitter and a receiver. The speaker wears the transmitter and speaks into a microphone attached to it. The listener wears the receiver which picks up the signal from the microphone and delivers it to the ear through an earpiece on the child's hearing aid. The size and shape of the two components may vary; but the purpose remains constant: to raise the level of the speaker's voice above the background noise (increase the signal-to-noise ratio).

2.5.5.10 ''Check your progress'' - 3

1. Write the basic parts of hearing aids?

   .....

   .....

2. What are the different types of hearing aids?

   .....

   .....

3. What are the full from/of C.I. and P.M.

   .....

   .....

2.5.6 Auditory Training

Hearing mechanism plays a very vital and important role in the development of speech and language ability for purpose of communication. We are always surrounded by various types of sound and through experience and exposure and we learn to select and response to the sound which are important. So hearing serves as the primary sensory modality through which we maintain an awareness of our surrounding.

2.5.6.1 Importance

Auditory training is essential and important for the hearing impaired child. Auditory training is required to make use of his/her residual hearing and to listen and understand the sound and acquire the speech and language skills gradually. Auditory training for hearing impaired child must be designed to serve mainly two purposes.

(a) To perceive a wider variety of environmental sounds which will allow the child to be at least to unexpected change in his/her environment and thus ensure his safety well being for his/her life.

(b) To perceive verbal signal, to acquire the linguistic role of language and develop speech skills and it is able to exchange idea and use oral communication.

2.5.6.2 When to start Auditory Training

As early as possible. Auditory training should be started when routine audiometric assessment is completed. Then the hearing impaired child wearing hearing aid in both ears and speech therapist as teacher gives speech stimuli and teacher should be given study)

2.5.6.3 Pre requisite issue for auditory training

The auditory training is very important for the development of speech and language. Few essential requirements given the auditory training start. The requirements are:

(1) Fitted suitable hearing aid.

(2) Suitable reinforcement may be given and co-operation of the child and the family member in the auditory training programme.

(3) Child's response to different kinds of sounds and intensities need to be checked carefully.

(4) Always remember that the sound which is exposed to child often might be listed in hierarchical manner.

(5) The activities and the material required for training the child should be prepared in advance and it is available normally in home.

(6) It is better not to give auditory training when the child is likely to sleep or is involved other in activity.

2.5.6.4 Conditioning Sounds

Conditioning is an important stage in auditory training. So, sound visual and tactile clues should be provided to show the child from where and how the sound is coming. The condition may be started with sound. These sounds are rubbing the finger, marble sound etc. Auditory training may be carried out at different levels as per the following steps.

(1) Introduce the sound one by one and make a note at which levels child gives the response.

(2) Vary the intensity of sounds and distance between the child and sound and note the lowest intensity and longest distance from where the child can detect the sounds.

(3) Train the child to say how many times he/she has heard the sounds.

(4) Train the child to say if the sound is of shorter or longer duration like /a/ and /aa/, /e/ and /ee/ etc.

(5) The child may be trained to localize the sound i.e. to detect from which direction the sound is coming.

(6) Train the child to listen and repeat the number or words in proper sequence.

2.5.6.5 Stages of Auditory Training

The auditory training consists of 4 major stages of development such as:

(1) Sound awareness training

(2) Sound discrimination training

(3) Discrimination of gross sound

(4) Fine discrimination of speech sound

(1) Sound awareness training: Introduce to different sounds one by one. The child

should respond to these sounds and from where the sound comes. Every day add loud sound a little more for the purpose of child's attention and focus on loud sound. Sound awareness training helps to assess hearing ability of the child in terms of the types of sound, intensity level and distance level from which the child can hear or understand.

(2) Sound discrimination training: This training involves the child to various auditory sounds produced by noise makers i.e. bells, drum, horns, whistle etc. As the child learns to respond to the presence of the sound and to discriminate between one or more sounds. This training should be given in the following steps.

(a) Train to listen to two sounds repeatedly.

(b) Child should consistently respond to both the sounds properly.

(c) Using conditioning procedure the child should be given auditory visual and tactile clues.

(d) Care should be taken in the presentation of the stimulus.

(e) Every step should be provided suitable encouragement and connect responses 80 90%.

(f) Gradually introduce many more sounds in the training.

(3) Discrimination of gross sound: At this stage the child has learnt the skills in recognizing the presence of the sound and perceiving gross difference between vowel sound with grossly dissimilar phonetic elements and between phrases which are closely related to his/her everyday experience e.g. p/g, s/I, pen/table etc.

(4) Fine discrimination of speech sound: It is last stage of auditory training. This stage helps the child to recognize suitable difference between similar vowels and consonants sounds as well as integrating the child's expanding vocabulary to permit him/her quick and accurate understanding of connected speech such as p/b, k/g, pin/bin, /tip/dip, ball/mall etc.

2.5.6.6 Auditory Training Material

Drum, Table, Khanjiri, Whistle, Rattle, Bell, Horn, Telephone, Dog bark, Cat's meow, Cow's moo, Crowing the cock, Singing bird, Moving train, Motor sound, Fire engine, Cycle bell, Door bell, Door knock, Laughing, Crying, Running, Dancing, Eating, Clapping, Cooker whistle, Calling name, Dad's Mummy's voice, Aero plane sound, T.V., Radio, Computer etc and other natural and unnatural variety of sound.

2.5.6.7 ‘‘Check your progress’’ - 4

1. What is Auditory Training?

   .....

   .....

2. Mention any four pre-requisites of auditory training?

   .....

   .....

3. How many stages are present in Auditory Training Name them.

   .....

   .....

2.5.7 Let us Sum Up

- Deafness is a silent disability and is either partial and total.
- In the hearing world deaf people face man challenges in hearing environment.
- The challenges are education, communication and employment.
- Hearing impaired people can communicate by lip-reading, sign language and using hearing devices such as hearing aids and also cochlear implant. When they use lip-reading. sign language and hearing devices that means loss of normal hearing and restoring using (human interpreter) technological supports (hearing device)
- Restoring techniques are (1) Human interpreter (lip-reading, sign language. communication worker) (2) Technical support (hearing device/amplification option) (3) Auditory training.

2.5.8-Answer to Check Your Progress

‘‘Check your progress’’ - 1

- Speak clearly but avoid speaking artificially slowly, exaggerating your lips, or shouting as this affects the natural rhythm of speech.
- Make use of natural gesture and facial expression as a clue to meaning.

- Make sure that there is adequate light on your face. Do not stand with your back to windows.
- Position the student so that he/she can lip-read you easily and see the projector or board and as much of the class as possible if there is to be a group discussion.
- Repeat questions asked from the floor.

2. British Sign Language (BSL) or Sign Supported English.

''Check your progress'' - 2

1-

- A hearing aid does not correct a hearing loss like glasses correct vision problems. Most persons with hearing impairments have sensory neural hearing losses and the clarity of speech is affected. The hearing aid does not make speech more clear; it merely amplifies the sound.
- Many people with hearing impairments are easily understood. Others cannot monitor the volume and tone of their speech and may be initially hard to understand.
- Students who have hearing impairments, just like students who do not have hearing impairments, vary to some degree in their communication skills.

2-

- Get the individual's attention before speaking.
- Look at the individual when you speak.
- Do not block the area around your mouth as it may inhibit lip reading.
- Speak naturally and clearly. Slowing down slightly may help. Do not exaggerate lip movement and do not shout.
- Try to avoid standing in front of windows or other light sources. The glare from behind makes it difficult to read lips and other facial expressions.

''Check your progress'' - 3

1. Microphone, amplifier, receiver, battery.
2. Body worn hearing aids, behind the ear, in the ear aids, in the canal aids, bone vibrations aids.
3. Cochlear Implant and Frequency Modulated system.

''Check your progress'' - 4

1. Auditory Training is a process of listening capacity which improves in hearing impaired child for the purpose of listening his/her residual hearing.

2-

- Fitted suitable hearing aid.
- Suitable reinforcement may be provided and co-operation of the child and the family member in the auditory training programme.
- Child's response to different kinds of sounds and intensities need to be checked carefully.
- Always member that the sound which are exposed to child often might be listed in hierarchical manner

3- The auditory training consists of 4 major stages of development such as:

- Sound awareness training
- Sound discrimination training
- Discrimination of gross sound
- Fine discrimination of speech sound

2.5.9 Unit End Exercises

1. What is Auditory Training? Describe the details about Auditory Training.
2. Describe the details about restoring technique human interpreter and technical support.

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Unit-3 ◘ Visual Impairment–Nature and Assessment

Unit-3.1 ◘ Process of Seeing and Common Eye Disorders in India

Structure:

3.1.1 Introduction

3.1.2 Objectives

3.1.3 Anatomy and Physiology of the Seeing Media

3.1.4 Different Parts of Eye and Their Function in Seeing

3.1.5 Process of Seeing

3.1.6 Common Eye Disorders In India

3.1.7 Symptoms And Teratment Of Refractive Errors

3.1.1 Introduction:

There is a kind of perception that takes place as our brain decides what it is we are actually seeing. You can actually watch this process of settling upon the right image if you look for it. It is especially pronounced if the brain can't immediately decide what it's viewing. For example, if you see something in the distance you can't quite make out the gestalt changes from image to image until the brain is satisfied that it is the correct one. Try to catch it sometime. In any case, we see what we have been taught to see. That is, the process of seeing is learned from the time we are infants. This is basically why all of us see the same things, and why anyone who doesn't is considered crazy. Artists have long played on the edge of perceptions that are not readily available to the rest of us. Impressionism is a good example. These artists realized that light affected colour and form in unimaginable ways (at that point in the history of art), and painted impressionistic scenes so the rest of us could also see them. Of course, now most of us do, if we allow ourselves to. This really is the essential point—allowing ourselves to. We are much more resilient and stable than we imagine. We can all handle more uncertainty than we imagine. Just because we see or think something out of the ordinary does not mean we're insane. It's a normal part of perception.

3.1.2 Objectives:

After going through this unit you should be able to:

1. Draw the structure of seeing media
2. Describe the functions of the media
3. Explain the process of seeing
4. Describe the disorders of eye
5. Explain the treatment procedure of refractive errors

3.1.3 Anatomy And Physiologhy Of Seeing Media

The process of perception is done through eye which is the predominant sense organ of human being. It is a very sensitive organ in our body to be taken care of properly. Around 85% of the information is received through our eyes. Sight is the sense through which the brain received approximately 75% of its information. The eye is essentially formed from both ectoderm and mesoderm. The eye collects information about size, shape and colour and transmits those to brain where these are interpreted.

So it must be said that eye is the apparatus for seeing. The structure of the orbit, the ocular adnexa, the ocular muscles, the nerves and the blood supply system are so as to help the eyeball to see and to protect it from injury. To understand the mechanism of vision we have to understand the function of the eyeball, the ocular adnexa (the eyelids, the conjunctiva and the lacrimal system) and the ocular muscles.

3.1.4 Different Parts of Eye And Their Function in Seeing:

The eyeball:

The eyeball rests in a soft cushion of fat protected by the bony orbit of the skull. It is almost a perfect sphere with clean window in front of cornea. The parts of eyeball are as follows-

Cornea

The cornea has an important role in image formation; it forms a primary refractive element in the eye. So it says that cornea is a clear front window of the eye which transmits and focuses (i.e., sharpness or clarity) light into the eye.

Iris:
The coloured part of the eye which helps regulate the amount of light entering the eye. When there is bright light, the iris closes the pupil to let in less light. And when there is low light, the iris opens up the pupil to let in more light.

Pupil:
The dark centre opening in the middle of the iris. The pupil changes size to adjust for the amount of light available (smaller for bright light and larger for low light). This opening and closing of light into the eye is much like the aperture in most 35 mm cameras which lets in more or less light depending upon the conditions.

Lens:
Focuses light rays onto the retina. The lens is transparent, and can be replaced if necessary. The lens is not noticed normally because it is hidden within the dark cavity of the inner eye. Intraocular lenses are used to replace lenses clouded by cataracts.

Sclera:
The white outer coat of the eye, surrounding the iris. It is similar to the cornea, except that it is vascular, and has dense, irregular, fibrous connective tissue.

Choroid:
Layer containing blood vessels that lines the back of the eye and is located between the retina (the inner light-sensitive layer) and the sclera (the outer white eye wall).

Retina:
The nerve layer lining the back of the eye. The retina senses light and creates electrical impulses that are sent through the optic nerve to the brain.

Macula:
The area in the retina that contains special light-sensitive cells. In the macula these light-sensitive cells allow us to see fine details clearly in the centre of our visual field.

Fovea:
The centre of the macula which provides the sharp vision.

Ciliary Body
Structure containing muscle and is located behind the iris, which focuses the lens.

Aqueous Humour :
Produced by ciliary processes of ciliary body. It provides nutrients for lens and cornea. It also maintains intraocular pressure (25mm.Hg), and is replaced several times a day 2 μ 1/min).

Vitreous Humour:
The, clear, gelatinous substance filling the central cavity of the eye secreted by the ciliary body up to the time of maturity. It has very loose connective tissue: contains water, hyalouronic acid and collagen. Pressure from the vitreous humour prevents retinal detachment. It supports the lens anteriorly and the retina posteriorly. It contains a hyaloid canal, which is a remnant of blood vessels during development.

Optic Nerve:
A bundle of more than a million nerve fibers carrying visual messages from the retina to the brain. (In order to see, we must have light and our eyes must be connected to the brain.) Your brain actually controls what you see, since it combines images. The retina sees images upside down but the brain turns images right side up. This reversal of the images that we see is much like a mirror in a camera.

Ocular adnexa:
Accessory structures of the eye, including the eyelids, conjunctiva and the lacrimal apparatus.

The eyelids:
The chief function of the lids is to protect the eyes from injury and excessive light. The eyebrow and eyelashes also participate in protective role.

Conjunctiva:
It is continuous with the skin of the eyelids. The palpebral Conjunctiva is the part of the conjunctiva that covers the inner surface of the Eyelid; the bulbar conjunctiva covers the surface of the eyeball. It is lined by stratified squamous epithelium, and contains goblet cells, which secrete the deepest, mucus, layer of tear film, which adheres to the surface of the globe. It is highly vascular. The conjunctive blends with the skin of the lid margins as well as with the corneal epithelium. It is also continuous, via the lacrimal puncta and canaliculi with the mucosa of the nasolacrimal sac and duct and hence nose.

The lacrimal system:
The two main part of lacrimal system are (a) the lacrimal gland which secretes tears and (b) the lacrimal ducts which carry the tears from the eye into cavity of the nose.

It also contains three layers of the tear film:

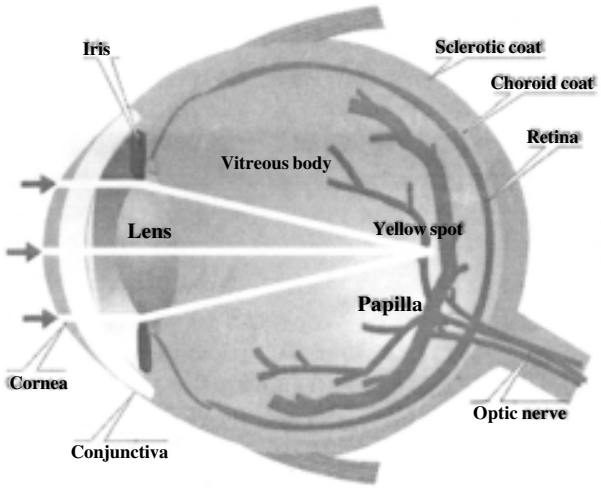
1. Deep mucous: from conjunctival goblet cells, adheres tears to the conjunctiva
    a. Middle aqueous: from main and third eyelid lacrimal glands; it cleanses, oxygenates and fills optimal defects.
3. Superficial oily layer: from tarsal glands prevents evaporation

Extra ocular muscles:

The muscles which control the movements of eye ball are six in number, all named by their positions with regard to eyeball. These are as follows-

1. Dorsal rectus muscle
2. Ventral rectus muscle
3. Medial rectus muscle
4. Lateral rectus muscle
5. Dorsal oblique muscle
6. Ventral oblique muscle

Usually carrying out the eye movements two or more muscles work together. In addition to the co-ordinated action of muscles in one eye, it is essential for proper vision that there be perfectly co-ordinated muscular action in both eyes.



3.1.5 Process of Seeing:

From the above discussion we can compare the eye with a camera. Vision is a complex function that requires more than the eye alone. The act of seeing requires light to see by and the brain to interpret what is seen. The light rays reflect from an object in a person's field of vision, fall on the eyes. The rays pass through the cornea through the aqueous humour and through the pupil of the colour iris which dilates or contracts to control light in accordance to the brightness of the object. In addition the pupil contracts when it looks something small in order to increase the sharpness.

The rays then pass through the crystalline lens when the eye is relaxed and looking into the far distance the rays of light are focused on to the retina. When we wish to look at something nearer say at 6ft the focus of the lens is automatically adjusted by the surrounding ciliary muscles. The fluid in the aqueous humours in front of the lens and the vitreous body behind the lens allow it to expand or contract easily. This process of focusing is called accommodation. The cornea and the lens combine to bend the light rays as they pass through. The rays pass through the vitreous body and penetrate the retina, where they set up a photochemical response in the outer most layers, there stimulating the rods and cones. The impulse is picked by the retinal nerve fibres and pass along the optic nerve to the brain where upside down image is formed. Based on experience, the inverted image is psychologically transposed.

The eyes move together and send the brain almost identical images. The brain then joins these two images into a single mental picture. The slight difference in the images is needed to produce stereographic vision. By this long process we are able to see.

3.1.6 Common Eye Disoders in India:

Eyesight is one of the most precious gifts that nature has given to mankind. It's only because of the eyes; one can enjoy the beauty of this world. It's impossible to imagine life without sight. Though a very small part of body, eye is one of the most complex human organs. It has various parts, all of which are responsible for normal vision. Smallest structural or functional alteration in the functioning of an eye can cause tremendous visual disturbances. This type of visual disturbance makes people helpless and also dependable. The other name of visual disturbance is called visual disorder .on the other hand it is also known as refractive error. In India maximum cause of the adult blind is refractive error or injury or accident. If they are identified at first time there is a chance for curing. But due to lack of knowledge or person's negligence most of the time these disorders are not properly treated or identified.

To see external object clearly, it is necessary that sharp images of objects must be formed upon the retina. The cornea, the aqueous humour, the crystalline lens and the vitreous body act together as refractive media to bring parallel rays of light reflected from external object to a focus on the retina. The images become sharp in the macula. The normal eye is called emmetropic while the abnormal condition is called errors of refraction or ametropia. Refractive error or need of glasses is one of the most common eye problems. It can start at any age. This is due to alteration in length, shape & / or capacity of eyes.

What is refraction?

Refraction is the bending of light as it passes through one object to another. Vision occurs when light rays are bent (refracted) as they pass through the cornea and the lens. The light is then focused on the retina. The retina converts the light-rays into messages that are sent through the optic nerve to the brain. The brain interprets these messages into the images we see.

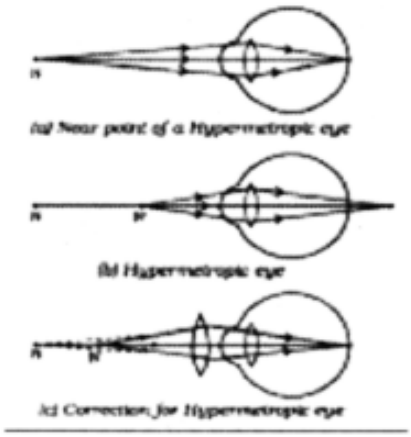
What are refractive errors?

Refractive errors occur when the shape of the eye prevents light from focusing directly on the retina. The length of the eyeball (longer or shorter), changes in the shape of the cornea, or aging of the lens can cause refractive errors.

Not all eyes are optically perfect and consequently light rays may not be brought accurately to focus on the retina. Faulty optical conditions, or refractive errors may be classified into four basic categories. These are as follows-

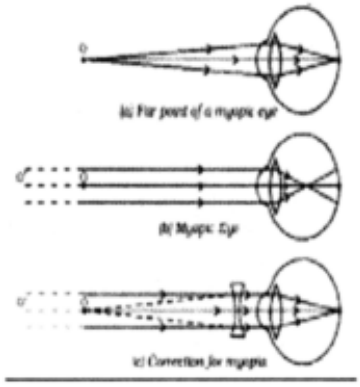
Hyperopia (farsightedness):

It is a common type of refractive error where distant objects may be seen more clearly than objects that are near. When the optics are too weak for the length of the eyeball, one has hyperopia or farsightedness. This can arise from a cornea or crystalline lens with not enough curvature (refractive hyperopia) or an eyeball that is too short (axial hyperopia) However, people experience hyperopia differently. Some people may not notice any problems with their vision, especially when they are young. For people with significant hyperopia, vision can be blurry for objects at any distance, near or far. This can be corrected with convex lenses which cause light rays to converge prior to hitting the cornea.



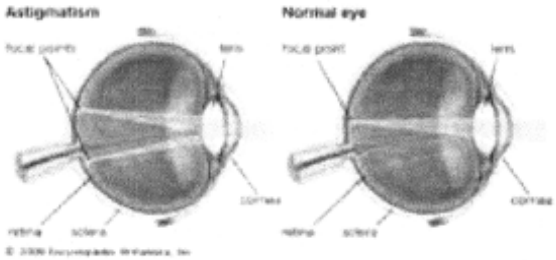
Myopia (nearsightedness)

It is a condition where objects up close appear clearly, while objects far away appear blurry. When the optics is too powerful for the length of the eyeball one has myopia or nearsightedness. This can arise from a cornea or crystalline lens with too much curvature (refractive myopia) or an eyeball that is too long (axial myopia). With myopia, light comes to focus in front of the retina instead of on the retina Myopia can easily be corrected with a concave lens which causes the divergence of light rays before they reach the cornea.



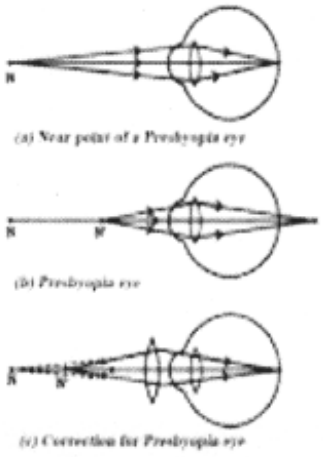
Astigmatism

It is a condition in which the eye does not focus light evenly onto the retina, the light-sensitive tissue at the back of the eye. This can cause images to appear blurry and stretched out. Cylindrical errors cause astigmatism, when the optical power of the eye is too powerful or too weak across one meridian, such as if the corneal curvature tends towards a cylindrical shape. The angle between that meridian and the horizontal is known as the axis of the cylinder. A person with astigmatic refractive error sees lines of a particular orientation less clearly than lines at right angles to them. This defect can be corrected by refracting light more in one meridian than the other. Cylindrical lenses serve this purpose.



Presbyopia

It **is** an age-related condition in which the ability to focus up close becomes more difficult. As the eye ages, the lens can no longer change shape enough to allow the eye to focus close objects clearly. The individual would experience difficulty in near vision, often relieved by reading glasses, bifocal, or progressive lenses.



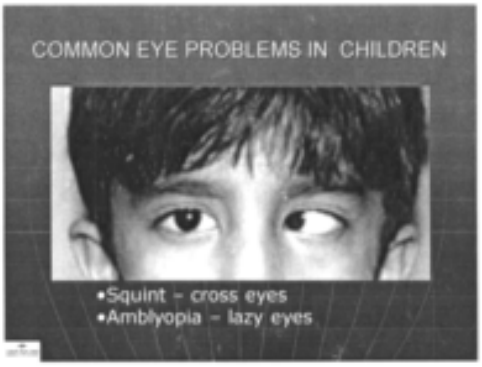
Other type of refractive errors are-

Amblyopia:

Amblyopia is any reduction in visual acuity in one or both eyes. This condition of mentally shutting out the images of one eye is also known as lazy eye. Amblyopia in young children may not present a permanent reduction in vision since correction may be possible. Treatment may consist of glasses, patching, surgery or a combination of procedures including eye exercises.

Squints (strabismus):

Defects of eye muscles are cause for eye disorder. If one or more muscles which help rotate the eye become weak or paralysed both eyes then fail to focus on some object at the same time or same angle. The condition is known as strabismus. It means that in coordinated action of the muscles cause the failure of the visual axes of the two eyes to meet at the objective point. Squint is convergent when the eyes turn towards the medial line; it is divergent if the eyes turn outward. Squint in children may some time lead to serious visual impairment as the brain tends to accept only the good images of the weaker or squinted eye. Due to disuse the weak eye may reduce to low vision.



Nystagmus:
It is the term applied to rapid oscillatory movements of the eye ball. The movements are involuntary. They are usually lateral but vertical, rotator and mixed rotator and lateral or vertical nystagmus occurs. Nystagmus may be congenital, early infantile or it may be acquired. Nystagmus is present in most cases of total colour blindness in which vision is carried out by the rod alone. In some cases head nodding with Nystagmus is congenital or hereditary a condition which persists throughout life.

3.1.7 Symptoms and Treatment of Refractive Error:

What are the signs and symptoms of refractive errors?

Blurred vision is the most common symptom of refractive errors. Other symptoms may include: Double vision, Haziness, Glare or halos around bright lights, Squinting, Headaches and Eye strain.

How are refractive errors diagnosed?
An eye care professional can diagnose refractive errors during a comprehensive dilated eye examination. People with a refractive error often visit their eye care professional with complaints of visual discomfort or blurred vision. However, some people don't know they aren't seeing as clearly as they could.

How are refractive errors treated?
Refractive errors can be corrected with eyeglasses, contact lenses, or surgery.

Eyeglasses:

These are the simplest and safest way to correct refractive errors. Your eye care professional can prescribe appropriate lenses to correct your refractive error and give you optimal vision.

Contact Lenses:
It works by becoming the first refractive surface for light rays entering the eye, causing a more precise refraction or focus. In many cases, contact lenses provide clearer vision, a wider field of vision, and greater comfort. They are a safe and effective option if fitted and used properly. It is very important to wash your hands and clean your lenses as instructed in order to reduce the risk of infection. If you have certain eye conditions you may not be able to wear contact lenses. Discuss this with your eye care professional.

Refractive Surgery:
It aims to change the shape of the cornea permanently. This change in eye shape restores the focusing power of the eye by allowing the light rays to focus precisely on the retina for improved vision. There are many types of refractive surgeries. Your eye care professional can help you decide if surgery is an option for you.

Unit : 3.2 □ Blindness and Low Vision-definition and Classification

Structure:

3.2.1. Introduction

3.2.2. Objectives

3.2.3. A Brief Historical Review

3.2.4. Definition

3.2.4.1 Blindness

3.2.4.2 Low Vision

3.2.5. Classification

3.2.1 Introduction

It is a true phenomenon that visual impairment tends to evoke more awkwardness from us than any other disability. For one thing, blindness is visible. The blind person is usually not one who can easily weave himself into the fabric of a crowd. Unlike many other exceptional people he stands out. The visually impaired person, however, has a variety of symbols. Cane, thick or darkened glasses, a guide dog etc.

3.2.2 Objectives

After going through this unit you should be able to:

1. Draw out the position of impairment
2. Know about blind
3. Tell about low vision
4. Also gather knowledge about visual classification

3.2.3 A Brief Historical Review:

The history of Special Education in genera] and of visually impaired children in particular had visualized many ups and downs in its progressive phase of development. Globally it evolved through the following five stages.

1) **Pre-Christian Era-**
   During this stage, disability was viewed as punishment of past sins and nobody wanted to interfere in the justice meted out to the disabled persons by God.
2) **Christian Era-**
   In this stage they are protected and pitied to reduce their pains and miseries.
3) **Dawn of 19th century-**
   Institutions were established to provide them separate education.
4) **Late 20th century-**
   The movement started to integrate them in the society.
5) **Present age-**
   The concept of special and integrated system of education has been emerged out on the basis of needs of disabled persons.

3.2.4 Definitions:

3.2.4.1 Blindness:

The term blindness is used for complete or nearly complete vision loss.

Legal/ medical definitions

The current definition does not make a distinction between those who have "irreversible" blindness (NO perception of light) and those that have light perception but are still less than 3/60 in the better eye. The legal definition involves assessment of visual acuity and field of vision. It is used to determine whether or not an individual qualifies for legal benefits. The American Medical Association (AMA) proposed this definition in 1934.this definition is now accepted by American Foundation for the Blind (AFB) and other Blind Association in different countries.

In India, the broad definition of visual impairment as adopted in the Persons with Disabilities Act (PWD), 1995 as well as under the National Programme for Control of Blindness (NPCB) is given as " Blindness refers to a condition where a person suffers from any of the following conditions:

Total absence of sight or Visual acuity not exceeding 6/60 or 20/200 (Snellen) in the better eye even with correction lenses or limitation of the field of vision subtending and angle of 20 degree or worse."

Educational/functional definition

Many educators are disinterested in the legal or medical definition of blindness. Their argument that visual acuity is not very accurate prediction of how one will function or effectively use the remaining sight he has. A common misconception is that legally blind having absolutely no vision, the vast majority are able to see.

Recognizing the limitations of the legal definition of blindness and partially sightedness, many have favoured an educational definition.

For educational purpose, "the blind are those who are so severely impaired that they must be taught to read by Braille, while the partially sighted can read print by using magnifying glasses or books with large print."

The educational definition of visual impairment considers the extent to which the child's vision affects learning and makes special methods or materials necessary. Educators often differentiate between blind and low vision students. For deciding the blindness, the visual acuity as well as field of vision has been considered.

Visual acuity:

It refers to the ability of the eye to see details. The visual acuity for distance is measured as the maximum distance at which a person can see a certain object, divided by the maximum distance at which a person with normal eyesight can see the same. Thus a visual acuity of 6/60 means that the person examined cannot see, at a distance of 6 meters, the object, which a person with normal eyesight would be able to see at 60 meters.

Visual efficiency:

Visual efficiency is the extent to which available vision is used effectively. The term visual efficiency includes visual acuity at long and at short, control of eye movements, accommodative ability etc. this also includes the processing ability of the brain. Visual efficiency is unique to each child. The visual efficiency can be developed by training but cannot be measured or predicted clinically with any accuracy by medical, psychological, or educational personnel.

As defined by Barrage, Visual efficiency includes such skills as controlling eye movements, adapting to the visual impairment, paying attention to visual stimuli and

processing visual information rapidly. The fundamental premise in developing visual efficiency is that children learn to see and must be actively involved in using their own vision.

Field vision
It refers to the field which both the eyes can easily see in the front. The normal field of vision is ISO degrees in front of eye.

Visual functioning
The visual functioning refers to the degree to which ability of a person to use vision for all activities.

3.2.4.2 Low vision

Low vision is a term often used interchangeably with visual impairment and refers to a loss of vision that may be severe enough to hinder an individual's ability to complete daily activities such as reading, cooking, or walking outside safely, while still retaining some degree of useable vision.

The Person with Disabilities Act, 1995 also recognizes LOW VISION as a category of disability and defines it as follows:

"Person with low vision means a person with impairment of visual functioning even after treatment or standard refractive correction but who uses or is potentially capable of using vision for the planning or execution of a task with appropriate assistive device."

This definition is incomplete as it inadvertently omits quantification of the acuity as well as the field of vision as is done in the case of the WHO definition. It is desirable to modify this definition and the following quantification should be added:

"Low vision are those who suffer visual acuity between 20/200 to 70/200(Snellen) or 6/18to 6/60 in the better eye after the best possible correction or a Field of vision between 20 to 30 degrees."

In the practice of eye care "LOW VISION" has a specific meaning as defined by WHO. This is as follows:

"A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field of less than 10 degree from the point of fixation,

but who uses, or is potentially able to use, vision for planning and/or execution of a task." The points emphasize are that there is significantly reduced vision visual performance is affected but there still is vision that can be used.

For deciding the low vision, the residual vision as well as functional vision has been considered.

Residual vision
The use of remaining vision by the visually impaired individuals to perform their daily activities is known as residual vision.

Functional vision
Functional vision is the use of vision for particular activities. Functional visual skills are required to carry out every day activities.

Central Scotoma
A hazy or dark hole appears in the centre of objects. Causes include macular degeneration and optic atrophy.

Tunnel vision
Loss of peripheral vision causes a restricted field of vision, Objects in the centre remain visible. Causes include glaucoma and retinitis pigmentosa.

Accommodation
If while looking at an object situated at infinity, the gaze be transferred to an object near at hand, some readjustment of the power of the crystalline lens will have to occur, otherwise the image will fall behind the retina. This adjustment of the power of the lens is called accommodation.

3.2.5 Classification:

The importance of functional definition lies in the 'label' people are given. Someone with visual acuity of 2/60 can have useful vision, for example, for mobility. However, he or she will be labelled blind person. The consequence is this person is then treated as if he or she is blind. This ignores the usable vision. There should be a difference between legal blindness and functional blindness or low vision. The World Health Organization uses the following classifications of visual impairment. When the vision in the better

eye with best possible glasses correction is: 20/30 to 20/60 : is considered mild vision loss, or near-normal vision 20/70 to 20/160 : is considered moderate visual impairment, or moderate low vision 20/200 to 20/400 : is considered severe visual impairment, or severe low vision 20/500 to 20/1,000 : is considered profound visual impairment, or profound low vision More than 20/1,000 : is considered near-total visual impairment, or near total blindness No light perception : is considered total visual impairment, or total blindness. Blindness is defined by the World Health Organization as vision in a person's best eye of less than 20/500 or a visual field of less than 10 degrees

Category	Corrected Visual acuity in the better eye	WHO's Defmition(standard)	Working Definition	Indian Definition
0	6/6-6/18	Normal	Normal	Normal
1	<6/ 18-6/60	Visual impairment	Low vision	Low vision
2	<6/60-3/60	Severe visual impairment	Low vision	Blind
3	<3/60-l/60	Blind	Low vision	Blind
4	<1/60-PL	Blind	Low vision	Blind
5	NPL	Blind	Total Blindness	Total Blindness

The WHO standard definition defines blindness as visual acuity of less than 3/60 in the better eye with the best possible correction as compared to that of 6/60 in India. The WHO functional definition however considers blindness starting at light perception or when a person has no usable vision. Similarly a person with visual acuity better than 3/60 but equal or less than 6/60 is graded as "blind" in India, while WHO grades him as low vision.

In India a person with a visual acuity <6/60 is legally blind, which enables to receive certain services and financial benefits. However a person who is legally blind can still have useful vision to do certain tasks as can be seen in the working definition. This refers to the fact that they still have functional vision which is the use of vision for a particular purpose. For India or other developing countries, it is essential to maintain the legal definition of blindness at the level of visual acuity of 6/60(20/200 Snellen) or less and field of vision of *20* degree or less. Already the travel concessions scholarship and other benefits are very meagre, if 'perception of light' to 'no perception of light' is considered blindness, a large number of persons who are at present availing these

concessions would fall outside the eligibility criteria and thus remain bereft of these benefits. Alternatively, if these concessions are extended to all the persons with low vision in the acuity range of 6/18 to 'perception of light' as defined by WHO the appropriate Government may not be able to meet demand due to financial constraints. For India and other developing countries it is desirable to maintain the definition of blindness as adopted in the Persons with Disability Act 1995 i.e. visual acuity of 6/ 60(20/200) or less and field of vision of 20 degree and less and to consider all the persons in the range of acuity of 6/18 to 6/60(20/60 to 20/200) as persons with low vision.

According to above discussion visually impaired are classified as follows-

Partially Sighted

The generally accepted definition for educational purposes now includes:

1. Those students with visual acuity of 20/70 or less in the better eye after the best possible correction, who can use vision as the main channel of learning.
2. Those students, who in the opinion of eye specialist and educational authorities will benefit by the use of special facilities provided by the programme for partially sighted students.

One eyed

The definition of blindness adopted in India excludes people with impairment only in one eye from the purview of blindness. Generally the impairment of 40% or more is considered a handicap but in the case of one eyed person it is only 30% according to the approved definition in medical parlance, a person with one good eye is not a blind person.

Vision loss

It refers to individuals who have trouble seeing, even when wearing glasses or contact lenses, as well as to individuals who are blind or unable to see at all.

Monocular vision impairment

"Monocular vision impairment" or "Monocular Blindness"; are used both eyes separately. By using the eyes in this way, as opposed by binocular vision, the field of view is increased, while depth perception is limited. The fellow eye in these need not necessarily to be "normal".

Self-reported vision loss
It is determined on an individual basis based on that person's perceived visual ability and its effect on daily functioning.

Functional limitation
It refers to the interaction of visual functioning and ability to perform activities of daily living/instrumental activities of daily living. Common daily activities affected by vision loss are reading, safe pedestrian travel, self-care, cooking, and recreational activities.

Visual impairment
It is often defined clinically as a visual acuity of 20/70 or worse in the better eye with best correction, or a total field loss of 140 degrees. Additional factors influencing visual impairment might be contrast sensitivity, light sensitivity, glare sensitivity, and light/dark adaptation.

Legal blindness
It is a level of vision loss that has been legally defined to determine eligibility for benefits. The clinical diagnosis refers to a central visual acuity of 20/200 or less in the better eye with the best possible correction, and/or a visual field of 20 degrees or less. Often, people who are diagnosed with legal blindness still have some useable vision.

Total blindness
It refers to an inability to see anything with either eye.

Unit : 3.3 □ Demographic Information-NSSO and Census 2011

Structure:

3.3.1 Introduction

3.3.2 Objectives

3.3.3 Demographic Information

3.3.4 Nsso

3.3.5 Census-2011

3.3.1 Introduction:

It is a constitutional obligation of the government to promote the welfare of people by securing and protecting as possible a social order in which social, economic and political justice shall inform all the institution of national life. For this reason census is necessary. There are several estimates about the size of the disabled population in India with reference to the world situation. 90% of the world's blind people live in developing countries. Visually impaired people account for 48.5% of more than 2 core figure in India. To give them proper prevalence demographic information has great importance.

3.3.2 Objectives:

After studying this unit, you should be able to:

1. Explain the need of census
2. Discuss the role ofcensus 2011
3. Explain the services provided by NSSO
4. Write about demography

3.3.3 Demographic Information

Demography is the statistical study of human population. As a very general science, it can analyze any kind of dynamic living population, i.e., one that changes over time or

space. It encompasses the study of the size, structure, and distribution of these populations, and spatial and/or temporal changes in them in response to time, birth, migration, ageing, and death. The word demography taken form Greek word where *demos,* means "the people" and *-graphy* means description or measurement. Demographics are quantifiable characteristics of a given population. Demographic analysis can cover whole societies, or groups defined by criteria such as education, nationality, religion and ethnicity. Educational institutions usually treat demography as a field of sociology, though there are a number of independent demography departments. Formal demography limits its object of study to the measurement of population processes, while the broader field of social demography or population studies also analyzes the relationships between economic, social, cultural and biological processes influencing a population. Demographic thoughts can be traced back to antiquity, and are present in many civilisations and cultures, like Ancient Greece, Ancient Rome, India and China. There are two types of data collection — direct and indirect — with several different methods of each type.

Direct methods

Direct data comes from vital statistics registries that track all births and deaths as well as certain changes in legal status such as marriage, divorce, and migration (registration of place of residence). In developed countries with good registration systems (such as the United States and much of Europe), registry statistics are the best method for estimating the number of births and deaths. A census is the other common direct method of collecting demographic data. A census is usually conducted by a national government and attempts to enumerate every person in a country. However, in contrast to vital statistics data, which are typically collected continuously and summarized on an annual basis, censuses typically, occur only every 10 years or so and thus are not usually the best source of data on births and deaths. Analyses are conducted after a census to estimate how much over or undercounting took place. These compare the sex ratios from the census data to those estimated from natural values and mortality data. Censuses do more than just count people. They typically collect information about families or households in addition to individual characteristics such as age, sex, marital status, literacy/education, employment status, and occupation, and geographical location. They may also collect data on migration language, religion, nationality and citizenship. In countries in which the vital registration system may be incomplete, the censuses are also used as a direct source of information about fertility and mortality.

Indirect methods

Indirect methods of collecting data are required in countries and periods where full data are not available, such as is the case in much of the developing world, and most of

historical demography. One of these techniques in contemporary demography is the sister method, where survey researchers ask women how many of their sisters have died or had children and at what age. With these surveys, researchers can then indirectly estimate birth or death rates for the entire population. Other indirect methods in contemporary demography include asking people about siblings, parents, and children. Other indirect methods are necessary in historical demography. There are a variety of demographic methods for modelling population processes. They include models of mortality, fertility, marriage disability, population projections and population momentum.

3.3.4 NSSO

The NSSO (National Sample Survey Organisation), now known as National Sample Survey Office, is an organization under the Ministry of Statistics of the Government of India. It is the largest organisation in India conducting regular socio-economic surveys. It was established in 1950. Employees of NSSO belong to Indian Statistical service and Subordinate statistical service. NSSO has four divisions: 1. Survey Design and Research Division (SDRD), 2. Field Operations Division (FOD), 3. Data Processing Division (DPD) and 4. Co-ordination and Publication Division (CPD)

The Survey Design and Research Division (SDRD)

It is a professional organ of NSSO, mandated to do the job of: Planning of the survey, Formulation of sample design, Drawing up of schedules of inquiry, Formulation of concepts and definitions, Preparation of instruction manual for survey field work, Survey Design and Research Division (SDRD). Training of field and data processing personnel on survey Methodology Formulation of scrutiny check points Drawing up of tabulation programme Preparation of survey reports Analysis and presentation of survey results and Undertaking studies for the improvement of survey methodology SDRD, NSSO is located at Mahalanobis Bhavan, Kolkata and is headed by an Additional Director General - a Higher Administrative Grade (HAG) level officer, and has sanctioned strength of three SAG (Senior Administrative Grade), fifteen JAG (Junior Administrative Grade), eight STS (Senior Time Scale) and four JTS (Junior Time Scale) level officers of Indian Statistical Service besides one Deputy Director (Administration) and the supporting staff members.

The Field Operations Division (FOD)

The one of the four Divisions of the National Sample Survey Office, is responsible for conducting surveys in the field of Socio- Economic, Industrial Statistics, Agricultural

Statistics, Prices, etc. as per the approved programmes. It is also responsible for updating the frame for conducting Socio-Economic Surveys in urban areas. This Division with its Headquarters located at New Delhi and Faridabad functions through a network of 6 Zonal Offices, 49 Regional Offices and 116 Sub-Regional Offices spread throughout the country and have staff strength of about 4000. The Division is headed by Additional Director General (ADG), an Additional Secretary Level Officer. In Headquarters, four Deputy Director Generals as well as other officers in the rank of Director/ Joint Director/ Deputy Director/ Assistant Director assist him. All the Zonal Offices are headed by Deputy Director Generals while the head of Regional Offices are Deputy Director General/ Director level officers except for Port Blair which is headed by Assistant Director. Field Operations Division (FOD).

The Data Processing Division (DPD)

This department of NSSO with Headquarters at Kolkata and five Data Processing Centres outside Kolkata at Ahmadabad, Bangalore, Delhi, Giridih and Nagpur are primarily mandated to undertake the processing, the tabulation and the dissemination of data collected through Nation Wide Large Scale Sample Surveys on various Socio-economic issues conducted by National Sample Survey Office (NSSO) under the Government of India. This task of transforming large volume of raw data into the final form of Key Indicators or Estimates in Tabular Format with due process of scrutiny and validation is carried out by a large number of trained and experienced technical officials in Electronic Data Processing Cadre under the overall supervision and guidance of the officers of Indian Statistical Service. The role of DPD starts from the initial stage of formulation of the Sample Design for NSS Surveys by SDRD wherein apart from providing input for the formulation it has to undertake the job of sample selection. Later on DPD undertakes the job of software development for Data Entry, Data Verification, Computer Edit, Other Data Validations, Howler Checks, Tabulation, etc. DPD also assists the States by providing complete IT solutions in all their data processing related activities and also through periodic training/workshop and other interactive methods. With the advent of Information Technology, DPD is now introducing modern technology to reduce time and effort in data capturing and transmission besides improving quality of unit level data. It also helps other countries/organizations in enhancing their capacity building particularly in data processing/analysis by conducting various need based training programmes. Main Functions are as follows

1. Selection of samples and preparation of Sample lists. Data Processing Division (DPD)

2. Manual checking of identification particulars and pre data entry scrutiny.
3. In-house development of validation and tabulation software.
4. Data Entry & Verification of filled-in schedules.
5. Validation of data through various stages covering both content check and coverage check.
6. Preparation of Directory and Multiplier files for estimation of parameters.
7. Tabulation of validated data as per approved tabulation plan.
8. Processing & tabulation of monthly Rural retail price data and release of Quarterly Rural Price Bulletin.
9. Assistance to state statistical agencies in processing of NSS state sample data.
10. Providing training in application of computer and on data processing.
11. Undertaking special data compilation and tabulation work for: Various analytical studies, Methodological studies etc. undertaken by NSSO in support of Working Group/Steering Committee Special users/Committees/Ministries/Depts./Orgs.
12. Organising scrutiny feedback workshop for FOD.
13. Providing technical guidance/assistance to NSS Data Users.
14. Meeting Data requirements (Adhoc tabulation/drawing of Samples etc.) and User's queries.

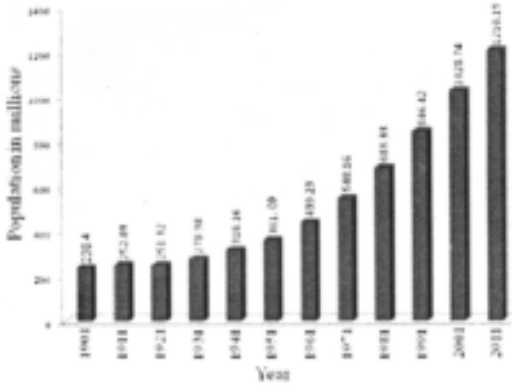
Co-ordination & Publication Division (CPD)

It is located at New Delhi and is responsible for: 1. coordinating the activities of all the Divisions of NSSO. 2. Dissemination of survey results and analysis through the biannual technical journal 'Sarvekshana' and 'National Seminars' to discuss the survey. *3.* Providing technical and secretarial assistance to Steering Committee of National Sample Surveys. 4. Supplying survey data of various rounds to individuals, researchers, research institutions and other private and govt. bodies. 5. Liaison with other Departments/ Ministries on various matters concerning NSSO. 6. Providing the technical and secretarial assistance to DG& CEO of NSSO.

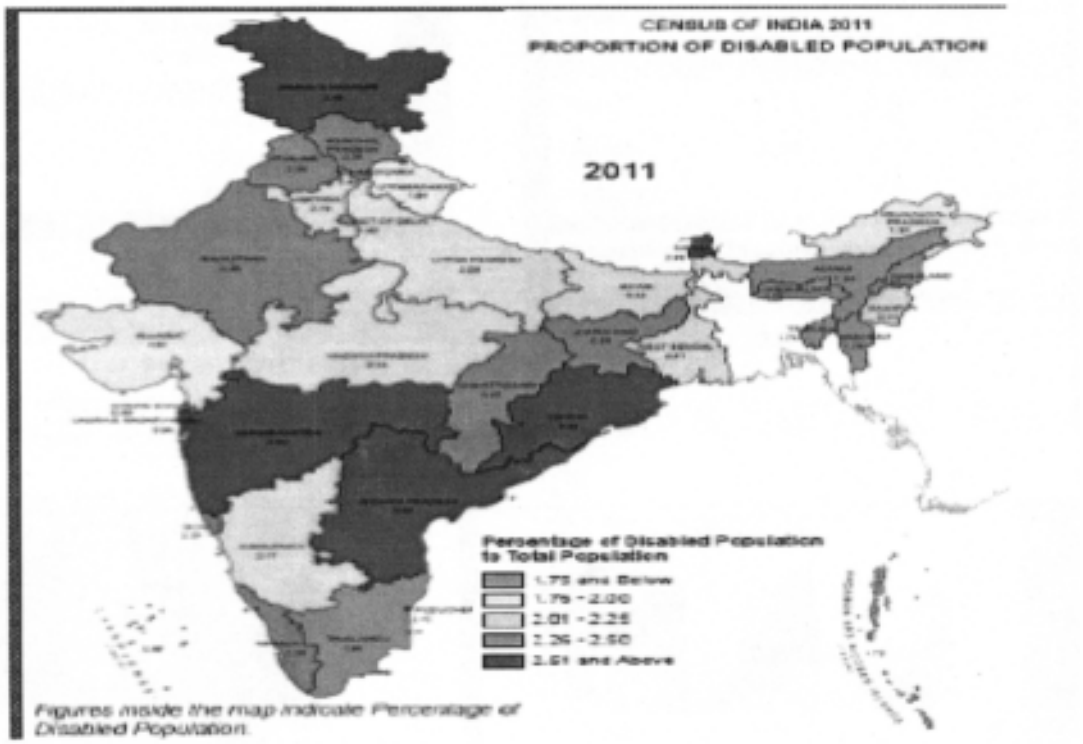
3.3.5 Census 2011

The 15th Indian Census was conducted in two phases, house listing and population enumeration. House listing phase began on 1 April 2010 and involved collection of

information about all buildings. Information for National Population Register was also collected in the first phase, which will be used to issue a 12-digit unique identification number to all registered Indians by Unique Identification Authority of India. The second population enumeration phase was conducted between 9 to 28 February 2011. Census has been conducted in India since 1872 and 2011 marks the first time biometric information was collected. According to the provisional reports released on 31 March 2011, the Indian population increased to 1.21 billion with a decadal growth of 17.64%. Adult literacy rate increased to 74.04% with a decadal growth of 9.21%. The motto of census 2011 was 'Our Census, Our future'. Spread across 29 states and 7 union territories, the census covered 640 districts, 5,767 tehsils, 7,933 towns and more than 600,000 villages. A total of 2.7 million officials visited households in 7,933 towns and 600,000 villages, classifying the population according to gender, religion, education and occupation. The cost of the exercise was approximately 2200 crore— this comes to less than 0.50 per person, well below the estimated world average of 4.60 per person. Conducted every 10 years, this census faced big challenges considering India's vast area and diversity of cultures and opposition from the manpower involved C. Chandramauli is the Registrar General and Census Commissioner of India of 2011 Indian census. Census data was collected in 16 languages and training manual was prepared in 18 languages. The census was conducted in two phases. The first house listing phase began on 1 April 2010 and involved collection of data about all the buildings and census houses. Information for National population register was also collected in the first phase. The second population enumeration phase was conducted from 9-28 February 2011 all over the country. The eradication of epidemics availability of more effective medicines for the treatment of various types of diseases and the improvement in the standard of living these are the main reason for the high growth of population in India.

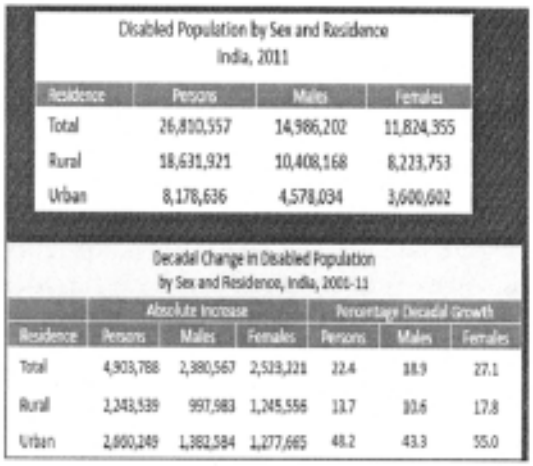


Census 2001 has revealed that over million people in India as suffering from one or the other kind of disability. This is equivalent to 2.1% of the population. Among the total disabled in t he country, 12.6 million are males and 9.3 million are females. Although the number of disabled is more in rural and urban areas. The disability rate (number of disabled per 100,000 populations) for the country as whole works out to 2130. This is 2,369in the case of males and 1,874 in the case of females. Among the five types of disabilities on which data has been collected, disability in seeing at 48.5% emerges as the top category. Others in sequence are: In movement (27.9%), Mental (10.3%), in speech (7.5%), and in hearing (5.8%). The disabled by sex follow a similar pattern except for that the proportion of disabled females is higher in the category in seeing and in hearing. Across the country, the highest number of disabled has been reported from the state of Uttar Pradesh (3.6 million). Significant numbers of disabled have also been reported from the state like Bihar (1.9 million), West Bengal (l.8 million), Tamil Nadu and Maharashtra (1.6 million each). Tamil Nadu is the only state, which has a higher number of disabled females than males. Among the states, Arunachal Pradesh has the highest proportion of disabled males (66.6%) and lowest proportion of female disabled.



Number of Disabled Population and Type of Disability

	POPULATION	PERCENTAGE (%)
Total population	1,028,610,328	100.0
Total disabled population	21,906,769	2.1
Disability rate (per lakh population)	2,130	—
Type of Disability		
(a) In seeing	10,634,881	1.0
(b) In speech	1,64-0,868	0.2
(c) In hearing	1,261,722	0.1
(d) In movement	6,105,477	0.6
(e) Mental	2,263,821	0.2

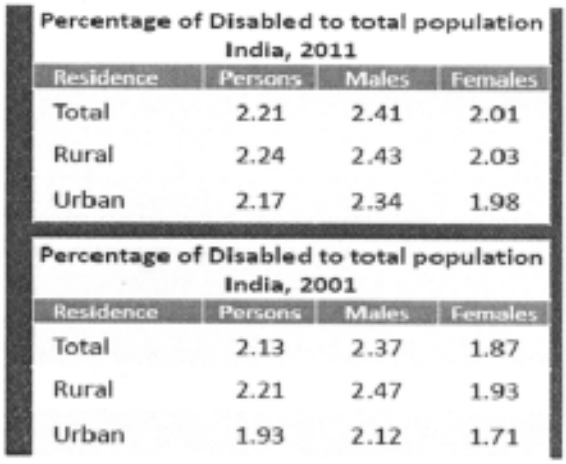


Disabled Population by Sex and Residence
India, 2011

Residence	Persons	Males	Females
Total	26,810,557	14,986,202	11,824,355
Rural	18,631,921	10,408,168	8,223,753
Urban	8,178,636	4,578,034	3,600,602

Decadal Change in Disabled Population
by Sex and Residence, India, 2001-11

	Absolute Increase			Percentage Decadal Growth		
Residence	Persons	Males	Females	Persons	Males	Females
Total	4,903,788	2,380,567	2,519,221	22.4	18.9	27.1
Rural	2,343,539	997,983	1,245,556	13.7	10.6	17.8
Urban	2,660,249	1,382,584	1,277,665	48.2	43.3	55.0

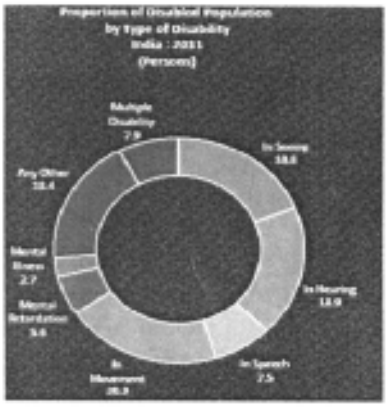


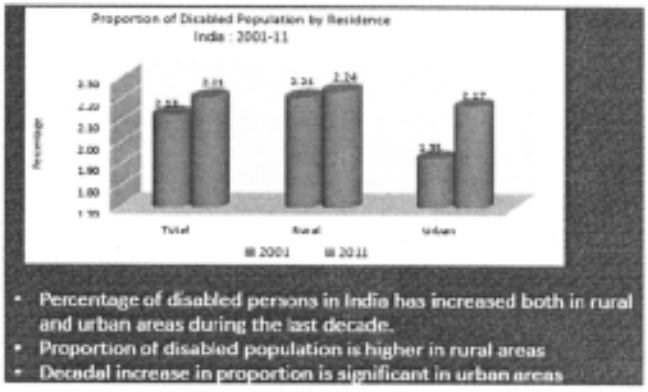
Percentage of Disabled to total population
India, 2011

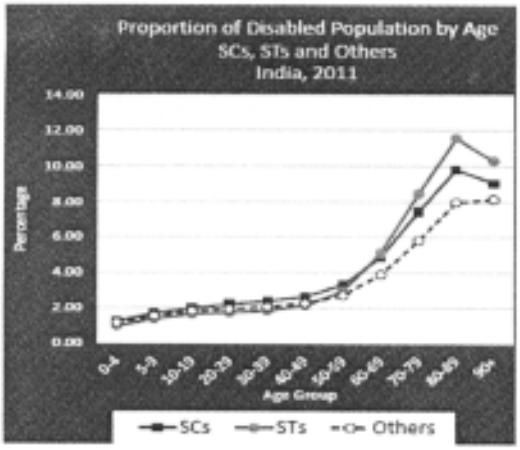
Residence	Persons	Males	Females
Total	2.21	2.41	2.01
Rural	2.24	2.43	2.03
Urban	2.17	2.34	1.98

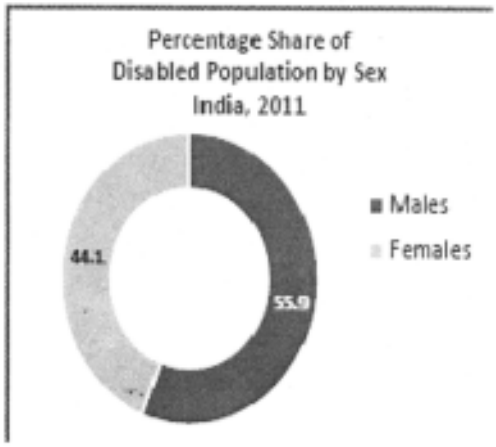
Percentage of Disabled to total population
India, 2001

Residence	Persons	Males	Females
Total	2.13	2.37	1.87
Rural	2.21	2.47	1.93
Urban	1.93	2.12	1.71









From the above discussion we come to conclusion that- the number of physically disabled persons in India was 16.15 million and they formed about 1.9 percent of the total population. 74.3 percent persons with disabilities live in rural areas. The prevalence of physical disability is reported to be 2 percent in rural areas and 1.6 percent in urban areas. Similarly, Incidence Rate is reported to be 90 per 1, 00,000 in rural areas which is higher than that of 83 in urban areas, c. Between the two sexes, prevalence as well as incidence is reported to be marginally higher among males than among females. About 12.4 percent of these persons suffered from more than one type of physical disabilities. The persons with locomotors disability are largest in number (7.6 million); followed by those with speech and/or hearing impairment (4.5 million) and then those with visual impairment (4 million).

About 9 and 7 percent households in rural and urban India respectively have at least one disabled person in the household. Among these households, about 92 percent had one disabled person, about 7 percent had 2 disabled persons and less than 1 percent reported 3 or more disabled persons, both in rural and urban sectors. About 25 percent in rural areas and 20 percent in urban areas are reported to be severely disabled as they could not function even with aids and appliances. About 70 percent of disabled persons are found to be illiterate in rural areas as against 46 percent in urban areas. Only 4 percent persons with disability in rural India have an educational level "secondary and above" as against 12 percent in urban areas. Only 29 percent and 25 percent persons with disability are employed in rural and urban India respectively. Out of these, 60 percent were self employed, 7 percent regular employees and remaining 33 percent as casual labourers.

Unit : 3.4 □ Importance of Early Identification and Intervention

Structure:

3.4.1 Introduction

3.4.2. Objectives

3.4.3. Early Identification of Vision Problem

3.4.3.1 Importance of Vision And Learning About Vision Loss

3.4.3.2 Symptoms of Vision Problems

3.4.4. Early Intervention Programmes

3.4.4.1 Meaning of Early Intervention

3.4.4.2 Deficit Model

3.4.4.3 Classification of Intervention Programme

3.4.5. Importance

3.4.1 Introduction

'Catch them young and teach them well' is the slogan reflected all over the world for the education of children with special needs. There are a lot of advantages over identification of children with visual problems at their young ages. Most of the eye problems are medically treated and cured. After medical correction, most of the children would see normally. Some medically untreatable conditions of eye defect lead to blindness. However, a very few children would suffer from total blindness and most of the children may have residual vision. Therefore early identification of child with visual problems will help the child to go for medical and educational interventions. In this unit a detailed discussion is held on early identification, intervention and their importance.

3.4.2 Objectives

After studying this unit, you should be able to:

1. Explain the early identification of child with visual impairment

2. List out the factors and behavioural indicators for vision-loss
3. Describe the early intervention programme
4. Able to write about importance of identification and intervention

3.4.3 Early Identification:

Early eye- examination is of utmost importance. All eye surgeons have been exposed to the frustration of an adult when informed that nothing can be done to improve vision in the lazy eye. This can be prevented to a great extent if it can be detected around the age of 3-4 years. It has been observed that 24% have refractive errors and many of these errors are present at birth and go unnoticed for a long time. Early identification is the step to set the intervention programmes.

3.4.3.1 Importance of Vision and Learning about Vision Loss

Although every one of our senses plays a role in early development, vision certainly seems to lead the way. Early bondage of the child with parents is based on the child's ability to make eye contact and sustain a gaze with his parents, response to their voices by gurgling and cooing. An infant tries to move because he sees something. He learns that things and people exist in the world primarily because he sees and hears them come and go. He visually tracks an object he pitches to the ground. He can inspire his parents to play with them by making eye contact, the earliest form of conversation. He learns about size, shape, and colour, function of objects, social interactions and so much more just by looking at the world at work. Every child with or without a disability should have regular and periodic vision checking. If the child is severely disabled, this can be even more important since their other senses may not be as useful in compensating for what they miss visually. In fact this is so important that schools should have vision screening at regular intervals throughout the remainder of the child's educational career.

Factors And Behavioural Indicators For Vision Loss

A child is at risk for vision loss if the child encounters the following factors:

- Family history of vision loss
- Malformation of the eye
- Prematurity and low birth weight
- Birth trauma

- Congenital viral or bacterial
- Meningitis, Encephalitis, Hyperthyroidism, Microcephaly

The following behaviours indicate the child's vision loss

- The child does not have eyes that look typical
- The child does not recognize caregivers' faces or smile in response to their smiles
- He does not get excited when he sees other familiar object
- The child's eyes do not move together when following object
- The child may hold an object very close to his eyes
- The child may over reach or under reach for objects

3.4.3.2 Symptoms of Vision Problem

Young children with vision problems often do not know that the way they see the world is not the way everyone sees it.

1. Permanent vision loss
2. Learning difficulties

   Any changes in the appearance of eyes or vision should be investigated further. Signs to Watch Out for Early Detection (As Adopted by UNICEF)

General symptoms that may occur from birth

- Squints or blinks when looking at something
- The eyes are crossed
- Favours one eye more than the other when looking at an object
- One or both of the eyes turn in or out
- The pupils are hazy
- Eyes are tearing excessively, they are red or eye-lids are encrusted with matter
- Turns or tilts head abnormally
- Has frequent or persistent sites

May occur from 0-3 Months

- Child does not follow an object in his visual field. Child does not play with his hands.

May occur from 3-6 Months

- Child does not reach for toys in his visual field
- Child does not make eye contact when being fed
- Child does not visually inspect object

May occur from 6-9 Month

- Child's mother skills such as rolling over, sitting or crawling
- Child does not appear to discriminate between similar objects or people
- Child does not pick up small objects successfully

May occur from 9-12 Months

- Child shuts or covers one eye when focusing
- Child holds playthings very close to eyes
- Child bumps into large objects when crawling
- Child rubs his eyes excessively
- Child does not attempt to grasp spoon
- Child does not appear to notice

May occur from 1-2 Years

- Walking is delayed
- Bumps into large objects
- Child is not interested in playing
- Child not interested in picture book
- Child holds book very close to eye
- Child is afraid to walk
- Child is clumsy and awkward for his age
- Child pays more attention to sound

May occur from 2-5 Years

- Stumbles over small objects

- Not interested in task that require Sustained visual concentration
- Complains of headaches, burning, itching of eyes
- Cannot see distant things clearly
- Does not notice colour difference

May occur at School Age

- Short attention span and daydreams
- Uses unusual or fisted pencil grasp, frequently breaking pencil
- Difficulty in remembering what is read
- Loses place while reading
- Cover one eye
- Very hard to read hand writing
- Skips words and re-read
- Difficulty in sequential concepts
- Poor eye hand coordination
- Gets easily frustrated

3.4.4 Early Intervention

The term early intervention refers to services given to very young children with visual problems, generally from birth until the child turns three. For this reason these programmes are sometime called "birth to *3"* or "zero to 3". Services included medical treatment, follow-up service, visual efficiency development, training on daily living skills and mobility etc.

Deficit Model

Current practice of early intervention is viewed as a deficit model. That is strategies address deficit of vision. The time to intervene is before the delay occurs. The goal is to prevent the delay if possible. That is why the identification of a vision problem as early as possible is essential. As soon as visual problem is identified the sooner intervention can be provided, the more likely it is that delays can be prevented.

Classification Of Intervention Programmes

Early intervention programmes are classified as vision screening, medical intervention and educational intervention. All these programmes go simultaneously for prevention of eye deficit, restoration of visionc development of vision effciency.

Vision screening

All children should be screened for possible vision problems, especially those under age of three with a suspected or identified risk factor, regardless of severity.

The initial screening should be conducted by trained personnel on vision screening procedures. The trained personnel may be low vision specialist, special teacher, rehabilitation workers and village nurses. Identified cases of visual problems are referred to the medical personnel who would attend to thorough eye examination.

Medical intervention

There are many possible defects or diseases of the visual system, but fortunately many of them appear after the first few years of life. There are still many malformations, defects, diseases, infection and disorders that can affect the visual system in infants and toddlers as it is presumed that medical follow up to screening will identify and prescribe treatment. The medical professionals will take care of treatment aspects for the diseases and defects of the eyes.

Educational intervention

Educational intervention includes the preschool training such as development of daily living skills, mobility skill, visual skill etc and placement of the child into formal school system. The trained teacher or rehabilitation worker who is qualified on visual impairment takes the child with visual impairment for training on various skills required by the child. He/she also provides counselling for the parents, family members, relative and neighbours about the development of the child with visual impairment and their role on caring the child.

3.4.5 Importance

Early Identification

Early identification is extremely important because early intervention will be most effective. Sometimes it is unclear whether a child has a vision problem or not. Physical signs of vision problems include eyelids drooping over one or both eyes, or eyelids that

do not completely cover the eyes when the child closes them. If a child has a clear squint, has jerky eye movements, or has eyes that do not move together, parents should see a paediatric ophthalmologist. Other signs include: Not looking at others in the eyes, Reaching in front of or beyond an object, Holding objects very close or very far to see them, Turning or tilting his head when he uses his eyes, Continuously pushing or poking his eyes, Looking above, below or off to one side of an object, rather than directly at it Bumping into objects and having a lot or trouble seeing at night, Feeling for objects on the ground instead oflooking with her eyes. After the identification of visually impaired students under these, parents should begin working with an early childhood interventionist. Young children who are visually impaired are eligible for early intervention services, which can help a family through the child's first few years oflife. Early intervention for students with visual impairment is vital in enhancing social, physical, and intellectual development. When a child who is over three, he will qualify for special education services if the visual impairment impacts his education. Parents should contact their district's special education office to locate services for their child. A child with visual impairment may qualify for services from teachers of students with visual impairment, an orientation and mobility specialist, a physical therapist, a speech therapist, or a psychologist, depending on individual needs. Children with visual impairment should also be provided with modifications and accommodations in an inclusive classroom.

Early Intervention

Research has shown that the time between birth and age of months is a critical developmental period in a child's life. These months offer a window of opportunity that will not be available later. Early intervention programes minimize and in some cases prevent delays in development of infants and toddlers with disabilities. High quality early intervention programes for vulnerable infants and toddlers can reduce the incidence of future problems in their learning, behaviour and health status. They can decrease the need for special education and related services when a child enters school, and increase independence. There is an urgent and substantial need to identify as early as possible those infants and toddlers in need of services to ensure that intervention is provided when the developing brain is most capable of change. Children whose special needs are identified and addressed during these crucial early years have a greater chance of reaching their full potential. Intervention is likely to be more effective and less costly when it is provided earlier in life rather than later.

Unit : 3.5 □ Functional Assessment Procedures

Structure:

3.5.1 Introduction

3.5.2 Objectives

3.5.3 What Is Functional Assessment

3.5.4 Functional Assessment Methods

3.5.5 Functional Assessment Procedures For Visually Impaired Child

3.5.6 Importance

3.5.7 Activities

3.5.8 Let us Sum Up

3.5.9 Unit end Exercises

3.5.10 References

3.5.1 Introduction

One of the key factors in achieving safety, permanency and well being is the creation of an effective assessment process. The assessment of needs is, in fact, so critical to the child and family's well being and dynamic in its focus that no single form, tool or single event can adequately support it. Needs assessment is a process that continues throughout the life of each case. Assessment tools are merely instruments that are useful in bringing attention to issues that need particular focus and in identifying current strengths, needs and functioning for purposes of decision-making.

3.5.2 Objectives

After going through this unit, you shoul be able to

1. understand and explain functional assessment
2. State the importance of of asessment
3. List out the activities of functional vision assessment
4. Understand about helpers for doing assessment

3.5.3 What Is Functional Assessment?

A set of procedures to identify the causes of a maladaptive or socially inappropriate behaviour and reduce it through teaching replacement behaviours instead of suppressing it through punishment. The body of empirical and scientific literature which supports these methods is found in the field of applied behaviour analysis. Within functional assessment methodology the causes are sought in the immediate environment and the learning history of the individual. Causes of the maladaptive behaviour based upon intrapsychic variables or psychodynamic processes are given little attention. The outcome of the assessment is an analysis of the way the person learned the maladaptive and how it is presently supported or maintained in the present learning environment. Functional assessment does not emphasize a search for a diagnosis or classification of symptoms according to psychodynamic processes. Instead, the purpose of the assessment is to classify the maladaptive behaviour by its function (cause) and then select treatments or interventions which are effective in reducing behaviour in that functional category. Consequently, treatments or interventions are classified by functional categories and not by form of the maladaptive behaviour. In the field of education many practitioners choose interventions or treatments based upon topography or form of the behaviour instead of the function. As a result some recommended interventions actually strengthen the maladaptive behaviour instead of reducing it. This situation can make school and their personnel vulnerable to successful legal, administrative and ethical challenges.

3.5.4 Functional Assessment Methods

There are three specific functional assessment methods: (a) Direct Observation, (b) Informant Methods and (c) Functional Analysis. The terms "functional assessment" and "functional analysis" are sometimes thought to be the same thing but they are not; a functional analysis is one specific type of functional assessment.

1. Direct Observation

For direct observational methods, an observer would watch the client engage in activities within their natural environment. When the challenging behaviour occurs, the observer would record what happened just before it, what happened just after it and also take notes on what they perceive to be the potential cause of the behaviour. This method is used to develop a hypothesis about the function of the behaviour. The terms used for

this method include: Direct Observation. Descriptive Functional Behaviour Assessment.

2. Informant Methods

The informant method involves interviews and questionnaires that can be completed by the client, their parents, staff members, teachers etc. These interviews would be used to identify what is happening before the behaviour occurs and then what happens after the behaviour. Just like direct observation, this method is also used to develop a hypothesis for the function of the behaviour. The terms used for this method include: Indirect Methods, Indirect Functional Behaviour Assessment, Informant Methods

3. Functional Analysis

This method, functional analysis involves practitioners deliberately changing what happens before and/or after the behaviour in an effort to test what mIght be causing the behaviour. Unlike the other two methods that are used to create a hypothesis, this method is used to actually test the hypothesis and is the only method that can truly predict when the behaviour will occur.

3.5.5 Functional Assessment Procedures For Visually Impaired Child

Like other disabilities in case of visual impairment, functional assessment is necessary to improve their remaining functional vision. Functional vision is the ability to use vision to perform desired tasks. Because of impairment in the eye and other parts of the system, low- vision children will not learn visually without intervention and help. Selection of instructional programmes and techniques requires a thorough assessment and understanding of child's capabilities.

The process of functional assessment should be done-

1) At the age of three months of a baby if the child is not attracted by the light or not move his/ her neck to see the colourful objects, the parents should report that the child may be visually impaired.
2) The child has not attracted the colourful toys.
3) If the child complairs about headache, body ache etc
4) The child may complain, to the parent, pain in eye at early stage.
5) At the time of playing the visually impaired child may not hold the ball as easily

as the normal child.

6) The normal functions of day to day activities are much more affected — reading, writing, walking etc.

7) It is always seen searching objects at any time in his/her working expenence.

Who conducts a functional vision assessment?

A functional assessment is typically conducted by a teacher certified in the area of visual impairment. The specialist is a certified teacher of the visually impaired, trained to evaluate how a child utilizes vision. The vision specialist will measure and observe the visual methods a child uses throughout a routine day and will speak with parents, teachers and other caregivers who know the child well. Information about how the child uses vision, the conditions and purpose of use, is essential and will be utilized in the functional vision assessment report. The vision specialist will review records and may talk to the eye doctor to learn more about the child's visual condition.

3.5.6 Importance

1. It helps to determine the current visual functioning level of the person.
2. It helps to determine the extent of visual stimulation and instruction needed to help the person make optimum use of remaining vision.
3. It enables the person to use his limited vision in the highest potential
4. It helps to plan the person's mobility training programme
5. It helps in decisions regarding the use of visual stimulation materials
6. It helps to decide upon the nature of the primary reading medium
7. It enables one to decide on the type of devices needed by the person

3.5.7 Activities

Vision is functional if a child is able to utilize visual information to plan and carry out a task. A functional vision assessment measures how well a child uses vision to perform routine tasks in different places and different material throughout a day. Functional vision assessment has two types of activities like-I. Optical functioning and 2. Perceptual functioning. Optical functioning may consist of seven activities like- visual awareness,

visual attention, visual fixation, visual focus, visual fusion, visual tracking and visual scanning. On the other hand perceptual functioning consists of eight activities like- visual discrimination, figure ground, visual memory, visual closure, spatial relation, mobility, visual motor coordination and form constancy.

VISUAL SKILLS

OPTICAL FUNCTIONING :

Visual Awareness:
To find out the ability of the child to identify an object

Visual Attention:
To find out the ability of the child to attend to the objects.

Visual Scanning:
The ability to search for a particular object among other objects

Visual fixation:
The ability of the child to fix the eyes on the object.

Visual focus:
The ability of the child to see a known object at various distances.

Visual fusion:
The ability of the child to see the object as one.

Visual Tracking:
The ability to follow moving objects.

PERCEPTUAL FUNCTIONING:

Visual Discrimination:
The ability of a person to distinguish different objects on the basis of their colour shape or size

Visual Figure-Ground Discrimination:
The ability to isolate a particular stimulus from the background, i.e. seeing the distinctive

features of an object

Visual Memory:
Ability to store and recall past experiences and integrate them into new ones.

Visual Closure:
Ability to perceive a total picture or object when onlypart of it is visible/available

Form Constancy:
Ability to perceive the same objects at different angles

Visual motor coordination:
This refers to the child's ability to perform a task using eyes and hand /foot in harmony. It consists of two types these are follows-

Eye-Hand Coordination:
Ability to use hands and eyes in harmony.

Eye-Foot Coordination:
Ability to perform a task using both eyes and foot in co-ordination.

Visual spatial relation:
This refers to the child's ability to identify spatial concepts like direction, distance etc.

Visual mobility:
This refers to the child's ability to indentify right and left concepts through movement.

3.5.8 Let us Sum Up

The process of seeing mainly organized through the parts of eye and image sharpness depends on the functions of the parts of the eye. But sometimes this process is aelayed or faces problems due to some errors which come under eye disorder. These refractive errors are curable if they are identified early and also get the treatment properly these. All these happen if people are aware.

Problem in eye does not come under blindness; blind are those who face problems for sight disturbance. According to PWD act and WHO’s definition visual impairment has

many classification. And these divisions depend on visual acuity, field vision, visual effiency, functional vision etc.

The NSSO conducted the 15th round of a nation-wide comprehensive survey of disabled persons during 1st April 2010 to 28th February 2011. The survey arrived at an estimate of 21 million persons having at least one or the other disability, which constituted 1.9 percent of the total population of 50 million. The survey revealed that population of the visually impaired in India at 850 million level of population. Among them minimum of them come under prevalence facilities.

Without early detection and treatment children's vision problems can lead to permanent vision loss and learning difficulties. So it is very much essential to prevent vision loss and preserve eyesight. Early intervention programme helps them for guiding properly and also helps them in their future establishment.

The development of visual ability is not innate or automatic. It requires stimulation and motivation to use vision in a variety of environments. A visually impaired child owing to uncertain and frustratingly limited vision may not always be motivated to use his vision to control and manipulate his environment to achieve specific goals. As a result he losles the ability to use whatever vision he has efficiently and purposefully. But modern researchers have proved that systematic techniques can facilitate the emergence of visually guided behaviour in some children and maximize the use of vision in others. On the other hand functional assessment procedures also measures how well a child uses vision to perform routine tasks in different places and with different materials throughout the day.

3.5.9 Unit exercise:

1. Draw a diagram of eye and label
2. Write, about refractive errors
3. How do we see?
4. Who are blind?
5. Write the pauses of low vision.
6. Classify the visual impairment.
7. Write short note on:

   (a) Visual acuity (b) visual efficiency (c) field vision

8. What is NSSO?
9. How does it function?
10. Write the salient features of the census do published in 2011
11. Explain the inportance of census
12. Prepare a list of symptoms of visual problems.
13. What is meant by early intervention?
14. Who should conduct the vision screening to whom and when?
15. What is functional assessment?
16. List out the activities offunctional assessment procedures.
17. How functional assessment help/problem child?

3.5.10 References

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Unit-4 : Educational Implications of Visual Impairment

Unit-4.1 □ Effects of Blindness-Primary and Secondary

Structure

4.1.1. Introduction

4.1.2. Objectives

4.1.3. Primary Effects

A. Cognitive :

(a) Berthold Lowenfeld's Interpretation

(b) Role of Sences

(c) Jean Piaget's Theory of Intellectual Development

(d) Some Factors Responsible for Cognitive Development

B. Attitudes affecting Blindness :

(a) Community attitude

(b) Parental Reaction

(c) Psycho-social Effects

4.1.4. Secondary Effects

4.1.5. Let us Sum Up

4.1.6. ''Check Your Progress''

4.1.7 ''Check Yourself''

4.1.1 Introduction :

'Blindness' has varied interpretations. It relates to impaired sense of vision.It means that the person suffers from the loss in the sense of seeing, the organ responsible for vision is defective.

Blindness in all countries and through ages has come to develop as a connotative term. It evokes different emotional reactions in different persons. The societies across

the globe have developed their own images of blind persons, of their capabilities and of their limitations. Even beyond that, they have developed their own ways of coping with the capabilities and/or limitations of the Blind.

Parents are the part of the community and they share social ways and attittueds. But when a blind child is born to them, they find their personal ways to cope with.

As the attitudes and reactions of the community in general, and parents in particular, impinge upon the child, blindness does not remain a simple sensory loss to him; it is confounded with pshychological overtones resulting in changes in self concept of the child.

The present sub-unit outlines below the above mentioned points and a note upon the role of the teacher face to face the blind child, his parents and his community.

4.1.2. Objectives :

After studying this sub-unit you will be able to

(i) Understand ande interpret effects of Blindness/visual impairment on the child.

(ii) Discuss the implications of child's blindness for the parents and the family.

(iii) Describe the prevailing atitudes of the community towards blindness and blind persons.

(iv) Analyse the effects of family and community attitudes on the blind child.

(v) Realise his/her own role as a teacher in relation to the blind child, parents and the community.

4.1.3 Primary/Basic Effects of Blindness :

A—Cognitive:

The effects of blindness are basically cognitive. Since blindness relates to the sensory deficit of vision and because senses are the gateways to knowledge. Vision is the most actively used sense by human being and hence knowledge grows chiefly of visual experience.

(a) Berthold Lowenfeld's Interpretation :

The resulting effects of blindness have been discussed widely, but the most accepted interpretation has come from Berthold Lowenfeld (1975). In his own words,

"Blindness imposes three basic limitations :

1. In the range and variety of experiences.

2. In the ability to get about.

3. In the control of the environment and the self in relation to it."

All these interpretations may have great effects on cognitive development. They have sociological, psychological and educational implications on blindness. According to him, the visually disabled individual gets a reduced experience and therefore, 'loss of sight' cannot be interpreted as the 'loss of experience'. The sociological implication in that visually disabled persons do have experiences but those are limited in comparison with sighted persons. The psychological implication is that blindness does not mean 'loss of life' since blind persons are more like than unlike sighted persons in terms of basic needs. The educational implication is that the reduction of experience imposed by blindness can be overcome by appropriate training to the affected individual.

(b) Role of Senses :

These three obstacles to independence and self-fulfilment are the special education provisions demand for the blind child. A brief note at the three limitations may be helped in understanding the depth of losses.

It has been estimated that 90-95% of all knowledge and experience comes. through the eyes. Vision is the major mode of acquiring information about people, places and processes. Therefore the blind child by definition is experientially deprived.

Vision provides much more continuous information than sound. Although touch may be equally continuous, its range is extremely limited. This definition may affect development of object permanence and conservation capability.

The capacity to organise a wide range of experiences through vision is much greater than through touch and sound. Further vision gives much more detailed information than any other sense modality.

Another educationally significant difference in sight and touch is that sight is a holistic sense. It provides information at one glance. Whereas touch is an analytical sense. We all know the story of gaining knowledge of an elephant by four blind persons. Information gathering range of touch is limited. Therefore, if you want a visually impaired child to build an accurate image of any object in his mind, you

should show it to him bit by bit till he has synthesized the image in his mind for unifying experience.

A totally blind child, in particular, depends to a very large entent on verbally mediated information. The mediation of words may leave gaps in experience and the filling of these gaps may require a very special effort on the part of the teacher.

Firstly, the blind child learns in pieces. He learns in a fragmentary way. He has to get time to put there bits and pieces toghether to form a concept which is not exactly like ours but which is enough like ours so that we can communicate. This is the is restriction in the 'range and veriety of experiences.'

The child with severe visulal impairment may be deprived of such experiences as the ordinary child has without effort. For example a young seeing child may look at an orange, jump to pick it up, feel it, smell it and eat it. At one go, the child has visual, anditory, tactile, gustatory and alfactory experience. But a severly visually implaired child may have great difficulty in locating an orange. The child will be able to locate it if it is within the range of his grasp, or within the rach of his arm. In this way the ordinary child easily gets a total experience, whereas a visually impaired child has a limited experience. His experience range can be enhanced only by supplementary tactile or auditory inputs given by a teacher or parents.

Secondly, blindness tends to create a very sedentary kind of existence. A blind person will just sit unless he is pulled out, motivated to get out and move out independently : He sits because of fear. He sits because of lack of skill in using information available in his environment and lack of skill in moving about within it. Certainly the ability to get about is restricted.

A severly visually impaired child has difficulty in moving about indepently in unfamiliar environment. Because sight does not give the child the total framework of the space in which he has to move. Therefore, determining the direction of movement poses special problems. This is particualarly difficult in large open spaces. Again detection of obstacles in the way may pose serious troubles. The child may run the risk of injury.

Thridly, a blind person talks loudly in a room that is too small for a loud voice or he talks "to a corner" or an empty chair rather than to another person. The common reaction is what a silly man. But it is not silly. It simply shows how a blind person is very much at a disadvantage. Not knowing where one is, being unable to contorl one's environment and oneslef in relation ot it is a significant deficit.

It is not easy for a severely visually impaired child to read facial expression. Reinforcement of positive behaviour may be denied to him if he cannot read the face of his mother to whether she is happy. Parental approval in strong positive reinforces, The child's eye contact with his mother in also not possible.

Now it is clear that vision is the dominant sense giving us information about the environment. No interaction with the environment is possible without gathering, storing, retrieving and organizing information. The loss of vision tends to restrict this process. Now we are to consider to what extent loss of vision hinders cognitive development and to what extent this deficiency is made up as the child grows in age and experience.

(c) Jean Piaget's (1896-1980) Theory of Intellectual Development will help us to know all in this respect.

Piaget says that Intellectual development takes place through the process of assimilation and accommodation.

What is Assimilation ?

Assimilation occurs when an already learnt stimulous evokes a response. For example, if a child sees a mango and recognizes it properly, this is an example of Assmilation.

What is Accommodation ?

Accommodation takes place when a child adds a new activity to his repertoir. After recognising a mango if a child begins to eat that, this is an example of Accommodation.

These two processes involve acquiring information, storing it, organizing it, retrieving it in response to an approprite stimulus and developing behavioural responses appropriate to the tank in hand. In the light of the limitations entire activity of information processing in influenced by visual disability.

Piaget divided Intellectual Development into several stages. Most important stages are :

1. **Sensory Motor Stage (0 to 2 years)**
2. **Preconceptual Stage (2-4 years)**
3. **Intuitive Stage (4-7 years)**
4. **Stage of concrete operations (7-11 years)**
5. **Stage of Logical operations (11 year or above)**

1. **Sensory Motor development :** According to Piaget's theory of cognitive development. The first two years constitute the sensory motor period during which infants' bahaviour progresses from being characterised by simple reflexes to showing an internalised and representational form of problem solving. This period is broken down in to sex stages.

(i) Reflexes (birth to one month) : The infant's behaviour is characterised primarily by reflexive responses to his own body and to some aspects of the external world. The infant discovers some objects are suckible and some are not.

(ii) Primary Circular Reactions (One to four months) : The infant begins to repeat selectively those actions that produce effects that are interesting and satisfying to him. These actions are primarily directed to his own body rather than external objects.

(iii) Secondary Circular Reaction (four to eight months) : The infant reproduces behaviour that produces effects in the external world that are satisfying or interesting to him. This stage marks the beginning of the infant's effective orientation to the external world.

(iv) Co-ordination of the Secondary Circular Reaction (eight to twelve months) : The beginnings of intentionality are seen in this 4th stage. Infant begins to co-ordinate his behaviour with respect to the external world in more complex ways. The use of his specific means to obtain speciefic ends shows his increasing organization of the world.

(v) Tertiary Circular Reactions (twelve to eighteen months) : In this stage the infant's behaviour clearly involves active trial and error experimentation on the world.

(vi) Internalization of thought (eighteen to twenty four months) : This stage marks the beginning of internalized thought.

In this sensorimotor stage intelligence is demonstrated through motor activity without use of symbols. Knowledge of the world is limited (but developing) because it is based on physical interactions/experiences. Children acquire object permanence at about 7 months of age (memory). Physical development (mobility) allows the child to begin developing new intellectual activities. Some symbolic (langugae) abilities are developed at the end of this stage.

A visually handcapped child may reach a particular stage late but connot skip it. This also confirms the view that even if there is some delay in developments, the quality of mental ability remains uninfluenced by visual disability. There has been

very little direct effects of blindness on the infant's progress throug the stages of the sensory motor period. Stephens (1972) discussed some implications of visual impairment. She noted Piaget's stress on the importance of the infant's interaction with his environment as well as the fact that in the normal infant a large measure of that interaction depends on vision.

2. Preconceptual Stage : During this stage children gradually construct more complex mental images. But these images obviously depend on the sensory data availble to the child. Unless specific efforts are made by parents, teachers and neighbours, the sensory data made available to the child is dificient. Therefore, the visually handicapped child crosses this stage later than the sighted child.

3. Intuitive Stage : At this stage a child is dominated by what is known as 'here and now' i.e. the child's thinking is dominated by immediate percepts. The sighted child reads print and may look at a number of two dimensional objects. But the blind child lives in a three dimensional worlds. Even the reading of Braille is a three dimensional operation. Again a great deal of experience coming to the blind child is verbally meidated.

4. Stage of Concrete Operation : At this stage child is expected to make use of reason and logic relating objectis to concrete objects. The limitations pointed out by Lowenfelf are applicable to blind children at this stage as well. If the range and variety of their experience is limited, their logic and reasoning cannot but be affected. Actually this is the result of limited experience and not of blindness.

5. Stage of Logical Operation : At this stage children are able to reason without the presence of concrete objects. In this stage of formal operations children can present problems mentally and operate on them. The blind children can make mental representation as effective and at about the same age as sighted children even if the precise nature of their mental representation is some what different.

(d) Some Factors Responsible for Cognitive Development :

❑ **Concept Formation :** Concepts have been styled as building blocks of thought. They are therefore, basic to cognitive development. A fundamental ability required for concept formation is classification. It involves nothing similarities and disregarding insignificant differences. The use of long or meaningless words not based on actual experience often discribed in the literature as verbalism. It is the use of words without knowing the precise meaning.

❑ **Conservation :** The conservation of a property refers in general to the ability

to retain correct judgement of the property even in the tace of perceptual transformation. The general finding is that blind children show a lag in the development of conservation of volume, weight and substance. But these are temporary lag and as a blind child grows in experience he is most often able to make up his deficiency in day to day functioning.

❑ **Imagery :** Imagery plays an important role in the child's cognitive growth and later inpracticably every aspect of his life.

What do we precisely mean by Imagery ?

Most of our actions are based on the thinking process. An image comes to our mind before we eat, talk, jump, run or perform a more complex task.

What are these images ?

There are the residue of stored experience. Indeed they are learned resoponses. But there learned responses may be visual, auditory, tactile, or kinesthetic or combination of visio-motor, audio-motor or verbal-motor. In fact no physical activity will be possible without such imagery.

❑ **Creativity :** Creativity often depends on unique and efficient combination of images. It is often been asked whether blind and sighted children differ in divergent thinking. There is no fundamental difference between blind and sighted children on divergent thinking except that blind children exhibit much greater verbal fluency where as sighted children use much greater visual imagery.

B. Attitudes Affecting Blindness :

(a) Community Affitudes and Reactions : The deficits caused by blindness are not taken as objectively by the community as occur to the individual. The reaction varies from community to community depending on its traditions, culture and belief. Killing of disabled persons existed. As the society progressed towards being a welfare state from a warfare state, so did the changes occur in the total outlook. The blind persons became members of the society who needed to be looked after but not at the equal level with others. They were to live an charity. It has also an undertofore of religions beliefs. To-day the scenario is changing. The community is based on the priciples of equality and fraternity. The motto is equal opportunities for all including handicapped people.

Though psychologists and educationists do talk about individual differences, yet we as human beings try to generalise things. Chariety its general tendency is to perceive a blind person as one who can make a livelihood only though begging,

hence blindness implies low level of living. Another misconception refers to the special talents of blind people like musical talents, fantastic meamories. As normal human beings they depends on senses of hearing and touch as the sight is denied.

The stereotypes go beyond the believes ans saying of it. It is reflected in the distortion in interaction with blind people. In daily life situation they are denied the opportunites, expectations are restricted and thus we 'socialise' the impairment into disability which is further extended to become a handicapped.

The community at large affects the blind child not only because of its general attitude but also throught the ways that are refelected in the attitudes and behaviour of the immediate human contacts of the child, the neighbours, the parents and the peers.

(b) Parnetal Reaction to Blindness : When a child is born blind, the parents feel at a loss for so many social, personal and psychological reasons. The reactions occur on a continum neglect to over-protection. Due to inability of most parents to understand the implications of an imparinemt, the impariment is perceived as handicap, on one extreme is the response of neglect. Because it is felt that a blind person is devoid of all normal human functions of being an active member of the society. Not only this even parents at times feel the birth of a blind child to be the result of some sin. Hence in their own frustration, the child, is ignored and naturally the 'expectancey prophecy' comes to be true, the child develops into a person who cannot contribute socially or economically to the society.

Neglect causes certain personality problems but the child has to learn certain basic living skills. Over protection is more dangerous. It deines the child all of the natural demands or expectations of society. In between these two ends of the continuum of neglect and over protection, are the discrepant behaviours of parents which add to the problems of the blind child.

The discrepant behaviour is the gap between what a person says and what a person does/feels—The social structure is such that we try to say or act what is socially acceptable. Real feelings are rarely expressed especially when they are centrary to the socially desirable ones. The parents of a blind child, at times, pose the full acceptance of the blind child as an over behaviours, because today society expects parents to stand by their children. But covertly, it is difficult to accept a child who becomes a liability, a reason for social talk and criticism. Overt rejection is managable but covert rejection does not only deceive a child, it hurts him psychologically. It affects not only his growth and social relationships but also his own self-concept, the very basic of a person's development.

(c) Psycho-social Effects on the Child : Psycho-social development of a blind child is not affected, so much by blindness, perse, as it is disrupted by the emotional over-tones of blindness, for the parents and thr community. It is now a well-known fact from reaserch that children tend to achieve as much, and only as much as their parents aspire them to achieve or the significant persons in their environment expect them to achieve. But once the community deos not treat them as individuals, they are lost into a crowd, the crowd of blind persons—beggars, musicions or do whatever they like, once, the parents stop treating the child as a developing individual, once they refuse to accept his capabilities and limitations, both in a realistic manner, his self concept is bound to be severey affected. Overprotection takes away his independence, neglect turns him to exhibit undesirable behaviour—Either way, it is the suffering child whose miserices multiply.

4.1.4. Secondary Effect of Blindness:

After going through the effect of Blindness–primary, the students have clearly understand that there are some effects of the Visual Impairment which are due to impairment, disability and for the deficient vision. These conditions are not final. Some can be minimised with the learning of some teachiques. For example a visually impaired person is handicapped in a new place and with the new things. If he/she is oriented properly with exploration and narration barring verbalism he/she will be able to do for himself/herself. Then he/she will no more be handicapped.

The on-set of blindness makes the effects whether it will be primary or secondary. Formation of concept differes in respect of born blind (congenitally) and later age blind (adventitiously) or acquired blindness. In case of later age blind the effects become secondary.

We should keep in mind the issue of residual vision. Visual disability is considered from 40%. The visual disability ranging from 40% to 90% relates secondary effect. 90% to light perceptioon will be considered severe visual disability and they have only functional vision. Hence the percentage of visual disability refers whether the effects will be primary or secondary.

Training and practice of some teachiques like orientation & mobility, concept formation either by TLM or getting in touch of real objects as far as possible, activities of daily living skills, have management, personal management, arranging of reading materials, assistive devices will minimuse the handicapping condition.

Apart these the attidutes of parents, family, peers, community need to be changed through awarness making them reciant of the ability of the visually impaired, trying for their real acceptence. People in the media need to be educated to write about blindness accurately and carefully. The public need imformation not only on the realities of blindness but also on the techniques which make both the blind and the sighted persons comfortable. Fortunately at the Govt. level some services are also extended for making the visullay imparied at par the sighted people. Hence the primary effects gradually become secondary with the progress of science, Information & Technology.

4.1.5. Let us Sum Up

The ordinary child easily gets a total experience where as a visually impaired child has a limited experience. The child's experience range can be enhanced, compensated to a great extent only by supplementary tactile or auditory imputs given by teachers or parents. In view of the above stated implications that a teacher is supposed to play his/her role face-to-face the blind child, his parents, and his community. The specific understanding and skills required of the teacher of blind children are given below with suggested activites for their development.

1. The teacher should know the social climate from which the child comes.

Activity :

(i) Prepare a case study of the observations/perceptions of the blind child of his social acceptance.

(ii) Make interview of the parents, neighbours, peers and fellow teachers about their reactions to the blind child.

2. The tecaher should have experience, knowledge of and faith in the capabilities of blind child.

Activity :

(i) Make observations from the Daily Lives of some blind persons employed in significant jobs.

3. Reduce discrepant behaviour.

Activity :

(i) Introspect your own attitude towards blindness.

(ii) Analyse the attitude of the parents.

4. Aviod negative or inappropirate semantics.

Activity :

(i) Analyse the tasks that are given to sighted & blind children.

(ii) Analyse the expressin of speech used for interacting with blind and sighted children.

4.1.6 ''Check your Progress''

1. List how the blindness affects objectively.

   .....

   .....

   .....

2. Define stereotype behaviour.

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   .....

3. To-day, the scenario is changing—Explain.

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4. Senses are the gate-ways to knowledge—Describe.

   .....

   .....

   .....

5. Over protection snatches way independence—Clarify.

   .....

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   .....

6. Distinguish between over behaviour and covert behaviour.

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4.1.7 Check Yourself

Some questions are here for self-check. Tick the most appropriate answer for each.

1. Three Major/basic limitations imposed by severe visual impairment was put forward by—

(a) Jean Piaget

(b) Berthold Lowenfeld

(c) Valintin Hauy

(d) Samual Gridley Howe.

2. The number of the most important stages of intellectual development as stated by Piaget is—

(a) 8 (b) 6 (c) 3 (d) 5

3. Sighted persons feel pity for visually impaired because—

(a) Visually impaired cannot live properly in the world of sighted

(b) Sighted people fail to understand strength of visually impaired

(c) By the society it is taught to the sighted

(d) Kindness is a human value.

4. A visually imparied person can learn effectively if—

(a) he is given variety of experience

(b) he is taught only through auditory mode

(c) he is given a chance to learn

(d) he is left to learn by himself

5. Parents of visually impaired children tend to overprotect because—

(a) They love thier children

(b) They despise their children

(c) They are afraid for thier safely

(d) They try to hide their guilty feeling.

6. Tick the most appropriate response.

(a) Senses are the geteways to knowledge [True/False]

(b) The community affects a blind child by not only its general attitude but also the attitude and behaviour of he neighbours, parents and peers. [True/False]

(c) Teachers can generalise about blindness on the basis of their limited experience. [True/False]

(d) All blind persons have special talents like musical talent and fantastic memory. [True/False]

(e) Blind persons are like any other normal human beings. [True/False]

Answer Key :

1. (b), 2. (d), 3. (b). 4, (a), 5. (c). 6. (a) False, (b) True, (c) False, (d) False, (e) True.

Unit : 4.2. □ Selective Educational Placement

Structure

4.2.1. Introduction

4.2.2. Objectives

4.2.3. Types of Educational Institutions

- **A. Special Schools**
- **B. General Schools**
- **C. Open Schools**
- **D. Non-Formal Schools**

4.2.4. Models of Educational programmes for children with disabilities.

- **A. Resourcc Model**
- **B. Itinerant Teacher Model**
- **C. Dual Teaching Model**
- **D. Distance Learning Model**
- **E. Alternative School Model**
- **F. Home Based Education Model.**

4.2.5. The Need of Inclusive Eduction for the Disabled in India.

4.2.6. Let us Sum Up

4.2.7. ''Check your progress''.

4.2.1 Introduction :

Mainstreaming of the disabled children is more than a half century old attempt in India. To-day equal opportunities to all disabled persons have become a mandate for all welfare states. In the preamble to our Indian Constitution, it has been emphatically declared that the people of India are resolved to provide equalify of status and opportunity for everyone of its citizens including the disabled persons of the country.

"Education For All" (EFA) has been The Thrust of our Government and our people for many years. But due to several reasons including inadequency of financial and personnel resources, this dream has not been complitely materialised so far. An alarming percentage of our school-going-age population or still illiterate and ignorant remaining out-side the educational prograpmmes.

4.2.2. Objectives :

(i) The students will have a clear idea of educational programmes and placement of disabled children particularly the Visually Impaired.

(ii) They would be more encouraged for the education of the visually impaired children and the target EFA will be achieved.

(iii) Being aware of the educational programmes for the Visually Impaired children they could counsel V. I. Children for their education and get inspiration for conducting some Research Study.

4.2.3. Types of Educational Institutions

A : Special School

Special school concept for the disabled is the earliest one implemented in India. The attitude changes to the services for the disabled persons in India parallely as those existed internationally. As a matter of fact, the eudcational community did not realise that disabled children could be educated. But the inception of special schools for different disabilities proved them to be worng.

What is a special school ?

A Special school is a place of education for the disabled children.

What is a Residential School ?

Residential School is an institution where all students reside and learn.

Are all Special Schools Residential ?

No. Some are completely residential where all enrolled students reside in the hostels arranged by the school. Some are partly residential and partly day-scholar i.e. Some students reside in the hostels and some students come to school from outside. Again some special schools have hostels, all students are day-scholars.

Do all special schools follow a special curriculum widely suited to a disabled child ?

No. Some categories of disability have some special curriculum widely suited to a disabled child. But in case visiual Impariment and Hearing Impairment, the existing curriculum for the normal education is followed. For other categories of disability only the mild and moderate groups can study under normal curriculum.

What are plus curricular activities for the Visually Impaired Students ?

In order to perform well in curricular aspects, Visually disabled children should learn skills which are peculiar to blindness. These skills ae called "Plus curricular activities' The correlation between general and plus curricular activities is positive and high. We will read more about this in the curriculum sub-unit.

In most cases the special schools provide 24 hours custodial care to the children with disabilities in a protective environment.

The growth of special services for disabled children in India has followed the global trends of care and help. It suggest the availability of some form of educational and rehabilitation of persons with disabilities. In pre-independent India, foreign missionaries introduced services for the disabled in the country. Besides direct service to these persons, the missionaries also assisted the Indian counter parts in attaining skills by undergoing teachinical courses abroad. The 1st school for the deaf in Mumbai and the first school for the Blind in Amritsar were started by The Missionaries in 1883 and 1887 respectively.

At the time of independence in India, there was no formal legislation to ensure compulsory education for the disabled. Though the articles 45 of the coustitution of India is assuring better services to persons with disabilities in India, it was no enforced through legislation until recently. As on today more Than 3000 special schools for the disabled are functioning in India of which approxmately 900 are institutions for the hearing impaired, 400 for the children with visual impairment, 1000 for mentally retarted and the remaining 700 for children with other physical disabilities.

A 'blind school' as it is commonly called is a special school, because it caters to the needs of a special kind of students–the visually handicapped. Visual impairment creates special problems and difficulties in the psychomotor, cognitive and affective areas, and in interpersonal relations of the individual–which require special kind of approach and solution. A blind school is supposed to do all these. It is different from a general school in the sense that it imparts not only, 'academic'

education but also aims at the development of compensatory skills i.e. rehabilitation among its students.

The speciality of a blind school lies in the fact that almost always it is a residential school, though an insignificant number may attend it as day scholars here and there. This characteristic depends on both historical and demographic necessities. Historcally, the modern blind schools have evolved from the pre-1784 asylums before the establishment of valentine Hany's school in Pasis. From that time till the present day, no other way of schooling seems feasible than separating blind children from the seeing in special residential schools. Special features of these schools can be noticed in the words of Lowenfeld, "In Germany, for instence, blind children entered the residential school and upon graduation were transferred from one building to another where handicrafts kept them productively occupied until they became too old to work and were moved to still another building, on the same groundo, for he aged blind– a kind of 'cradle to grave security'.....In many parts of the world, it has not yet moved for beyond this stage.

Demographically, the geo-scatter of the blind population makes it imperative that they should be collected in one place so that they can be given education and training properly. The institutionalization of visually handicapped children in residential special schools illustrates in concrete terms the quality of attitudes to handicapped––the desire to create aome positive means of assistance and the willingness to separate and confine.

In these schools, the manners of instruction is also different—either there are special teaching methods, or the theacher-pupil ratio is very low, the close connections between the medical and pare-medical staff is also a distinctive feature of special school.

Special schools have several aims for their pupils which are quite different from the regular schools. These Shools include making the visually handicapped child as normal in bahaviour as possible. This means, imparting training in for example, orientation and mobility, training, sensory training, use of residual vision, daily living skills development etc. The aim is to enable the child to blend into his/her social context as for as possible. A general aim is the vital notion of independence—the maximum economic, social and personal self-sufficiency for the child. The school also tries to help the child to live with his/her disability in a way which minimizes its handicapping effects. These are some of the aims which distinguish a special school from a normal regular school.

To enable the special school to achieve these goals all the component factors

which constitute a school must be brought together and made to work like a, well-oiled machine. This is called "School Organisation" Combining both—human and non-human elements, we get four major factors essential for good organisation and these are (i) Management, (ii) Teaching Personnel, (iii) Curriculum & (iv) Pupils.

Apart from the above-mentioned factors, there is another equally important element in the organisation of a special school which is 'community' including the parents. This fact is generally not taken into amount as it remains beyond the boundaries of the school premises, but nonetheless, its importance cannot be minimised because it is the community which is the means and the ends, of the education and training of the handicaped child.

Just to bring all the elements together is not oraganisation, a force is required to make all these factors work in union. This force in the school organisation is the Headmaster or in some cases the Principal, or in other words the Head of the Institution is the Pivot round which the whole organisation revolves.

❑ Special School as Innovator :

'To innovate' means "to introduce something new or novel in the existing system." The necessity of ushering in the new becomes imperative when the old and traditional system fails to deliver he expected result in the changing situaltious. In the New Education Policy (NEP) a basic change in the outlook and approach was proposed. By providing effective lobby for legistlation, sensitizing the decision makers in he Government, helping the regular schools in the proper management of Integrated system, diversifying their own activities, initiating research and experiment in the field, the special school can play the role of responsible guide and innovator.

❑ Special School–its relevance

Setting up a special school with all the necessary resources like infrastructure, equipments and manpower warrants a huge capital. In a developing country like India which can't afford to huge investments on alternative system became imperative so as to bring all the disabled children under the umbrella of education. Inclusive education is one of the viable approaches to make the dream come true. Inclusive education is not a threat to integrated education concept or the special school programmes rather an important componant for education of the disabled. The special schools can concentrate more on difficult groups such as severe and profound group of children and children with additional disabilites. It is noted that the introduction of one system had never suppressed the old system but has widened the scope and action of such system. Therefore, special schools can change their role

in the following ways for expanding inclusion.

1. Serving as resource centres for a cluster of general educationa schools which are involved in inclusive education.
2. Organising inservice courses to the teachers of general schools in mtheods of handling children with disabilities.
3. Sharing special equipment with general schools for enriching learinng experiences of children with disabilites.
4. Organising summer camps for non-disabled children to create awarness in them an disability related issues.
5. Providing residenteal school facilities to children with severe and profound disabilities.
6. Undertaking action research studies on disability related issues and dissminate the information to general schools.
7. Initiate community based rehabilitation services to provide alternative education and rehabilitation to persons with disabilities in their own localities.

Therfore, special schools can play a vital role for the betterment of inclusive education in India. The inclusive education and special school concepts are not competitive to each other. In fact they are complimentory to each other. This spirit would go a long way in establishing a base for the harmonius growth of services for persons with disabilities in India.

❑ Integration and Inclusion–how do they differ ?

In India the two systems–intergrated education and inclusive education have a major difference. In integrated education, specialist teachers provide most of the essential as well as support services, where as general classroom tehachers provide additional assistance to blind children in the classroom.

In inclusive settings, the education of disabled children is treated as an integral part of general education. Therefore, essential services are provided by general classroom teachers and only support servives are provided by specialist teachers.

Provision for education of children with disabilities is usually made in special schools. But these special schools are completely indadequate to cater to the need

of the vast population of children with disablities. So the steps have been taken to make provision of education of these children in general, open and non-formal schools.

B. General Schools :

More than 5,00,000 schools are there in India to look after the educational needs of the children in the country. These schools are meant for the normal children. But the constitutional provision to make education compulsory and free for children including disabled ones up-to the age of 14 years has compelled the policy makers and administration to make available the facilities of these schools for the education of the disabled children. In this context, these general schools may be grouped into Four Categories :

❑ Schools with normal children only.

❑ Schoos where disabled children are enrolled but without any special facility of trained teachers or special teaching aids.

❑ Schools where disabled children read along with normal children but trained teachers are there to understand their special needs and try to satisfy there needs to some extent.

❑ Schools where there are special sections for disabled children.

C : Open School :

All disabled children cannot be benefited from formal learning system. There are many over-aged children and dropouts who may like to continue education through distance mode. The clients in vocational and rehabilitation centers who want to continue higher education many pursue the same through distance learning system. The Indira Gandhi Natinal Open University, The Netaji Subhas Open University, some universities in every states of India, some foreign universities, Rabindra Mukta Vidyalaya etc have also started special study centres to assist persons with disabilities to continue shool education and higher education. Such distance education opportunities must be used to the maximum possible extent to make more disabled persons educated.

Open learing system is considered as the panacea of the general educational system. When developed nations as well as developing nations are acknowledgeing the need of open learning as a viable alternative to make any country literate, the special education system, being a part of general edcucation system, needs to

examine the feasibility of open learning to make more disabled persons literate. The National Open School has developed instructional material for adaptation of curriculum in the case of disabled children. It has also started providing accreditation to selected institutes in the country to offer all levels of academic and vocational courses for the benefit of disabled children. The strengths of the National Open School curriculum are its wider range of options for course selection and facility to learn at the pace of the learner. These two aspects suit the requirement of children with disabilities. The children, according th their abilities, may select either academic or vocational courses.

D : Non-Formal Schools :

While open learning system may be encouraged for school-going and academically capable children, many adult disabled persons may not be benefited from this approach. There is a need to promote non-formal education programmes in the existing community based rehabilitation programmes to provide educational services to there clients. These clients may not opt for higher education, but they may become lifesafe for better living. Adult disabled persons are the potential seekers of non-formal education.

4.2.4 Models of Educational Programmes For Children with Disabilities

A. Resource Model :

This is an educational plan in which a child with any type of disability specifically visually Impaired is enrolled in a regular class. Within the school building a special teacher called resource teacher is available to the child along with his regular teacher. The regular teacher assumes major responsibility for the children with all disability in general programme. The resource teacher is responsible for instruction in special techniques or skills required for children of all types of disabilities. One full time resource teacher can manage 8–10 children of different types of disability in the resource programme. As for as possible, the children should be distributed in different classes/sections, preferably not more than 2 in one class/section.

In developing countries, at least seven models of Resource System are in practice. These are the following—

(a) Resource model where visually impaired children study in genrral schools and stay in hostels for non-disabled children.

(b) Resource model where visually impaird children study in general schools and

stay in hostels of the near by special schools.

(c) Resource model wher visually impaired children study in general schools and stay in hostels exclusively arranged for them.

(d) Resource model where visually impaird children study is general schools and stay with parents at home.

(e) Semi-resource model or co-operative model where visually impaired children are taught only by the resource teacher in a separte class in a general school.

(f) Multi-category resource model where disabled children of different types are educated in a general school by the regular teachers and a specialist teachers.

(g) Multi-category itinerant model where one special teacher attends to the need of visually impaired children of different categouries in a particular locality.

B. Itinerant Teacher Model :

This is an educational plan in which the children with all disabilities are enrolled in a regular class in his/her home school where his needs are met through the combined efforts of the regular teachers and visiting intinerant teacher qualified to offer special service. The salient features of the Itinerant model.

❑ The children in this programme are distributed in different schools.

❑ The Itinerant teacher has to travel everyday to reach the children.

❑ Each child will be visited by the teacher twice or thrice a week. However children with all disability of primary classes should be given frequent visits. In this case, limited number of children with all disability should be enrolled at the primary level especially in the beginning stages of the Itinerant programme.

❑ Each school will not be houring a resource room. So for the itinerant teacher, a resource kit is must.

❑ The schools selected for the programme can be within a radius of 8 kms. However, this distance depends upon the topography of the locality.

❑ Depending upon the topography, the itinerant teacher should be provided with transportation arrangements—a bicycle or a motor cycle can be given.

C. Dual Teaching Model :

This is the model which can make the universalisation principle, a reality. Even though resource and itinerant programme can reach a huge number of children with

all types of disability, there are numerous places where educational services for this population are not existing. For example, an isolated village which has one or two children with multi-category disability can very well go for the dual teaching plan. This plan is successful only when the number of disabled childern is very limited, not more than two for ideal programme. The regular teachers with the support instructional material and limited competency oriented training can look after children with multi-catagory disability in addition to their regular classroom respossibilities. A token incentive may by provided for their additional work with disabled children. A large number of teachers, at least one teacher per school have to be trainied through crash programmes of two to three months duration to serve in the dual teaching plan. When such arrangements are made, any visually impaired child also can avail the educational facility in the local school itself.

D. Distance Learning Model :

The present day scenario is changed. The out-reach programme services of education is at every doorstep now. Expensive college and university centralised higher education is brought very close to our home through the study centres. Institutions like Indira Gandhi National Open University, Netaji Subhas Open University, all other universities of our own state and other states even the foreign universities facilitate higher education available in the home locality. Apart these to-day Information & Technology has brought the world and all resources of education to our room-corner. Like general students all category of disabled students including Visually Impaired can avail themselves of the opportunities of higher education seating at home keeping personal business and engagement undisturbed and intact.

E. Alternative school model :

The possibility of alternative schooling such as night schools, evening schools, pacakge programme etc. may also be explored and take into account for providing are neeeded to improve the skills of the disabled individual to become economically as well as educatinonally rehabilited. India has great potential for the growth of alternative education models to promote maximum services to all disabled persons.

F. Home based education model :

"This programme is meant for children who are physically handicapped also to the extent that they cannot attend a school, or who live where a school seuitable for them is not available." The purpose of this school is that the physical ineapaiety

should not and need not create a "mental vegetable". If the children are unable to attend the school education can be brought to them.

In this approach specialised teachers are nominated routinely to minimise interruptions in a student's education caused by short and long time confinment at home. The special teachers in this system are assigned with a caseload and visit the student in the home on a regular basis. The major responsibility of there teachers is to assist the child's regular classroom teacher in preparing instructional plans and guidelines which can be pursued with the homebound student on one-to-one tutorial basis. It is desirable that the learning environment should be made more compatible to the child's basic physical and emotional needs in theis system. The homebound programmes are rarely practised in Indian conditions.

4.2.5. The need of Inclusive Education for the Disabled in India

In India special school services are more than a century old. At present, approximately 30,000 blind children are served in nearly 400 special schools for the blind. The present scenario is that :

(i) A disabled child has to travel to far off places, whereas a non-disabled sibling from the same family can attend the local school. This accessibility of local school is not made available to children with visual impairment.

(ii) In most villages of the country, children with disabilities of different conditions are present. As far as the standard models are concerned, one specialist teacher serves 8–10 disabled children of the same category. But the scattered villages in the country do not have an adequate number of the same category to justify the appointment of a full-time resource teacher. Therefore, the need of multicategory personal becomes inevitable.

(iii) The extent of disability in each category ranges from mild cases to severe and profound cases. The mild and moderate cases are more in number than the severe and profound cases. Due to a lack of sensitivity of general education to the needs of children with viusual impariment, even the mild and moderae cases are not attending schools. This invites the involvement of general education so that children who are currently left out can be served.

(iv) Last but not the least, the enrolment in the integrated education as per the sixth All India Survey on Education (1998) in 8633. The total coverage in both special schools and integrated settings constitutes less than 57 of the population of

blind children. Therefore, special schools and integrated education models are not able to provides access to all. The Education for All (EFA) campaign should not become 'education for all minus blind children'. If EFA in the case of blind children is to become a reality, inclusive education needs to be nurtured and implemented. In additin to the accessibility factor, the natue of distribution of visually impaired children too demands inclusive education. At present the SarvaShiksha Abhiyan/ Mission is the active force for full implenmentation of Inclusive programme.

4.2.6. Let us Sum Up :

❑ Education of disabled children in India is served by mainly four types of schools—special, general, open and non-formal.

❑ There are various models of Education available for disabled children such as––Resource Room Model, Itinerant Teacher model, Distance Learning Model, Alternative School Model, Home Based Education Model.

4.2.7. ‘‘Check Your Progress’’ :

1. (i) The teacher should know the educational placement of disbaled children.

Activity :

Enquire disabled children's learning in your locality

(ii) Type of study materials of a visually impaired child.

Activity :

Locate a visually impaired child. List his/her study materials and techniques of learning.

2. Point for discussion.

After going through the sub-unit you may like further discussion on some points and classification on other

Note down those points.

3. (i) Inclusive and Integrated setting of educatin is not a Threat to Special Residential System—Justify.

(ii) Inclusive and integrated educational setting for the disabled children—Differentiae.

4. Assignments :

Prepare a Report regarding the types of schools and models of education available in Your Block. Collecting data from various sources and give your suggestions and recommendations for promotion of education of the children with disability.

5. Self–Check :

Tick the most apporpriete answer :

(i) The tirest school for the visually impaired in India was established India– (a) 1784, (b) 1883, (c) 1987, (d) 1887.

(ii) Constitution of India assrures better services to persons with disabilities under article No.— (a) 54, (b) 45, (c) 24, (d) 44.

(iii) Expanded core curricular items for the visualy unpaired are followed more in— (a) General Schools, (b) Open Schools, (c) Special Residential Schools, (d) Non-Formal Schools.

(iv) This model of Education for the disabled can make the universalisation principle, a reality.— (a) Dual Teahing Model, (b) Itinerant Teacher Model, (c) Resource Room Model, (d) Home Based Education Model.

(v) Instructional material for adaptation of curriculum for disabled children has been developed by— (a) The National Open School, (b) General School, (c) Special Residential School, (d) Non-Formal School.

(vi) Inclusive education is essential in India for— (a) Larger coverage of disabled children population, (b) Huge cost for running special school will not be needed, (c) Implementation of EFA will be possible normaly, (d) All of the above.

(vii) The categories as per percentage of disability is— (a) 4, (b) 5, (c) 6, (d) 3.

Answer Key :

(i) d, (ii) b, (iii) c, (iv) a, (v) a, (vi) d, (vii) a.

Unit - 4.3 ◘ Teaching Principle

Structure :

4.3.1. Introduction

4.3.2. Objectives

4.3.3. Child Central Approach to Teaching

4.3.4. Principle of Teaching

4.3.4.1 Psychological Principles of Teaching

4.3.4.2 General Principles of Teaching

4.3.5. Maxims of Teaching

4.3.6. Pirnciples of Teaching for the Visually Impaired children

4.3.7. Some more points to be taken into granted

4.3.8. Let us Sum up

4.3.9. ''Check Your Progress''

4.3.10. Check Youself

4.2.11. References

4.3.1. Introduction :

Rehabilitation council of India (RCI) in the preambel of B.Ed. Spl. Ed. Programme–2015 has stated rightly and significantly about the new treand of teaching–moving away, from 'show and tell' to 'learning by doing'. A disabled child is a child first like all normal children, then we are to consider the disability accordingly in course of teaching-learning process. Hence we are to glance first. The principles of teaching prescribed for normal children as all these are applicable to all categories of children and then the disability particularly the visually impaired will be taken for discussion.

4.3.2. Objectives :

The clear knowledge of the principles of teaching will help the teacher-students

(i) to take their teaching in the goal-roented right direction without groping or hovering aimlessly

(ii) to take steps for teaching properly both in inclusive, integrated, special & home-bomb set-ups.

4.3.3. Child Centred Approach to Teaching :

● Meaning of Child Centred education—

The claim of the teacher, 'I teach children, not subjects' implies care for the 'whole' child–his/her personality, needs & learning style and not just for his/her academic process. Child-centred education stresses the need for taking care of the child, its growth and development. It requires 'individualisation' of approach, so that one must study each child carefully, keep observations over a period of time, study the growth and development in sensory-motar, intellectual, emotional, social, language areas and soon.

● Key Concepts of Child Centred Eudcation—

Aim—The aim is development of the total personality of the child

Programme—Programme is to be activity based with different teaching strategies.

Pace of Learning—It is to be based on childrne's needs & abilities.

Teaching-Learning—Teacher's role is that of a facilitator in learning and development.

Discipline—It is to be achieved through the maintenance of positive human relationships between teachers and pupils.

● Need for child—Centred Approach and its implications

(i) The child is the most important agent in his/her own learning. Out of the three components of learning situation—the child, the teacher and the environemt,

the prime place is occupied by the child. It means that curriculum must be thought of in terms of activities and experiences which appeal most to the child.

(ii) Children learn best when they are active. Learning takes place through a continuous process of interaction between the learners and its environment.

(iii) Knoledge or information is not the goal. Self-realization is the goal. Personality and character are more important than the subject matter.

(iv) Child-centered approach is more psychological than logical. It emphasises the process rather than the product.

(v) Child-centered approach gives boundless freedom to the child under the creative and sympthetic direction of the teacher.

(vi) One single exposure to an experience does not affect all the necessary co-ordination of the physical and mental faculties of a child to preserve the net value of exposure. Hence there have to be repetitive exercises and drills to give a certain knowledge and the efficiency and tenacity of skill and value.

(vii) A Child is a unique being and has a Specific role to play. The teacher's role is to help the child to conform to its unique role, both in its spirit, habitual values, choices and consistent behaviour patterns.

(viii) The child's sense of wonder and astonishment and his/her natural curisoty leads to a learning process which should be encouraged by the teacher.

● Limitations of Child–Centred Education–

Child-centred education has a few limitations which must be takne care of by the teaches. Too much freedom is likely to engender egocentricism in children. Children may grow to be unwilling to accept reasonable authority. If all the times and at all places likes and dislikes, preferences, whims and interests of children are elevated above the matured judgements of parents and teachers, it may result in undesirble outcomes. Adams, therefore, wanted that both the children and thier teaches should be on the same footing of inportance.

Pragmatically speaking, learning cannot be child centred always in absolute

term. Child-centred education implies that each child may have a separtae learning activity besides a few group activities. Perhaps no nation can afford to spend so much money, resources and time on child-centerd education. There age so many children under the charge of a teacher that it is rather imossible to attend to the specific needs of children individually.

- **Corrective Measures :**

Of Course emphasis on child-centred eduacation tends to free the child form the tyranny of the traditional approach to education like 'chalk and talk', 'bookish knowledge' and 'The supremacy of rod'. Implict in all the positions of child-centred education is that the teacher must be pripared to give initiative to the learner in the educational encounter. The role of the teacher is child-centred education is encouraging self-disciplinary function of the child which cannot be over-emphasied. It can be summed-up as—

(i) Motivating children.

(ii) Developing trutst and confidence in children's capacity to learn.

(iii) Becoming as a resource for crating meaningful learning experiences.

(iv) Accepting the indivicual and the group.

(v) Participating as a member of the group in guidind learning.

(vi) Becoming sensitive to the child's needs and tinteracting in a way that would provide a sense of feeling and seeurily.

(vii) Recognising and reinforcing the individual contribution.

4.3.4. Principle of Teaching :

The educators and philosophers have emphasised certain principles of teahcing which the teachers are expected to bear in mind for making their teaching effective, efficient, and inspirational. These are classified as psychological general principles.

4.3.4.1 Psychological or Learning of Teaching :

(i) **Principle of Activity or Learning by Doing :** Children are active by nature and any process or method that is not based upon the students activity is not

in accord with the progressive educational theories. Rousseau considers the child as a "hero" in the drama of education and as such he/she must be allowed to play. The dominant role. So the first principle is to keep the class active. The great vitality of our children cannot be permanently restranied without providing a positive purpose which will interest the children and give them opportunities for ovservation and the use of their hands. This is to offer them the fulfilment and satisfaction which nothing else confers.

Activity does not mean mere physical activity. To develop all sides of pupils' personality it is necessary for them to be active in all ways, to exercise all the powers they have.

(ii) **Principle of Playway :** This principle is closely related to the principle of learning by doing. According to Froebel play is the chief activity of childhood. It gives joy, freedom, contentment and inner and outer peace. It holds the source of all that are good. But "without rational conscious guidance", says Froebel, "childish activity degenerates into animals play instead of preparing for those tasks of life for which it is designed."

(iii) **Principle of Motivation :** The teacher will do his/her best to motivate all children in the lesson-motivation arouses the interest of children and once they become interested, they are willing to concentrate and work. Motivation is developed by the following techniques—(a) utilising the instinctive tendencies of the children in an effective manner; (b) satisfying the curiosity of children; (c) utilising all the senses of children; (d) relating closely body and mind; (e) linking teaching-learning with life.

(iv) **Principle of Self Education :** Best teaching is enabling the child to learn by his own efforts. Teachers must fire the imagination of their students. Children must be left free to express themselves, for the best education is self-education. Teachers must stand aside. They must talk less, explain less and direct less. The essential acitivity in teaching is not the adjustment of child to teacher but is to enable him/her to adjust himself/herself to the environment and also to change the environment to adjust himself/herself. Teaching must enable the child to work independently and without the teacher at a later state.

(v) **Principle of Individual Differences :** No two children are alike. Teachiung to be effective must cater to individual differences of children.

(vi) **Principle of Goal Setting :** A definit goal must be set before each child according to the standard expected of him/her. Short term or immediate goal should be set before small children and distant goals for older ones. It must be remembered that goals should be very clear and definite and the children must understand there goals.

(vii) **Principle of Stimulation :** Burton has said teaching is the stimulation, guidance, direction and encouragement of learning. Ryburn emphasises, the guidance of the teacher is mainly a matter of giving the right kind of stimulus to help him/her to learn the right things in the right way.

(viii) **Principle of Association :** Thorndike points out that things we want to go together should be put together. Many different things or ideas which want to go together should be associated with each other. They should form a part of one process. Then it becomes easier to make the students understand their relationship.

(ix) **Principle of Readiness :** This principle is the indicative of learner's state of mind to participate in the teaching learning process. Readiness is preparation for action.

(x) **Principle of Effect :** This principle states that a response is strenthened if it is followed by pleasure and weakened if followed by displeasure.

(xi) **Principle of Exercise or Repetition :** According to it, the more a stimulus induced, respense is repeated, the longer it will be retained. This principle has two subs-parts-principle of use and principle of disuse.

(xii) **Principle of Change and Rest :** Psychological experiments in learning have demonstrated that fatigue, lack of attention and monotony can be overcome by making appropriate provision for change, rest & recreation.

(xiii) **Principle of Feed-back and Reinforcement :** Learning theories point out that the immediate knowledge of the results and positive reinforcers in the forms of praise, grade, certificates, taken money and other incentives can contribute to make the task of learning joyable.

(xiv) **Principle of Training of Senses :** Sesnses are the gateways of knowledge. The power of observation, discrimination, identification, generalisation and application can only be apprpriately developed through the effective functioning of senses.

(xv) **Principle of Group Dynamics :** Under the influence of group behaviour, appropriate changes in the behaviour of the members of the group can take place. Indivicuals composing the group think and feel as the group feels, do as the group does. A suitable elimate for group dynamics is to be created in the classroom environment.

(xvi) **Principle of Creativity :** Opportunities should be provided to the students to explore things and events and find cause-effect relationships. This principle envisages that every student possess some element of creativity which must be explored and developed to the maximum extent.

(xvii) **Principle of Correlation :** Gandhiji was of the firm view that correlation should be the basis of all work. He advocated that correlation of the learning task should be established with the craft, physical and social environment.

4.3.4.2. General Principles of Teaching :

Successful teaching necessitates that the tehacher comes down to the level of the pupils and at the same time assits them in rising above it. To a great extent, the principles of teaching to be followed depend upon the age of the pupils, the subjects and topic of the lesson. However, there are certain general principles which should underline the teaching of all subjects. Actually there is no clearcut dividing line between psychological and general principles of teaching.

(i) **Principle of Definite Goals or Objectives :** Destination or goals of teaching-learning must be clear to the teachers and the students. Goals and objectives keep them on the track. Definiteness of goals helps in planning, excuting and evaluating every step, phase or act of teaching-learning process.

(ii) **Principle of Child Centredness :** The entire teaching endeavour is for the child. Therefore, it is essential that teaching strategies should cater to the aptitude, interest and abilities of the students. In the drama of education, child should be assigned the role-of 'hero'.

(iii) **Principle of Individual Differences :** No two children are alike. Teachiung to be effective must cater to individual differences of children.

(iv) **Principle of Linking with Life :** Teaching can never be performed in a vacuum. It is always in a social context. In the teaching of all the school subjects, exampled from everyday life should be given their due place.

(v) **Principle of Correlation :** Knowledge is one 'whole'. Various ideas and events are inter related. There exist links among various subjects. Correlation of the present events can be made with the past. Similarly future can be visualised on the basis of the present happenings or state of affairs.

(vi) **Principle of Active Involvement and Participation of Students :** Teaching-learning is a two-way traffic. Traditional teaching was almost teacher-centred. There was very little scope for the involvement of the students. The tacher used to teach and the students would liesten to him passively. The new teaching emphasises that the students must actively participate in all the stages and steps of teaching-learning.

(vii) **Principle of Cooperation :** Classroom environment becomes lively when the teacher and taught work in union, helping each other in carrying out the task of teaching and learning. All the participants have the same common interest. Naturally they must cooperate with teacher.

(viii) **Principle of Remedial Teaching :** All the students do not learn with the same speed and accomplishement. Some lag behind and need extra coaching. The teacher has to find out where the fault lies and think for positive measures. He may have to arrange for remedial or compensatory or extra teaching for any particular group of students for removing their specific difficulties.

(ix) **Principle of Creating Conducive Environment :** Physical as well as social environment of the classroom plays a vital role in motivating the learners. Arrangement of light, fan, furniture etc. should be properly attended to. There should be proper discipline and order. The teacher should be sympathetic but firm.

(x) **Principle of Planning :** Planning determines the quality or success of any task. Planning in teaching involves the preparation of the lesson notes, provission of teaching aids and working out strategies to be adopted in the delivery of the lesson.

(xi) **Principle of Effective Strategies :** Teaching process to be effective must adopt proper means, strategies and tacts. A teaching strategy is a generalised plan for a lesson which includes structures, desired learning behaviour in terms of goals of instraction and an outline of planned tactics necessary to implement the strategy.

(xii) **Principle of Flexibility :** Strategics should serve as guides for effective teaching. Strategies may have to be changed, if the classroom situations, so warant. Teaching is a complex task and a live phenomenon. The possibilities of alternation in planned strategies cannot be ruled out at the excurtion stage. A teacher must be quite imaginative and resourceful for adapting himself/ herself and his/her teaching to the requirements of the teaching-learning environment.

(xiii) **Principle of Variety :** A variety of teaching aids and strategies should be adopted to motivate and sustain the interests of the students. Variety serves as great tonic for creating fresh environement and checking boredom and lethargy.

(xiv) **Principle of Activity :** Children are active by nature and any process or method that is not based upon the students activity is not in accord with the progressive educational theories. Rousseau considers the child as a "hero" in the drama of education and as such he/she must be allowed to play. The dominant role. So the first principle is to keep the class active. The great vitality of our children cannot be permanently restranied without providing a positive purpose which will interest the children and give them opportunities for ovservation and the use of their hands. This is to offer them the fulfilment and satisfaction which nothing else confers.

Activity does not mean mere physical activity. To develop all sides of pupils' personality it is necessary for them to be active in all ways, to exercise all the powers they have.

4.3.5. Maxims of Teaching :

The maxims of teaching are very helpful in obtaining the active involvement and particepation of the learners in the teaching learning process. They quicken the interest of the learners and motivate them to learn. They make learning effective, impirational, interesting and meaningful. They keep the students attentive to the teaching-learning process. The maxims will be discussed under course code A3 and unit-3 in Semester-II. Here only the points are to be noted :

(i) Proceed from the Known to the Unknown

(ii) Proceed from Simple to Complex.

(iii) Proceed from Easy to Difficult.

(iv) Proceed from the Concrete to the Abstract.

(v) Proceed from Particular to General.

(vi) Proceed from Indefinite to Definite.

(vii) Proceed from Empirical to Rational.

(viii) Proceed from Psychological to Logical.

(ix) Proceed from Whole to Parts.

(x) Proceed from Near to Far.

(xi) Proceed from Analysis to Synthesis.

(xii) Proceed from Actual to Representative.

(xiii) Proceed Inductively.

In the ultimate analysis it must be observed that the maxims are meant to be our servants and not masters. Moreover, by and large, all are interrelated.

It is also to be kept in view that children differ in their aptitudes, capacities, interests, mental and physical make up. Different maxims suit different situations and different children. It is, therefore, essential that a judicious use should be made of each maxim.

4.3.6. The Principle of Teaching for the Visually Impaired Children :

The discussion of a general principles of teaching for all children is nowover. We will proceed to highlight the specific principles of teaching required to be obeyed in course of dealing withthe visually imparied children. Ever since formal education of blind children began, enlightened teachers of the blind have practiced such principles, mostly without being theoretically aware of them.

(i) **Educational Set Up :** To what extent these principles can be applied in the actual process of teaching depends somewhat on whether visually Handicapped children receive their education as a group in an environment geared to their

needs, as residential schools are, or as single individuals in general school facilities where they may have an understanding general classroom theachers and should have a resource or an itinerant teacher who is aware of and knows how to meet their special needs.

(ii) **Need For Concrete Experience :** In order to give the blind child a knowledge of the realities around him/her the teacher must aim at providing him/her with a wide variety of concrete ecperiences. Thus making up to a certain extent for the limitaion in the range and variety of his/her experiences. For the blind child it is not important to learn concertely about exotic things; his/her primary need is to learn about his/her environment.

The young seeing child is familier with a multitude of characters and scenes of domestic and social life. Experiences of such things as these, and of their observed relationship, are the very stuff of the child's mind, and on them the teacher draws daily activities for the purpose of teaching. The deepest and most fundamental needs of blind children are a rich and intimate experience of common things, and a direct acquaintance with the many characters that move across the scenes of daily life, and the activities of the characters. The children must learn to know persons and things in terms of their own sensory persons and to meet the situations in which they occur on an independent footing. For these no verbal substitutes will serve. They need the direct contact with the world.

Concreteness in teaching can be achieved in essentially two ways : by having the children observe the object or situation itselt or by providing them with a model of the object. In all cases if there is army possibility, reality is to be preferred. Children must be given sufficient time for the observations. Study excursions and field trips can familiarize children with many situation which otherwise world remain abstract for them. A model or replica can only be a substitute and will always in some ways be incomplete or distorted, unless the teacher is careful and persistent in making the students fully aware of size and other distotions.

The use of embossed picture to give blind children an equivalent of visual illustrations has often been tried but never had only lasting success. Embossed outlined representates of essentially two-dimenssions objects, such as leaves, a fork, or a butterfly, may be identified by the blind children and even a man's figure will

be understood because the child will relate the body parts to his/her own bodily experience. Such embossed pictures cam even result in wrong ideas, for instance when a four-legged animal is shown with only three legs, since the fourth-leg is visually hidden. Though limitations are there diagrams and embossed maps are the most valuable from the early school years on in developing spatial concepts and basis relationship needed for orientation and other purposes.

Giving blind children a knowledge of the realities around them is not a question of enriching the child's vocabulary, but of giving him/her a sense of reality about his/her environment. It will prevent him/her from following into a pattrn of unreality towards which he/she may be inclined for other reasons. It will also be valuable to him/her in his/her social life, because in conversations he/she will not feel left out by lack of concrete knowledge but will be able to take an active part as the result of experiences which he/she in common with others.

(iii) **Need For Unifying Experiences :** Blind children are at a services disadvantage in experiening things and situations in their totality. Touch permits simultaneous observation only of objects that can be embraced by either the hands or the body. Larger objects must be observed by consecutive touch motions and in many instances only parts of them are observed in this way. Vision permits a unification of observations and it structures and orgainizes discrete impressions received by other sensory organs. The lack of unifying integrative experiences must be counteracted by teachers who give blind children opportunities to experience situations in their totality and to unity part-experiences into meaningful wholes. The teaching by study units is an important means of achieving this end. By this method blind children will not only learn the facts of a given topic as seeing children do, but will also recognize how the different parts combine into a total object, situations, or topic.

(iv) **Need For Learning by Doing :** As a result of their blindness and because of the environmental reactions to this handicap, blind children have in general significantly less opportunities for self acting. Special attention must be given at home and school to encouraging blind children to do as many things for themselves as are desirable and compatible with a well-conceived time economy. That blind children from an early age on are not visually stimulated

by their environemt to imitate activities of others combined with tendency of many parents to be content with just satisfying their childs bodily needs, causes a tendency toward inertia in many blind children. The general approach should be to encourage blind children to learn to do things themselves with as little assitance as possible. The blind child should be encouraged to become independent and sucessful at the endeavours like eating, dressing, playing, meeting people and getting about. The more situations he/she has learned to master, the stronger will be his/her feelings of security nd the more positive his/her self-concept.

As regards the creative activities of blind children, educators should not impose thier 'seeing taste' on blind children, but should let them create things according to their own concepts and emotions. The visual aspects of a piece of clay modeling are irrelevent for the blind child, who works by touch and expresses his/her sculpture his/her touch concepts of things and events. Thus the result may be a product which in no way resembles the visually perceived objects, but truly expresses what the blind child knows and feels. It is the process that counts not the product.

From all that has been said about individual considerations and about special educational needs of blind children it is obvious that the teaching can fulfil his/her role only if the number of children in his/her group is small. This is true for classes in residential schools as well as for facilities in local schools, with either resource room or itenerant teachers. The actual number of children will depent on such factors as grade level, age, subject matter (is the upper grades), and geographic location (for itinerant teachers). In general, between five and ten children can normally be assigned to one teacher. If special conditions exist, such as an itinerants teacher serving blind children in primary grades, or if the children are multitian dicapped, a much smaller teacher-pupil ratio, sometimes one to one, is essential for success.

4.3.7. Some more Points to be taken into Granted

Apart the above mentioned major points the educators should keep in mind the following in course of teaching a blind child.

(i) Age of on-set of blindness is of crucial importance.

(ii) Extent of residual vision determines the nature and dominance of visual imagery.

(iii) Stability of residual vision and suffering from tranma.

(iv) Knowledge of family back-ground.

(v) Contrive concrete life situations to give the visually handicapped child experiences that he/she would miss day-to-day life.

(vi) Where necessary take the visually handicapped child to experiences that he/ she cannot have at home or in the class-rooms.

(vii) Use models where absolutely indispensible.

(viii) Organise visits to Museums, Post office, Markets, and social and cultural centres in the city, town or in the neighbouring areas where the school in located.

(ix) Touching objects should not be prohibited. Indeed, it should be encouraged.

(x) Verbal description should be supported where possible with concrete experiences.

(xi) Reward and punishment should be judiciously given to motivate the visually handicpped child to interact extensively with his environment.

(xii) Diagramatic representation in braille or in large print should be used where necessary to give the visually handicaped child an idea not only of two dimensional perspective but also of the three dimensional world.

(xiii) Learning by doing should be the basic principle of the teacher. In this way the formation of imagery and concepts could be fostered.

(xiv) Play at home and in the classrooms should be extensively used as a tool promoting cognitive development.

(xv) Acting should be used in appropriate situations to improve the visually handicapped child's expression and strengthen his retention and recall.

(xvi) Role playing should also be used to give a visually handicapped child experience of life situations.

4.3.8 Let us Sum up :

The principles of teaching help to navigate the goal-orented teaching-learning process efficiently, competently and successfully. Committed quality teaching is expected from an educator. Hence each and every educator should know well and obey the principles of teaching. These days are the days of child-centred education. Hence the child whether normal or disabled sarticualarly visually handicapped should be given appropirate principle-based teaching-learning environment, care and attention. Principles-psychological and general help the education to be endowed with proper techiniques and strategies for education of all children. But for the visually impaired children some specific princi;es are to be takne into account in addition to the two principles meant for all.

- **''Course Work'' :**

(a) Write the process and name or articles needed for preparing 4 modles and 4 maps for teaching the visually handicapped children.

(b) Give critical analysis of these models and maps.

4.3.9 ''Check Your Progress'' :

1. 'Learning by doing'—What type of activity does it mean ?

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2. Principle of Individual Difference—Explain.

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3. Remedial Teaching—Does it prove teachers lack of competency ?

4. Type of education set up of a visually handicapped child changes the role of the educator—Clarify.

5. In the process of teaching-learning of visually handicapped child the age of on-set blindness is of crucial importance —Explain.

6. Teaching of totally visually handicapped and low vision child differs—Justify.

4.3.10. Check Yourself :

Tick the appropriate answer—

1. Child is the 'hero' in the drame of education has told by—
   (a) Johann Heinrich Pestalozzi
   (b) John Dewy
   (c) Jean Jacques Rousseau
   (d) Alfred Binet
2. Principle of motivation does not incluce the technique of—
   (a) linking teaching-learning with life
   (b) relating closely body and mind
   (c) satifying the curiosity of chidren
   (d) utilising only the sense of vision of the children
3. Planning of teaching does not involve—
   (a) preparation of excessive talk
   (b) preparation of lesson notes
   (c) making provision of teaching aid
   (d) working out strategies for deliversing lesson.
4. The most fundamental needs of visually handicaped children do not include–
   (a) rich and intimate experience of common thing
   (b) a passive sedentary tendency
   (c) a direct acquaintance with the characters that move across the senses of daily life.
   (d) the activities of the characters that come in their contact.
5. The teaching of visually impaired multiple disabled (VIMD) children the ideal teacher-pupil ratio should be—

(a) one to more than ten

(b) one to eight

(c) one to one

(d) one to ten

- **Answer Key :**

(1) (c), (2) (d), (3) (a), (4) (b), (5) (c)

4.3.11. References :

See pages 67 & 68

Unit-4.4 □ Expanded Core Curriculum Concept & Areas.

Structure

4.4.1. Introduction

4.4.2. Objectives

4.4.3. What is curriculam?

4.4.3.1 Function of the curriculum

4.4.4 Need for Special Approaches for Visually Imparied Children

4.4.4.1 Objective Effects of Blindness Causing Experiential Deprivation in Visually Imparied Children

4.4.4.2 Curriculum for Inclusive/Integrated Education Programmes.

4.4.5. General Curriculum with Modified Experiences

4.4.6. Exanded Core Curriculum/ Plus Curriculum

4.4.7. Special Areas : (a) Braille

4.4.7.1 (b) Orientation and Mobility

4.4.7.2 (c) Daily Living Skills

4.4.8. Co-curriculum Activities in Brief

4.4.9. Difficulties to Cope with

4.4.10. Let us Sum up

4.4.11. ''Check Your Progress''

4.4.12. Check Yourself

4.4.13. References

4.4.1. Introduction :

Curriculum planning for visually impaired children follows the same maxims as for normal children. The motto is to facilitate children's learning. The effects of

visual impairment necessitate some adjustment in the planning and exceution of the curriculum. Some skills for learning which ae natural to a sighted child need to be developed through a well planned programme hence the need for expended core curriculum/plus curriculum. Similarly the visully imparied child needs some special in-puts from the teachers besides what is given to every child. He/She also needs, at times, special inputs in terms of equipments or efforts.

4.4.2. Objectives

After completing the subs unit the teacheer/students are expectable to be able to :

(i) Describe the concept of curriculum in general and its implications for teaching visually impared children for classroom practice.

(ii) Specify curriculum adaptations for teaching viusally imparied children.

(iii) Identify the components of Expanded core curriculum/plus curriculum activities for visually imparied children

4.4.3. What is Curriculum ?

(a) Education is treated as a race, with its obejctives as the goal and curriculum as the course leading to the goal. The traditional system insinted on curriculum as the acquisition of mastery over certain skill and certain areas of knowledge. According to modern educational thoughts curriculum does not mean only the academic subjects traditionally taught in schools, but includes the sum total of experiences. That a pupil receives through a variety of activities in the school, in the classroom, library, laboratory, play grounds, in formal contacts between teahcers and pupils. In this sense, the whole life of the school becomes the curriculum, which can touch the life of the students at points and helps in the evolution of a balanced personality. Modern curriculum. Thus, "covers all the wider areas of individual and group life. It encompasses all meaningful and desirable activities outside the school provided that these are planned, organised and used educationally.''

The concept of curriculum reflects the following concerns :

(i) Curriculum exists only in the experiences of the children.

(ii) Curriculum inclueds more than the content to be learnt content does not constitute the curriculum until it becomes a part of the childrens total experiences.

(iii) The school curriculum is an enterprise in guiding living.

(iv) The curriculum is a specialised learning environment deliberately arranged to direct the interest and abilities of children towards effective participation in the life of the community and the nation.

4.4.3.1 Functions of the Curriculum :

(b) The functions of the school curriculum are deformined by two factors :

(i) Taking into account the varying capacities and the endless potentialities for good or evil in the life of the community and the nation (Social goals)

(ii) Problems encountared by the individual for living in the society (individual goals)

The curriculum is the instrument through which these two factors are brought together; it consists of experience through which children achieve self realisation and at the same time learn to contribute to the building of better communities and a better nation.

4.4.4 Need For Spcial Approaches For Visually Imparied Children :

(a) The whole gamut of the curriculum for children in school and community is centered around two significant aspects, "The Opportunity" and "The Experience". Often children are provided with opportunities, but the mere provision of opportunities does not mean acquisition of experience. The understanding of the self and the world is not a 'whole' when expereience is denied.

Sighted children have advantage over visually impareed children in the acquistion of knowledge through experience. The vision, which brings an enormuos amount of information in just a glimpse enables sighted children to have rich experiences in a "Natural Way". The learn the experience as a "whole". But the

learning of visually imparied is not "whole" but in "Pieces" of information. Thus there is a significant diference between the two groups. The sighted having "Natual Learning" and the visualy imparied child having "Mediated Learning". There is therefore a need for different approaches to the curriculum for visually-imparied children.

4.4.4.1 Objective Effects of Blindness Causing Experiential Deprivation In Visually Impaired Childern :

(b) According to Dr. Berthhold Lowenfeld, The objective effects of blindness are :

(i) Reduction in the range and variety of experiences—As vision is the major mode of acquiring information, the visually-impared child learns in a fragmentary way. He/She has to have time to put these bits & pieces together to form a concept which is not exactly like that of the sighted but which is sufficiently like ours to enable us to communicate.

(ii) Reduction in the ability to move about—Blindness tends to create a very sedentary kind of existence. A visually impaired person may just be inactive become of fear, lack of skill in using information and lack of skill in moving about within it.

(iii) Control over the environment and self in relation to its—By just being blind and not knowing where you are, to whom you are speaking and what you are facing, being unable to controla the self and environment in relations to self is a significent defecit.

Except these, all other effects such as etiology, extent of blindness and all other mitigated experiences are purely subjective. The three obstacles in the form of "objective effects" to independence and self-fulfilment are the underlying reasons for all the "Plus Curriculum" or "Expended Core Curriculum" set forth for visually impaired children.

4.4.4.2 Curriculum for Inclusive or Integrated Education Programmes :

(c) A visually impaired child in the regular class is one among many children in That class. The curriculum meant for visually impaired children of, the inclusive/ imtegated programmes should be more like than 'unlike' that of the sighted

children.Most information is received by the visually impaired child through 'Touch' and 'Hearing'. Hence these experiences must be planned to facilitate the acquisition of at least the near normal experience acquired by other children through 'vision'. Hence there is no need for a special curriculum for visually impaired children in the inclusive/integrated education programmes but special approaches based on multi-sensory experiences are needed. To learn the general curriculum, the visually impaired child should possess some skills which are peculiar to blindness and dealt with under 'Plus curriculum'/'Expended Core Curriculum'.

In the light of this, the curriculum for visually impaired children may be stated as follow :

4.4.5. General Curriculum With Modified Experiences :

The general curriculum which containes more "visiual experiences" and less "non-visual expereience" must be analysed to convert visual to non-visual experiences for the betterment of the concept development of the visually impaired child. The four steps are given hierarchy of preferred management of "educational experience".

(a) We give Duplicate experiences; but cannot always, so we

(b) Modify experience some times;

These modifications may be in terms of—Content, Method of Display, Type of Material used, Response Expectations From The Child.

(c) Sometimes, there is no suitable means of modification, and we must therefore substitude one kind of lesson for the visually impaired child, which as closely as possible, approximates that presented to his/her sighted peers. But even then, and specially in the early days, we may sometimes.

(d) Omit a lesson

These four steps are very important in giving experiences to the visually impaired child through the mutli sensory material. It has been found by experience that higher the academic standard, easier it is to produce the material exactly. That is most omissions occur during the first year.

The pattern shifts quickly, and in no time at all, omissions are rare, substitations are imfrequent, modifications continues to be desirable; but of the greatest

impertance is the fact that more and more duplicate experience are possible.

The visually impaired children could be divided into two main types.

Those for whom braille or recorded study materials must be the medium of learning.

Children with low vision who can read porint with magnification in good and defused lighting.

By and large, in both cases no significant modification is required in the curricular content. However, many boards of secondary education in India have exempted visually impaired children from appearing in maths and science in the 10th and 12th class Examinations. They are allowed to take music or an additional at language. Therefore, many schools teach science and maths to children from 6th to 8th class but discontinue the subjects from 9th class onwards. This is not absolutely necessary in the light of modern equipments now available. It is possible for a visually impaired child to take 10th or 12th class examination with maths and science. Over the years changes may come.

Particularly in West Bengal Board of Secondary Education does not allow entire exemption of any subject, to the visually impaired students appearing at the final examination. Only alternative questions of equal marks are set against a few questions in the subjects like Mathematics—The construction protion and in Geography & Life Science against the pictorial portion alternative questions are set other wise all papers & questions are like the normal students. In all standards from 1st to 10th no change in there.

Special equipments are needed for teaching Braille, Mathematics, Science and expanded core curriculum subject. Embossed maps are necessary for teaching social studies.

It may be necessary for a teacher to adapt his/her teaching stategies to suit the needs particularly of visually impaired children. The following points should be borne in mind.

(i) Show models instead of illustration.

(ii) Orally spellout, whatever you write on the black-board.

(iii) Assignment should be taken either in Braille or on any andio system. In case of non-feasibility of the both, oral examination is necessary.

(iv) Orient the child fully to his classroom and the shcool building. Do this bit by bit so that an accurate image is formed in the child's mind.

(v) It will be preferable to adopt what is sometimes called the buddy system. This means association of one other peers who will take the responsibilities of giving the visually impaired child lecture notes, taking him out when necessary, playing with him/her in suitable hour.

(vi) Envourage the child to be as mobile as possible within the school campus.

(vii) Let him/her use in the classroom, all the equipments he/she needs for doing all the subjects taught in the shcool.

(viii) Given the right environment, equipments and encouragement, the blind child should be expected to perform well as the rest of the students.

(ix) Blindness should not be treated as an excuse for post performance.

(x) Encourge all the students in the class to intreact freely and without inhibition to the blind child.

(xi) Enforce the same discipline to the visually impaired child as it applies to other children. There should be no positive discrimination in matters of disciplines with visually impaired children.

(xii) Low vision children usually do not require special methods except giving them more time for doumg assignments . It they have mobility problem, some visual orientation may by given.

4.4.6. Expanded core curriculum/plus curriculum :

The expanded core curriculum commonly known as plus curruculum is not 'extra' for visually impaired children best 'compensatory'. These are the basic skills on which the general curriculum skills are developed. These skills are skills peculiar to blindness, which a sighted person does not need. Experiences have shown that the strength in, the 'expended core curriculum' or 'plus curriculum' always faclitates better learning of the general curriculum. The special areas are as follow :

4.4.7 Special areas

(a) Braille

Braille Louis Braille himself blind, introduced the Brallie System for the educational purpose of visually impaired, persons. Braille is a tactical approach to reading and writing for the visually impaired, in which the letters are formed by a combination of raised dots in a cell. The cell consists of six dots which can be arragnged in 63 combinations or characters. The finger tips possess sensitive nerve endings which make touch reading possible. The area covered by light pressure of the finger tips on paper gives the necessary information to the child to discriminate between different configuration of braiile letters, written within the braille cell, which is approximately 6mm vertically and 3.6 horizontally. The braille system is classified as Grade I, Grade II and Grade III levels.

In Grade I, each letter of the braiile word is specified. Grade I bariile is sufficient for those who do not read braille for extensive reading. It is sufficient for lower primary school children and adult blind people of rehabilitation. Programmes when they try to learn braille for the first time.

Grade II respresents the contracted form of the Grade I braille characters, prefixes, suffiexes, pronouns, conjanctions are denoted by contractions. Grade II braille is needed for the child to proceed to higher education. Mastery over Grade II braille helps the learner to read more Braille books in less time. Braille is based on phonetic scripts and, therefore, Indian languages and all world languages are easily written and read in braille.

Grade III braille system is not followed by many visually impaired people because of its complexity. It is the complicated form of the Grade II Braille and presented more or less in a form of a "short hand system"/stenography. A few visually impaired people who take note and record the proceedings of meetings learn Grade III braille.

● **Braille Reading :** Braille learning requires some pre-requisite skills called 'Braille mechanism', which means the efficient flow of hands over the braille lines with proper hand and finger position together on the dots from left to right. When the right hand reaches the end of the line, the left hand should, retrace the line which was just read, and identify the begining of the next line. To develop this braille

mechanism, certain tactual discrimination activities should be undertaken as these activites have great importance for developing the sensitiveness of the finger tips. Tactile tolerance needs to be diveloped among visually impaired children for effective Braille reading. Learners having no good braille mechanism just "butterfly" over the braille sheet. Scrubbing hampers the speed of Braille reading. Braille reading should come first and Braille writing next.

● **Brailled Writings :** Braille state and stylus are commonly used by learners in developing countries for writing purposes while writngs, the child has to punch the dots from the right to the left of the slate. Braille writing frame is used placing the paper in between the two parts of the frame (Guide). After this, thc child has to reverse the paper and read it from left to right. In order to write Braille effectively, the child should possess skills such as (i) Flexibility of fingers, (ii) Fine motor co-ordination and control of muscles, and (iii) Competency to read familiar Braille codes. Writing in Braille slate and stylus needs enormous muscles control, and thus may be introduced during the second year of a child's schooling.

To develop speed in writing, the lefthand should always identifiy the braille cell while the right hand punches the letter in the previous cell. The stylus and the left hand should be placed on consecutive cells. By this the lefthand assists the right hand which holds the stylus to identify the correct of in the braille cell. While writing, the stylus should be held vertically. Tilting the stylus may make holes on the braille paper, which spoils neatness in braille writing work. Braille typing with the use of Brailles can be used with learners of higher classes.

Sophisticated electronic equipment such as talking machines, audio materials and optacons make the reading acitivity of the child easier. However, presently this advanced technology is available only in developed countries. Whatever the innovations, Braille continues to be the primary mode of communication for visually impaired learners.

4.4.7.1 Orientation And Mobility :

(b) Independence in travel breaks the sedentary condition caused by blindness. Two important skills are necessary to attain such an independence-one being the knowledge of the environment and the other, moving from one place to another in the environment in realtion to oneself.

The skills that are related to the use of the remaining senses of the sightless person to establish one's position in and relationships to, significant objects in the enviroment are widely classified as orientation skills. In the environment the abilities of the individual to move from one place to another are classified as mobility skills. By nature both skills are interlinked. A sightless learner with excellent orientation skills and graceful mobility skills is said to have attained physical independence and such learners are easily accptable by the sighted community.

'Orientiation and Mobility' is a typical area in the development of the sightless student in which the client needs absolutely individualised instruction and practical assistance mobility is not a subject for discussion with the sightless persons, it must compulsorily be practised by them. This area warrants individual, one-to-one attention because the onset of blindness in individuals leaves them sometimes with no visualisation of the world. Approach wise, there are differences between a bornblind (congenital) and adventiously-blind (acquired) person. The later-age blind may have acquired some concepts about the objects of this world; for one born-blind, everything needs to be started from scratch. Therefore, the techniques of the orientation and mobility, briefly "O & M" are the some but the approches are different for the visually impaired individuals.

● **Sensory Training & Mobility :**

The good and efficient training in the use of the remaining sense enables the sightless individual for independent travel. The loss of sight is compensated by the sense of touch & hearing. Sensory stimuli enable a sightless persons to determine his position or direction. Such sensory stimuli are classified as "clues". Hearing plays a dominant role in mobility. The important areas required for sensory training may be branched off as follows.

(i) **Sense of Hearing :** Sense of Hearing is essential as we rely on the auditory information of the world consciousty or unconsciously. The sight less student has to depend on this sensory training to a great extent. It overcomes the difficulties of the student suffering from lack of visual perception.

(ii) **Sense of Touch :** Exploration of an object is worth a thousand words used in explanation. Objects, perceived through touch, determine the defininess of the objects and help the individual to form a neat conception of them. More

than mobility, the sense of touch has a lot to do with the reading of the sightless student. It has its limitations as large objects lie beyond tactile exploration. "Wholeness" can be perceived by the child only when the object is within the reach of the non-seeing child's hands.

(iii) **Sense of Smell :** A good nose voluntarily effects the information of the objects which can be smelt. These are sensible clues for a traveller during his/her travel, the smell of a gutter, the smell of smoke in a chemical industroy smell of flowes in a garden or smell of a kitchen, are sources of information for him/her to locate where he/she development of this skill speaks well of the chemistry laboratory of the child's school experience. This also helps in the day-to-day life of the individual. If the student has an "educated nose" his surroundings can trasmit enormuos information to him/her.

(iv) **Sense of Taste :** Of course, this sense has less utility in the mobility of the child, as it does not ralay any details form the outside world. Unless the sense is provoked, sensing is not spontaneous. This skill helps the sightless person to associate the names of the substances with the sensed taste. For example, sweet, sour and hot should be associated with the substances which provide such experiences. For a sighted person, seeing such objects is a stimulus. The conditioning by observation is natural for a sighted person, best for the sightless, it is a vital experience.

(v) **Sense of Kinesthesis :** The feeling of the body is responding to external stimuli, otherwise the kinesthetic sense, enables the child to get certain information like cold, heat, breeze and elevation of surface. Mobility is guided by his/her efficient kinesthetic sense.

It is a musunderstanding to suppose that the loss of sight leads to extraordinary abilities in the other senses. A child who has acquaired the necessary sensory skills, orientation to environment becomes easier and this leads the child to a greater level of confidence in mobility.

● **Types of Mobility Techniques :**

The major techniques which are widely accpted are the sighted guide techniques, guide dog techniques and the long cane techniques. All the sysems have

their own advantages and limitations. It must be left to the discretion of the individual to select the particular system that suits his/her need and temparament.

(i) **Sighted Guide Techniques :** It is the skill of traveller with a sighted comparion. It is learning for both the sighted and the sightless persons.

(ii) **Guide Dog :** It is popular is Europe and America. The system could not stand the test in developing countries for many reasons. It involves an enormous cost.

(iii) **Long Cane Technique :** The system in widely accepted by many countries recent years for independent travelling of the sightless. It is acceptepted for many reasons—it is in expensive; it is handy; the length can be adjusted according to the height of the person in collapsable canes; the techniques are simple; the techniques learnt in a know environemt can be aplied in an unknown environemt and so on. Despite the advantages, some sightless are reluctant to use the cane as device for mobility because of the feeling it confirms that the person is sightless. But people who have realised the richness of the cane techniques advocate the long cane for their sightless fellows.

(iv) **Safety Techniques :** Safety techniques are neessary for sightless persons to protect body is a restriected environment and outdoors.

A sightless person is said to have mastered the Orientation and Mobility Training when he/she feels safe in moring from one place to another, when he/she feels secured in the environment and moves gracefully. Safety, security and gracefulness are the three main outcomes expected on mobility training.

4.4.7.2 Daily Living Skills :

(c) Education of sightless children has undergone periodical changes. Many new methods are being developed in educating sightless children. They trained to be independent so that they may be accepted by the society. As a medium of communication, the invention of Braille has made a big break through. This enables visually impaired children to overcome to a great extent the losses of written communication. Similarly the invention of Orientation & Mobility skills, using the devices like long cane and other mobility aids, helps sightless people to more freely

from place to place without much dependence on others. This independence is slowly changing the attitude of the society towards sightless people because they perform many activities like sighted people.

Daily living skills are helping then to socialise effectively in the community. Due to the less of sight, visually imparied people have the disadvantage of not getting the visual feed-back, which in turn, retards the child from possessing the skills normally acquired by imitation. Therefore, it becomes vital to teach the daily living activities to the child who is visually imparied. Daily living skills together with the orentations and mobility can make the child readily accepted by the seeing world.

● **What is Daily Living Skills ?**

Daily living skills are those abilities that enabled the disabled child to carry out his/her day-to-day acitivities without assistance or mininum assistance. Development of these skills insitells confidence in the child to enter the mainstream of normal children.

Loss of sight at times retords the daily living skills of the child. Lack of opportunity and environment are the reasons for the development lag in sighless children. The goal of education set forth for sightless children should not be too general, for this may fail to give any measure of how the student can achieve a goal and under what circumstances. It is necessary to prepare a list of individual task, ranging from the use of the hands to the preparation of a complete meal. This, in itselt, however, is not sufficient. There is need to develop a cirterion to judge the success of the student's performance in each standard.

● **Training Strategies :**

Where, when and how to teach daily living skills to the usually impaired children need to be specified in clear behavioual terms before taking up education for such a task. In designing a daily living skills development programme, one should have the following objectives.

(i) Observation of the daily living skills exhibited by sighted children at various grade levels.

(ii) Diagnosing the diffculties faced by sightless children in acquiring the skills

possessed by sighted children in a natural manner.

(iii) After the necessary diagnosis, pre-requisite skills must be difined for sightless children that will lead them to perform daily living skills in a better way.

(iv) Even though daily living skills are defined in a general context, they must be classified according to grade levels and, if possible, age leves.

(v) For each skill, a methodology must be developed. Methodology should primarily mention the teacher approach to a specific task.

(vi) Some daily living skills may warrant certain aids for learning. Such aids and appliances should be made available for teaching those specific skills.

(vii) Teaching skills should not stop with training. The teacher should design his/her own criteria for evaluating the acquisition of the required skills by the visually impaired child.

(viii) The abilities developed through the training are sustained when there is a continuous follow-up. The teahcer plan should also suggest the various sources, either direct or indirect that can provided follow-up services after the nceessary skill-development training. The evaluation should be on an individual basis.

● **Areas of Interest in Daily Living :**

The efficient use of daily living skills depends upon the ability in sensory training, as well as the mobility training of the child. For example, in the task of going to the market and buying vegetables, the skill of going to the marked is mobility, whereas the skill of purchasing, choosing. The right vegetables, getting change and speaking to people, constitute the daily living skills. Hence, the art of daily living and mobility teaching should go together. The main areas of interest in daily living activities may be classified as follows.

(i) Techniques to be used at meal time.

(ii) Shopping Techniquies.

(iii) Care and maintenance of clothing and personal belongings.

(iv) Maintenance of personal recrods.

(v) Systematisation of daily routine.

(vi) Money identification and money management.

(vii) Use of Telephone and other devices.

(viii) Development of tactile, kinesthetie and olfactory abilities.

(ix) Skills in using electrical appliances.

There is a feeling that deficit in the daily living techniques is one of the most continually humiliating and frustrating of all the shortcomings imposed by blindness. Times are changing. There are now better opportunities for visually imparied children to erase this feeling by demonstrating there skills. Inclusive/Integrated education programmes and the introduction of new methods of teaching in residential programmes are importent signs of development in this vital area. It is the duty of every person working for the education of the visually imparied to provide them ample opportunity. Then they can show their potentiality; they can overcome the embarrassment caused by this limitaion; they can rejuvenate themselves to self-sufficiency and responsibility. It is the art of daily living that works wonders.

4.4.8. Co-curricular Activities in Brief :

Recreational & physical activities are the personality buildings and should not be left out from curriculum. Intellectual activities like singing, playing instrument composing poems, eloquence etc. Physical activities like games & sports, skimming etc. intellectual-cum-physical activities like dance, etc are very essential for the sightless children.

4.4.9. Difficulties To Cope With :

One of the main difficulties in this area is the slow pace of the performance of the visually impaired children. It is true that the sighted and the sightless could take part in some activities with little modifications. As sighted children tend to opt for "fast activities", they may be reluctant to join with the visually impaired child, not because of blindness but owing to the slow pace of performance of the sightless. Therefore, the approach in this context should be purely on an individual basis. This adjustment is necessary in the Inclusice/Integrated education programmes for visually impaired children.

On no account, should the curriculum in the inclusive/integrated education programme be changed only for the sightless child. On the other hand, it is not advisable and feasible as the inclusive/integrated programme is a part of the 'General' school which has a common curriculum. Therefore, it is suggested that we provide modified and special approaches, so as to reach the 'near normal' experimence at per with sighted children. This should be the main objective of the currimulum approaches in inclusive/integrated education programmes.

A rich curriculum approach depends upon the nature of instructions expected by the sightless child, type of materials used by the child, the method of teaching followed by the regular teacher and the nature of remediasl and resource instructions organised by resource teachers/special educators. A thorough understanding of these aspects facilitates understanding of a better approach in adapting the curriculum content of sightless children in the inclusive/integrated eudcation programme. Experience makes it clear that visually impaired children in fact gain more than they lose through this special approach. The understanding between the resource theacher/ special educator and regular teachers makes the curricular appracch more effective. It constantly improves and there is no saturation point.

4.4.10. Let us Sum up :

Curriculum meant for sighted children should be followed in the education for the sightless children without major omissions. Research studies (Jangira, 1986; Mani, 1982) indicate that 80-85 percent of the general curriculum could be duplicated for visually disabled children. The rest can also be provided through modified and substituted experiences. Omissinons are rare and it is for less especially at the higher grades when the students learn more of content.

Expanded core curriculum/plus curriculum, therefore, is a foundation for development in general curricular areas and teaching of these skills should be an integral part of the educations of visually disablled children.

4.4.11 ‘‘Check Your Progress’’

Give four examples of content for visually impaired children in the integrated/ inclusive set up one each.

1. **Duplication :**
2. **Modification :**
3. **Substitution :**
4. **Omission :**

4.4.12 Check Yourself

Tick (✓) the alternative which you consider to be the best choice.

1. Curriculum means the—
   (a) content taught in the classroom
   (b) experience acquired at home
   (c) totality of experiences of the child in his/her day-to-day life
   (d) all content and experience deliberately planned for educational purposes.
2. Modern curriculum covers—
   (a) the individual life experiences
   (b) the family life experiences
   (c) indivicual and group life experiences
   (d) none of the above
3. Provision of opportunity—
   (a) ensures provision of experiences for visually impaired children
   (b) does not ensure provision of experiences for sightless children
   (c) is the same as experience
   (d) mentions the needs of visually imparied children
4. Visually impaired children—
   (a) learn in pieces
   (b) learn the content as a whole
   (c) learn like sighted children

(d) none of the above

5. The learning of visually impaired children is treated as—

   (a) natural learning

   (b) mediated learning

   (c) unnatural learning

   (d) isolated learning.

6. Reduction in the range and variety of experiences—

   (a) is a subjective effect of blindness

   (b) is impersonal loss for visually impaired children

   (c) is an objective effect of blindness

   (d) reduction in experience provided to children

7. Sightless children in inclusive/integrated education programmes need—

   (a) the same curriculum meant for sighted children

   (b) the curriculum for special shools

   (c) the same curriculum meant for sighted children with various approches

   (d) a different curriculum

8. More duplicated experiences may be provided for the visually impaired child at—

   (a) the primary level

   (b) the secondary level

   (c) the pre-school level

   (d) the college level

9. The skills peculiar to blindness are known as—

   (a) plus/expanded core curriculum

   (b) extra curriculum

   (c) co-curriculum

(d) core curriculum

10. Visually impaired children can participate more effectively with sighted children in—

(a) physical activities

(b) intelltual activities

(c) social activities

(d) recreational activities

11. Grade II braille represents a contracted form of—

(a) prefixes, suffiexes, pronouns

(b) sentences

(c) words

(d) capital letters

12. Univesally accpeted technique of good braille reading is—

(a) using the right hand forefinger

(b) using the left hand forefinger

(c) using both the forefingers

(d) using all fingers

13. The teacher should always compel the students to follow the correct techniques—

(a) yes, it should be

(b) no, it need not be so

(c) teaching should be through correct techniques, but the student may be inclined to go his own way. Therfore, the teacher should not compel him/her.

(d) it should left to students.

14. Braille reading is—

(a) as fast as print reading

(b) a little slower than print reading

(c) same as print reading

(d) none of the above

15. Braille writing on a slate is done—

(a) from right to left

(b) from left to right

(c) anywhere in the braille cell

(d) in the cell horizontally

16. Reading braille and writing can go together simultaneously—

(a) yes

(b) no

(c) braille writing should come after braille reading

(d) braille writing and braille reading have no relationship

17. The abilities of the individual to move from one place to another are known as—

(a) orientation skills

(b) plus curriculum skills

(c) mobility skills

(d) walking skills

18. Teaching of mobility skills should be the same for all visually impaired children—

(a) yess it should be the shame for all

(b) no, it depends upon the onset of blindness

(c) no, it depends upon the daily living skills

(d) it depends on the capbility of the teacher

19. Orientation skills are greatly influenced by—

(a) the sense of taste

(b) the senses of thouc and hearing

(c) the sense of smell

(d) the vision

20. Widely used mobility techniques in developing countries are—

(a) sighted guide techniques

(b) guide dogs

(c) electronic aids

(d) long cane techniques

21. Guide dog techniques cannot serve the purpose of developing countries owing to the—

(a) inadequacy of training methodology

(b) enormous cost of the system

(c) prejudice among visually impaired people

(d) shortage of dogs

22. At the primary shools, The visually impaired child should—

(a) not be taught O & M skills

(b) be taught the long cane techniques

(c) be taught the pre-cane mobility skills

(d) be taught guide dog techniques

23. In an inclusive setting the sightly child can be oriented to the school environment in a better way by—

(a) the sighted peer group

(b) the regular teacher

(c) the special educators

(d) the parents

24. Daily living skills are—

(a) expanded core curriculum skills

(b) extra-curriculum skills

(c) skills for performing day-to-day activities

(d) skills for maintaining good health

25. Skills required for the readiness of the child to learn day-to-day survival skills are—

(a) daily living skills

(b) pre requisite skills

(c) academic skills

(d) curriculum skills

26. For teaching all daily living activities—

(a) a common methodology should be followed

(b) methodology should be based on the nature of activity

(c) methodology is not necessary

(d) none of the above

27. Daily living skills should be taught according to—

(a) age levels

(b) grade levels

(c) ability level

(d) living background

28. Aids are necessary for teaching—

(a) all daily living skills

(b) certain daily living skills

(c) academic and not daily living skills

(d) none of the above

29. Learning of daily living skills by an individual—

(a) continues even after the schooling

(b) continues till the end of the school year

(c) takes place at different time intervals

(d) takes place in pre-school years

30. Listening to music is—

(a) an academic skill

(b) an auditory skill

(c) daily living skill

(d) none of the above.

Answer Key :

(1) (d),	(2) (c),	(3) (a),	(4) (a),	(5) (b),
(6) (c),	(7) (c),	(8) (b),	(9) (a),	(10) (b),
(11) (a),	(12) (c),	(13) (c),	(14) (b),	(15) (a),
(16) (c),	(17) (c),	(18) (b),	(19) (b),	(20) (d),
(21) (b),	(22) (c),	(23) (a),	(24) (a),	(25) (b),
(26) (b),	(27) (c),	(28) (b),	(29) (a),	(30) (c).

4.4.13 References :

See Pages 67 & 68.

Unit-4.5 ◘ Commonly Used Low Cost and Advanced Assistive Devices

Sturcture :

4.5.1. Introduction

4.5.2. Objectives

4.5.3. Importance of Technology

4.5.4. Available Technology

4.5.4.1 Traditional Low-Tech

A. Linguistical

B. Computalional

C. Geography

D. Science

E. Mobility

F. Recreational, Games & Sports

G. Other–Daily Living Devices Personal Devices etc.

4.5.4.2. Low vision Devices

4.5.4.3 Modern High-Tech

4.4.5 Let us Sum up

4.5.6 ''Check Your Progress''

4.5.7 Check Yourself

4.5.8 References

4.5.1 Introduction :

Over the years, it has been considered that the only occupation a blind person can pursue is related to playing musical instruments and singing. It is widely still believed that auditory faculties are more developed in the blind. As schools for the

blind were set up in various parts of the country during the late 18th century, the doors to higher education opened. While some studied law and became successful lawyers and sloicitors, other opted to enter the teaching profession some pursued careers in Railway & Bank sectors, in social work and others setteled to work as telephone operators etc. In recent years, however, blind persons have ventured to take up opulent managment studies. They have embrased technology and as a result, have positional themselves into very competitive front.

Advancement, in technology has brought in revolutionary changes in the quality of life and patterns of work and leisure. Assistive devices have helped the visually impaired to achieve better levels of independence through more access to information. The technology available is (i) traditional-low-tech, (ii) modern-high tech, and (iii) low-vision. However, useres have to depend on imports for high-tech devices. Technology has tremendous potentialities for facilitating economic rehabilitation of the visually impaired and thee is a need to improvise technology in the absence of universal designs. The government of India has taken initiatives to promot technology and assist the disabled to purchase such devices however, there are still a fiew bottlenecks. New areas of technological development have to be explosed. So that the objective of equal opportunities for the visually impaired is achieved.

4.5.2. Objectives :

After reading this sub-unit the student-teachers will be able to :

(i) Understand what assistive devices are to be used for the visually impaird learners;

(ii) Gain a general understanding of assistive devices available in the country for the visually impaired learners.

(iii) Gather knowledge when and where to use particular type of assisitve device.

(iv) Have clear idea of using assistive devices in different educational pleacement of the visually impaired learners;

(v) Acquire readiness for use of assistive devices before its handling is practical;

(vi) Know how to make teaching-learning-materials (TLM)

(vii) Estimate the contribution of modern technology to make assistive devices visually imparied friendly.

4.5.3 The Importance of Technology :

The twentieth century has witnessed phenomenal advancements in technology in almost every sphere. Those developments have brought in revolutionary changes in the quality of lives of human beings. Today, even a common man is utilising specialised equipment to his/her advantage in activities of daily living and productivity. No doubt, technology has influcened our patterens of work and leisure.

Technology has played a very important role in mitigating the limitiations imposed by a disability. The use of assistive devices has helped persons with visual impairment to achieve new levels of independence and facilitate their rehabilition print continued as a barrier to access to information until recently, however, modern technology has paved the way for using Internet with audio. Braille and large-character displays resulting in improved independence access to a large amoent of printed information. Technology advances have prouded numerous new devices also challenges to the visualy impaired.

Technology encompasses a broad spectrum of assistive devices. Quite a number of these devices both low-tech and high-tech are now available and used side by side by the visually impaired all over the world.

4.5.4.1 Tradition—Low-Tech Devices :

In India most of the visually impaired continue to use traditional and low-tech devices for linguistecal, computational, recreational, mobility and activities of daily living purposes. Most of these devices are low priced also.

A. LINGUSTICAL :

- **Braille Writing Devices :**

[i] **Inter-Line Writing Frame :**

It is used for writing interline standard Braille characters. The frame comprises a wooden baord/plank, with holes on either sides, a metal/plastic frame called guide, a reversible paper clamp and a stylus. The guide is fitted in these holes and brought gliding down as writing progresses. The metal/plastic foot-scale like guide has two flop joined with a hing. Each cell in the top flap of the guide has

six notches representing six dots. The bottom flop of the guide has fine pot-hole craters cell-wise which helps to emboss raised dots on the paper with punch of the pin of the stylus. The guide has two lines of Braille cells. The clamp is fitted at the top of the board/plank with pins to hold the paper in position. The clamp has a small swivel stud for locking and holding braille papers. When one side of the paper has been brailled, the clamp with the paper still held, is turned over, as a until the binding margine is made automatically. The paper holding clamp is of two types––in one type two-fold clamp is fixed on the plank and can be opened when needed; in other type the clamp holding with the paper can be reversed. Writing progresses from right to left. The brailled paper to be read requires to be reversed and reading progresses from left to right. This is the simplest and low cost appliance for Braille writing.

[ii] **Interpoint Writing Frame :**

Plastic made frame has two flaps joined with a hing, and is opened like book opening. The top flap has braille cells with thorough cell notched holes. The bottom flap has only cell-wise very fine pot-holls craters. The paper is set in between the two flaps and paper holding corner pins locks the paper with a little snap. Writing needs punch by the stylus. Writing and reading method is same as like inter-line frame. Only differences between Inter-line and Inter-point are : (i) Wooden and Plastic; (ii) no need of gliding the guide in the Inter-point frame; (iii) cell in the Inter-point is smaller, (iv) In the Inter-point frame no writing on the reverse is possible; (v) the Inter-point frame is light in weight and easily portable. The Inter-point is convenient for the students from standard-III.

[iii] Taylor Post-Card Frame :

It is used for writing small braille characters on one side of the paper. The corner pins are arranged in such a way braille can be read without removing the paper from the frame; when the top section is lifted, the paper remains attached to it.

[iv] **Pocket Braille Frame :**

The four-line pocket braille frame produces small braille characters on one side of the paper. This is specially used for making small and occasional notes.

[v] **Stylii / stylus :**

Braille writing in the above explained frames is not possible without a sytlus. For punching to produce Braille characters this is the sole device and hence is indispensible. These are produced with plastic or aluminium or wood handles of various shapes like ball-head, bull-head, concave head etc. to suit individual needs. The pins of all stylii are made of stainless steel and the handles are of ploished hard wood or synthetic material. These are normal low-cost stylus. But it runs a little risk as the pin remains open.

[vi] **Safety Stylus :**

Aluminuin body, the handle is caved, the pin is fitted with a screw. While writing the pin-side is taken out unscrewing from the handle. Screw side of the pin in set tightly in the handle hole. After use the pin is set again in the handle hole.

[vii] **Braille Kit :**

It is rexine coated or a decorative wood box 36 cms × 28.5 cms. with a weight of 3085 Gms and contains the itmes like—■ Braille Frame; ■ Braille Writing Pocket Frame; ■ Two Stylii ■ Taylor Mathematical Board with Arithmetic Types; ■ Abacus; Rubber Sheet; ■ Spur Wheel; ■ Foot Ruler; ■ Measuring Tape; ■ Compass Set; ■ Some Braille Papers; ■ Circket Ball; ■ Some Play-way Braille Utter Composing Apparatns; ■ Folding Mobility Stick (cane); ■ Signature Guide. The itness may very sometimes.

[viii] **Braille Writer :**

It is a top-side writing machine for writing on one side of the paper, enabling to read as it is written. This machine can be compared to a normal type, writer with a major difference that it has only nine keys, three for paper setting and six for embossing and one spacer.

The brailler embosses combinations of six dots in a braille cell.

The Brailler is made of metal with an enamel finish, with plastic key-tops and adjustable margin stops. The paper is roller-fed and line spacing is achieved by pressing a special key. The most popular Braille wirters are :

■ Perkins Braille; ■ Stensby Braille writer; ■ Taj Brailler;

■ Worth trust Perkins Brailler; ■ Minal Brailler.

[ix] **Braille Paper :**

To write braille in all the above mentioned apparatus the must item is thick braille paper, the standard size of Braille paper is 22"×28" and weight of each gross is 8.6kg.

Manufacturers :

■ Titagarh Paper Mills Ltd; ■ Andhra Pradesh Paper Mills Ltd; ■ West-Coast Paper Mills Ltd; ■ Rohtas Paper Mills Ltd; ■ Orient Paper Mills Ltd.

[x] **Braille Duplicators (Braille Copier) :**

(a) Thermoform Machine :

It is semi-automatic braille duplicating machine. It is useful for taking out multiple copies of the braille matter on the 'Braillon' sheets from the master copy generally prepared on the braille paper. These brailler sheets are plastic made. This machine operates on the principle of vacuum and high temperature. It is power operated Foreign made is 'American Thermoform' and indigenous is 'Induthrem'.

(b) Vacuum Forming Machine :

It is available in standard sizes. It is used for taking out multiple copies of braille matter using PVC, HIP, Acrylic & ABS sheets with 2mm thickness.

[xi] **Braille Box :**

It is a play-way learning Braille device for the 1st year learners. Wooden finish the smallest size of the is 5"×10"×2". Braille cells with holes are set in the box. Thin round headed aluminium pegs are used to compose braille charaters—letters, words.

It is available in larger sizes.

[xii] **Study Material Listening Appliances : Talking Book.**

The material recorded on cassettes has emerged to be the most popular mode of imparting education to visually impaired persons. As Braille books are very heavy, damaged prone, require high cost in production, storing difficulties and many newly blind persons are unable to learn braille easily and many of them don't like reading braille talking books are gradually becoming to be the best viable alternative. In the present day for listening recoded study maerials visually impaired personss use mostly C.D. Player or I. Pod.

B. COMPUTATIONAL / MATHEMATICAL APPLIANCES :

[i] Taylor Frame :

The surface of this frame is an aluminium or a palstic sheet with star shaped holes in straight rows. The holes are octagonal having eight angles. The lead pegs knwon as types are double-ended having a line on one side and two dots on the other. The pegs move in the holes clock-wise starting from position 6 of the clock. The rotating of these pegs with line side in the hole in different angle position denotes the digits starting from 1 to 8. Then the type is set up-ward down i.e. doted side with rotating will donote 9, 0, +, –, ×, ÷, ., =, signs. This frame is suitable for teaching arithmetic to visually impaired learners specifically in lower classes. There are Algebric types also for doing Algebra from standard-VI.

[ii] Abacus :

A simple instrument for performing rapid arithmetical calculations. Abacus is an oblong frame having 13 to 15 vertically arranged rods called column on which beads slide up and down-Each column is separated by a bar technically known as centre bar. The beam supporting the beads is marked with a raised bar between every third rod. The bars serve to indicate the decimal point and other units of decimal measure.

The abacus is to be held straight. The bottom portion of the centre bar contains 4 beads in each column and the upper portion of the centre bar contains one bead in each column. It is to be held in such a way that the 4 beads below the centre bar are at the bottom and the single bead above the centre bar is at the top.

Each bead in the lower portion of the abacus denotes 1 unit and the bead above the centre bar denotes 5. Each column denotes the position of the number it represents. the extreme right column is the units column, the 2nd column from the right is the tens column, from the right 3rd is the hundred column, the 4th column from the right is the thousand column and soon and so forth.

[iii] Counting Device :

Wooden Board with holes. Aluminium round-headed pegs are set in the holes. It helps to learn counting and to develop pre-requisite skill of Taylor Frame by setting. The pegs in straight line and to place the pegs in the holes properly and swiftly. It is for use of the 1st learners.

[iv] **Geo Board :**

Wooden Board with fixed pegs. Geometrical shapes are made and practiced with rubber bands. It is for use in upper classes.

[v] **Talking Calculator :**

Audible calculator in synthesized speech useful for calculation, clock, alrm and calendar. Manufactured by casio and sharp companies, Japan.

[vi] **Primary Mathematics Kit :**

Specially designed kit for the visually handicapped children to comprehend mathematics concepts. It contains ■ a plastic box; ■ slide strips, ■ number boards; ■ fractional strips; ■ braille clock; ■ geometrical shapes—geomatrical figure tray; ■ magnetic board; ■ geometrical devices.

[vii] **Spur Wheel :**

A serrated revolving wheel in a plated metal handle. It is used for making continuous embossed lines on the reverse side of the paper.

[viii] **Compass Set :**

It includes a foot ruler, a protractor and a set square in nylon and a spur wheel. It enables visually impaired students to use the same techniques as his sighted counter part. the foot ruler and set square have embosseed markings for their convenience. The compass has a removable component fitted with a toothed wheel for drawing embossed dotted lines on the reverse of the braille paper.

[ix] **Geometry Mat :**

A rubber sheet for use as a base in conjunction with the spur wheel and braille paper for making geometrical drawings.

[x] **Opisometor :** A bell rings each time the disc moves a distance of one meter. Useful for mapping and understanding mathematical problems in length and perimeter.

[xi] **Some Other Mathematical Devices :**

- Counting Stand/Device
- Graded Abacus

- Fraction Boards
- Hundreds, Tens, Units Board
- Geometric Shapes and Solids etc.

C. GEOGRAPHY DEVICES :

[i] **Sensory Quill :** It is an equipment for obtaining a raised line format of any writing or drawing. The height and texture of the line can be altered. Useful in learning hand writing skills, mathematics, science, drawings & spellings.

[ii] **Raised Relief Plastic Maps :** Vacuum formed plastic maps printed in strong colours with names in letter press for the benefit of person with low vision. The main towns are shown by large dots and principle rivers by depressions. Braille symbols denote the names of seas, main rivers and towns, a key to which is given in the guide. The boundaries on political maps are indicated by raised lines.

[iii] **Geographical Features Model :** Models of features of mountains, vallies, lands & rivers are there in vacuum plastic two diamenssion sheets & three dimenssions all in briht colour useful for both visually impaired and low vision person.

[iv] **Relief Globes :** A plastic globe in textured relief. The lans masses are shown in different colours. The principle towns are indicated by raised dots; rivers and lakes by depressions. Dotted lines indicate the tropics, arctic and antarctic circles, the international date-line and meridians. The names of oceans and the main land are shown in Braille.

Nystrom's Bathymetric world model is raised relief map of the world with oceans drained. All under-water features are exposed. A cassette recording explaning the features is supplied with the product.

[v] **Braille Diagram Board :** Metal sheet fixed on a board with closely formed holes in which round-headed pins are stuck to form maps and diagrams.

D. SCIENCE DEVICES :

[i] **Conductivity Apparauts :** Demonstrates the difference in the heat conductivity of copper and iron. It consists of a wooden stand with horizontal heating rods.

[ii] **Vacuum Printed Diagrams :** These diagrams are also available for various body systems, anatomy, physiology etc.

[iii] **Three Dimenssional Raised Relief Plastic Charts :** Rigid PVC sheet, printed and formed in multi-colours charts available—

(a) **Botany General :** It includes typical plant cell, plant meiosis, plant mitosis, Ribo-Nuleic Acid, Bacterial forms, spirogyra and Funaria-common moss in botany.

(b) **Botany Advance :** It depicts fertilization, T.S. dicot leaf, dicot stem, types of placentation.

(c) **Zoology : Vertebrate and Invertebrate :**

(d) **Human Physiology and Human Body Systems :** It includes human skeleton, circulation system, heart nervous system, a section of the brain, muscles, digestive system, the ear, the nose and the eye.

(e) **Human Reproduction :** It includes male and female reproduction organs, fertilization and foetus.

E. MOBILITY DEVICES :

(i) Canes : The types of canes available are as follows :

[a] **Symbol Canes :** Made of sections of light metal tubings, generally aluminium or its allyos, joined through the centre by means of an elastic cord. The canes fold up conveniently for carrying in the pocket or handbag. When matically fall into position.

Devised for portability and not intended to be used other than as a guide aid and an indication that the user is a visually impaired person. This cane is populaely known as a Brailled folding stick.

(b) **Guide Cane :** A stronger version of the symbol cane and intended to be more of a mobility and but not a means of support. The four sections, covered with ribbed plasitc sleeving, are joined through the center by means of an elastic cord enclosed in nylon sleeving. It is fitted with an elastic loop handle and a standard nylon tip.

(c) **Long Canes :** A wooden or aluminium stick of 85 to 90 centimeters. Three models are availabnles—■ rigied ■ two pieces and ■ four pieces.

The aluminium cane is generally sleeved with PVC material, having a rubber grip and a nylon tip with or without a crook. The nylon tip at the bottom touches the ground and generates very subtle sound to indicate difference of surface of the ground. the lower lastpart of each cane measuring is generally red, sometimes white. The cane day is observed in the name 'White Cane Day'.

[ii] **Electronic Travel Appliances :**

An ETA is described as a device that sends out signals to sense the environment within a certain range or distance, processes the information received and furnishes. The person with relevant information about the environment. Most of these devices are based on integrated circuits and emit sound or tactile signals.

As ETAs are not available and prevalent in India, it is not very necessary to give description of these devices. However for the sake of information, some names of these devices are noted here.

- Lind say Russesl E-model Path Sounder
- C5 Laser Cane
- Ultrasonic Torch
- Sonic Guide
- Light Probes
- Mowat Sonar Sensor
- Nottingham Obstacle Sensor
- Electro Cortical Prostheisi
- Electro Roftalm
- AF B's Computerzed Travel Aid.
- Polaroid Ultrasonic Travel Aid.

For details about ETAs, refer to NIVH publication "Selected Abstracts & Annotated Biography On Orientation and Mobility"

[iii] **Mobility Show Cord :** A plastic show card to help visually impaired persons to cross busy roads and to hail a taxi.

[iv] **Mini Beeper :** A battery operated, hand-held electronic gadget having application in mobility, recreation, sports and obstacle location.

F. RECREATION GAMES & SPORTS :

(a) Recreation :

[i] **Playing Cards :** Superior quality standard playing cards with reverse embossing in standard Braille on the top left corner.

[ii] **Chess :** A wooden board with the black squares raisud and all the squares drilled in the centre for the reception of the pegged chessman. Holes are provided at each end for pieces not in play. The pieces are of uniform height, the white having a point with pin at the top to distinguish them from the black.

[iii] **Dominoes :** Made of plastic and having raised black dots on a white back ground with black inset pieces on the reverse. These dominoes are ideal for palyers with low vision also.

[iv] **Brahma Puzzle :** The puzzle consists of three pegs on a wooden base and eight discs of different diameter each with a hole in the centre. The purpose is to transfer all the discs from the peg to another without allowing any disc to be placed over a smaller one.

[v] **Audible Ball :** Made of strong good quality plastic in which hole has been punched. Small metal ball bearings are inserted. The hole in sealed. These small balls are inserted for creating sound enabling the visually impaired children to locate the ball.

An ordinary good quality ball of plastic of 5 cms. radios can be converted into an audible ball by drilling a hole, putting smal size pebbles or ball-bearings and then sealing the hole using the soldering rod. The ball can be used for playing cricket.

[vi] **Draught Board :** A wooden board with sunken playing squares. The colours of the men are distinguished by size. Pieces of double thickness are used as kings.

A variety of other games as listed here under have also been adapted for the visually impaired.

■ Bezique maker; ■ Bridge scorer; ■ Lexicon; ■ Happy Family; ■ Whot; ■ Patience Board; ■ Chess Clock; ■ Jigsaw Puzzle; ■ Electronic Ball; ■ Bectle Game; ■ Centre-peg; ■ Scrabble; ■ Dice and Dice Cub; ■ Nine Men's Morris; ■ Tic-Tac-Toe; ■ Unilock Word Building Device; ■ Checkeres Set; ■ Rattle Bells.

Only chess, playing cards, Nine men'sn morris, Draught Board and checker set

and various puzzles are available in India. Other games are available from the Royal National Institute for the Blind, London.

(b) Games & Sports :

[i] **Football, Basket Ball and Soccer Ball :** These are equipped with a small electronic beeper which is battery powered and emits a compact sound. The beeper is held within a moulded cavity designed for easy access to 'on' & 'off' switch.

[ii] **Cricket :** It is becoming very popular in India. The standard rules have been drawn. It can be played using the audible ball as mentioned earlier.

[iii] **Stilt Walking :** The ordinary strong bamboo poles or wooden poles with foot rest at a height of 30 cms from the ground can be used for training the visually impaired in stilt walking.

[iv] **Swimming :** It is also emerging to be a popular sport among visually impaired persons. The normal swimming pool with sound indicators on the sides and lane ropes with thermocol pieces can be used for training them in swimming.

[v] **Atheletics :** The normal tracks with some precautions and safety measures can be used for training the visually in race, shotput, Javelin Throw, Sack-race, musical chair, hit the target etc. In the present time the visually impaired runs in conjunction with the sighted runner as guide/nevigator binding very loosely with a tether on their wrist. For one pair double track is used.

[vi] **Table Tennis :** It has become a popular in-door game for the visualy impaired in many south-east countries. The normal table tennis table with some modifications in the net and the sides can be used for the purpose.

G. OTHER DEVICES :

(a) Daily Living Devices :

[i] **Clocks & Watches :** A standard alarm clock is adapted for the use of the visually impaired. It has strengthened hands and an open plastic dial having the hour positions indicated by two raised dots at the 3, 6, 9, 12 positions and single dots at the remaining hours.

Manufacturer : HES Limited, Patel Estate

Jogeshwari (west), Mumbai-400102

[ii] **Travel Alarm Clock :** This adapted clock as mentioned above is fitted into a case. The whole clock is packed into the case when folded. When opened, the case also serves as a sland for the clock.

ALIMCO Alarm clock has time setting knops. The dial is encased in a transparent plastic cover which can be easily removed from the top for obtaining access to the clock dial. The raised dots are provided for indicating hours with two dots for 3, 6 & 9 position, 3 dots for twelve hour position and signal dots at the remaining hour positions.

[iii] **Pocket Watch :** A hunter watch, the hinged cover of which opens when the winding knob is depressed. Fitted with strengthened movements and dots as mentioned earlier.

[iv] **Ringer Timer :** A one-hour ringer, in streamlined plastic case for timing any operation when an audible reminder is required. Each five minute period is indicated on the embossed setting dial by two dots and the first quarter hour is additionally marked to show the individual minutes.

[v] **Wrist Watch :** It has the appearance of an ordianary wrist watchs with the front cover being fitted with a transparent centre. The front can be lifted with a lever mechanism when the winding knob is depressed. The general arrangement for dial marking is two dots on the 3, 6, 9 & 12 positions, and a single dot at the intervening hours, but for the 12 O'clock position two or three dots according to the particular watch.

Manufacturer : Hindustan Machine Tools Ltd...

Watch Marketing Division

26/1, Levell Road, Bangalore–560001

[vi] **Talking Time :** This is an electronic watch as well as alarm clock fitted with an electronic device which announces the time whenever the knob is pressed. It is possible to set time, date, day and alarm etc. All the settings are audible in signals, it is thus possible for a visually impaired persons to do the settings himself/ herself.

The most popular brands are sony and sharp. In India, Sikkim tme corporation limited (SITCO), Sikkim has introduced talking wrist watch. The SITCO has established marketing divisions in all the major towns in India.

(b) Personal Devices :

[i] **Sound Beacon :** This pocket size electronic device emits a sound which can be varied from a loud continuous whistle down to low intermittent beeps at various rates. It is generally used as a homing device.

[ii] **Notex :** It consists of a rectangular base and flaps made of high-density polythene hinged together. It differentiates Indian currency notes of different denominationes. It considers length and breadth of a currency note for its differentiation.

Available from : NAB Louis Braille Memorial Research Centre Mumbai.

[iii] **Magnets :** Round, square and u-shaped magnets for picking up pins, small nails and other iron or steel objects.

[iv] **Signature Guide :** A template to guide the visually impaired persons in placing signature in proper place.

[v] **Address Template :** Made of cardboard with four raised lines to guide a visually impaired person to write his/her address on Inland letters and envelopes.

[vi] **Light Probe :** Full function light detector may be adjusted for desired sensitivity to light.

[vii] **Location Finder :** Own house, apartment or office can easily be found out with protable, light weight location finder. A siren, attached outside location, will sound on pressing transmitter attached to a key chain.

[viii] **Other Personal Devices :** The Americal Foundation for The Blind and Maxi Devices are supplying a variety of personal devices for the visually impaired persons as noted here under. These are so far not available in India.

- Thermo voice : announces temperature
- Talking Blood Pressure & Pulse Monitoring Kit
- Becton Dickinson Magni Guide : for accepting barrille of insulin syringe
- Insulin Needle Guide
- Talking Blood Glucose Moniforing Kit
- Big Print Address Book.

- Talking Wallet
- Locklid Saucepan
- Weight Talker
- Key finder
- Clothing Identifiers
- Tactile Braille Signs
- Eye-Ease Eyedrop Guide
- Medicine Spoon

For the present we will set aside a long list of vocational training, Home Management, kitchen etc equipments modified and developed for use by the visually impaired persons.

4.5.4.2 Low Vision Devices :

There are two main types of Low Vision Devices :

Optical Devices which use lenses to magnify objects

Non-optical Devices and techniques which make objects easiler to use.

(a) **VTS Link :** It is a portable large print computer and work station, specially designed to meet diverse needs of the visually impaired. It provides people with low vision with the most comprehensive solution to computer access available today. It features a custom-made high contrast flat display screen which present a sharp clear image of character up to 75 mm.

(b) **Visualtek :** Closed circuit TV magnifying system magnifies upto 60 times the normal size with wide variation of light intensity and btoh positive and negative images.

(c) **Schmidt Reader :** It is also a close circuit TV and functions on the same principle as the visualtek.

(d) **Overhead Projector :** It is supplied with screen, stand, lamp and transparency sheets with magnification facilities.

(e) **Magnifying Lenses :** These lenses have many applications other than

reading; they make everthing bigger & brighter. Following models of magnifier lenses are available.

[i] **Mounted Magnifying Lens :** It has an extra large sized Fresnel lens as magnifier. It provides large visual field and leaves both hands free for manipulation of reading material or hand work. It is useful for quick scanning of large surfaces and objects.

[ii] **Flexible Arm Illuminated Magnifier :** It has a large sized precision glass lens and a circular tube light mounted around the lens. The lens-light assembly is mounted on a spring balanced stand with feather touch movements and a reach of 900 mm, allowing the lens to be placed in any position and freeing both hands of the observe for work. It is an ideal aid for inspection, quality work in electronics, instrumentation and precision engineering industries, gems and jewellery, geology and hospitals. (Lensel Product Catalogue)

[iii] **Magnifying Binoculars :** It is handy in close work, both hands free.

[iv] **Book Magnifier :** Having a large field it enables reading of printed material such as newspapers, paper back books, fine legal print etc. It magnifies one page at a time.

[v] **Illuminated Magnifier :** Provides magnification along with illumination of the object. A range of models, including battery opearted ones. Ideal for viewing maps, directorices, botanical and geographical. Specimens when ambient light is not adequate. Useful for close work.

[vi] **Paper Weight Magnifier :** It is a moulded plastic lens. Clear plastic allows light through to copy.

[vii] **Super Loupe :** It is handy 2x magnifying lens hangs from neck cord and rests against chest, leaving hands free to do hand work.

[viii] **Eye Loupe :** A favourite with watch makers and jewellery. Using precision acrylic lens the unit is very light and can be held comfortably in eye sockets. It is also available with adapter for use with spectacles. It can be put on and takes off easily.

[ix] **Head Loupe :** Mounted on a comfortable handband, it can be flipped up when not in use. As both eyes are used this magnifier provides 3D vision enabling fine manual coordination. The lenses have built in prisms that eliminate squinting

and eyestrain. It can be worn over spetacles also. It is best suited for any kind of detail work where both hands are required to be free to attend to his/her work.

[x] **Flashlight Magnifier :** Ivory light hood rests on printed material keeping focal distance steady.

[xi] **Fresner Wallet Magnifier :** Slim, extremely light weight and visiting card size, it fits easily into pocket or purse. A ready at hand magnifier for reading fine print in dictionaries, menu cards, instructions on medicine bottles etc.

[xii] **Pocket Magnifier :** A general purpose magnifier commonly used as an inspection tool and a reading aid. It is easy to hold and can be used to read a sign or a bus number.

[xiii] **Rayner Recumbent Spectacles :** It has a single prism mounted on a study block plastic frame which requires little adjustment.

[xiv] **Super scan Reading Glasses :** It can be worn over ordinary spectacles.

[xv] **Windsor Spherical Magnifiers :** It is a range of hand-held magnifiers avabilable in 50,76 and 102 mm lens diameter giving 3.0, 2.0, and 1.8 magnification.

[xvi] **Stand Magnifier :** Handy table top magnifier, ideal for magnifying printed matter, films, art works, maps etc. Rests on work susface and leaves both hands free. The stand has side opeings allowing illumination and easy accessibility of tools to the object being viewed. (Lensel Product Catalogue).

[xvii] **Hand-held Magnifier :** Commonly used general purpose magnifiers. There have precision lenses made of optic grade acrylic. The lenses are break-resistance and much lighter than equivalent glass lenses, hence more convenient to use.

Manufacture : Lensel Optics Pvt. Ltd.

66/2, D2, Mide Chinchwad

Pune–411019

4.5.4.3. Modern High-Tech Appliances :

The impact of mordern technology, which is volatile and ever-changing, is yet to be experienced by a majority of the visually impaired in India. At times the changes are so rapid. That is is really difficult to keep pace with them. High-tech

aids are now available–Though at a high cost, even exorbitant in certain cases. But these devices have significent impact on education and employment of the visually impaired.

[i] **Digital Tapelers Recorder :** Yeoksam-Dong, Kangnam-Ku, Seoul, Korea has developed Digital Tapeless Recorder (Check-back) for the blind. The blind people can use it alone without someone's help. It has a special voice prompt for the blind which includes a voice guide, easy research mode, volume adjustment and option for use of earphone.

[ii] **Kurzweil Reading Machine :** A portable optical scanner that reads type-set or type-written text and turns into speech. Its features include : (a) a large memory to provide improve processing of incoming text; (b) an automatic contrast control; (c) tools for format analysis; (d) multi-lingual capability for textinary of these verbal languages; (e) communication interface which allows it to serve as an input or output device with other data or text processing equipment.

[iii] **Optacon :** It is book-sized electronic device with a movable camera, the size of a pocket knife and a tactile screen the size of a finger tip which presents a tactile image on an array of vibratory pins. The reader passes the camera over printed material with his/her right hand and his/her left index finger feels in vibratory relief. The image the camera sees. The manufacturer claims that an experienced optacon user reads upto 90 words per minute, about half his/her Braille reading speed.

[iv] **Braille Computers :**

- **Braille Window** is the Braille-display for connection to all sorts of IBM compatiable personal computers.
- **Key tone** is a portable information handling, word-processor and computer acces device that takes to its user.
- **EHG-BW/2-PIEZO** is a monitor and keyboard which provides out-put in raised dots and can be conveniently used by the visually imparied persons.
- **Galaxy Piezo** is a special computer for the visually imparied and it gives output in embossed dots.
- **Galaxy Speech** is a special computer for the visually impaired with speech output.

● **Brille'n Speak** is pocket size note taker. It can be used for word processing, as a calculator, as a clock and a calendar. It can store 200 pages of Braille text.

● **Versa-Braille II+** is recognised as a convenient Braille operating system. It can be used for editing, programming and word processing. The input is from sixkeys and output is in the form of raised dots. It is a product of Telesensory Systemot Inc.

● **Index Braille** Index Braille is a Sweden based privately owned business with a mission devoted to development and production of Braille Embosser.

The company has introduced Double-sided Braille Embosser, popularly known as "Index Everest". It has a high speed Interpoint Braille Embosser which uses normal cut sheet. Over the years, The Everest has proved to be one of the most reliable Embossers on the market.

● **Speech Synthesizeers** A speech system converts text from a computer into spoken words. It is the hardware device that does the speaking in a speech acces system.

(a) **External device :** It connects to a computer externally and comes with a speaker and a socket for head phones and can be moved around to different machines.

(b) **Internal device :** It comes as a chip or circuits board that must be inserted inside the computer with-sockets for speakers and headphones. It can be moved around to different machines, it works faster than an external device.

(c) **Soft-ware based device :** It is loaded as software on a compateble computer and it gives speech out through the sound system of the computer itself. The Microsoft voice is useful for reading the documents and for operating window commands with the help of multimedia kit. Important features of synthesizers include.

● voice quality; ● speed at which text is converted to speech; ● memory requirements; and ● compatibility of the synthesizer to the computer (Mac or Pc) and ● the number of language available.

(d) **Language Software :** The Indian Institude of Technology (IIT) Chennai has developed Braille Software as well as language software which enables a visually impaired person to access compulters for Braille as well as language outputs in all the Indian Languages. The Vidya Vriksha Training Centre for the disabled, a Chennai

based NGO is imparting training to visually impaired persons in the use of software. It is also providing the software completely free of cost to the users and institutions. It has also developed a system of key board mapping and operations in Indian languages and instruction manual for use of the special version of the ITI multi lingual software.

Computers provide a rich and diverse bearing in the lives of the visually impaired. No device in the journey of time can boast a better feat. Every day new devices are coming up. Interested teacher-learners can have more knowledge from web-site and e-mail.

[i] **ASAP for windows :** web-site : http://www.screenaccess.com

[ii] **Hal :** e-mail : sales @ dolphinaccess.com

(or) support @ dolphinaccess.com

Internet : http://www.dolpinaccess.com

[iii] **JAWS For windows (JFW) :** e-mail : info @ hj.com

Internet : http//www.hj.com

ft : ftp://ftp.hj.com/pub/hj

[iv] **Out Spoken for windows V.1.2 :** e-mail : osw@aagi.com

Internet : http://www.aagi.com

[v] **SLlM WARE Window Bridge :** e-mail : help@synthavoice.on.ca

Internet : http ://www.synthavoice.on.ca

(or) ftp.synthavoice.on.ca

[vi] **Window-Eyes :** e-mail : support@gwmicro.com

Internet : http ://www.gwmicro.com

ftp : ftp.gwmicro.com

● Name of some more companies :

[i] Aicom Corporation : Fax : (408) 577-0373

[ii] Arkenstone, Inc : web:http://www.arkenstone.org

[iii] Artic Technologies : web:http://www.artictech.com

[iv] Balzie Engineering : web:http://www.blazie.com

[v] Digital Equipment Corporation : Phoen–(800) 344-4825

[vi] Dolphin Computer Access Ltd : e-mail:sales@dolphinusa.com
web:http://www.dolphinusa.com

[vii] Duxbury Sytems Inc : Phone (978) 486-9766

[viii] Enabling Technology Company : e-mail:enabling@brailler.com
web:http://www.braille.com

[ix] G W Micro : web:http://www.gw micro.com

[x] Human ware Inc : web:http://www.humanware.com

[xi] Kurzweil Educational Systems, Inc : e-mail:info@kurzweiledu.com

[xii] Pulse Data Informational Limited : e-mail:sales@pulsedata.com
web:http://www.pulsedata.co.nz

[xiii] R C Systems Inc : Fax (206) 355-1098

[xiv] Telesensory System, Inc : Phone: (408) 616-8700 or (800) 227-8418
e-mail:tele@netcom.com
web:http://www.telesensory.com/index.html

Indian Sources of Availability of Devices :

Therform machine : (i) Asian Power Cyclopes
Rochipura, P.O.: Majra, Dehradun–248171
(ii) Advance Engineering works
22, Lytton Road, Dehradun.

- Brailler : (i) North Trust
48, New Thiruvalam Road, Katpadi–632007, Tamil Nadu
e-mail : worth@md 3vsnl. net.in
- Braille, Arithmetic, Mobility, Recreational & other devices.

(i) National Institute for the visually Handicaped.

116 Rajpur Road, Dehradun–248001, Uttarkhand.

e-mail:nivhddn@nde.vsnl.net.in

(ii) National Rehabilitation Engineering Intitute

Blind People's Association, Vastrapur, Ahmedabad

Pin–380015, e-mail:bpa@vsnl.com

web:http://www.education.vsnl.com/bpa_ahmedabad

(iii) Asian Power Cyclopes

(iv) Advance Engineering

(v) Sparsh Products, 151–5, Rajpur Road, Dheradun–248001

Uttarakhand, e-mail:rectarao@de 13.vsnl.net.in

(vi) Voltas Ltd, Kaybee cell, Volkart Building

19 J N Heredia Masg, Ballard Estate, Mumbai–400038

(vii) Artificial Limbs Manufacturing Corporation

G. T. Road, Kanpur–2080116, Uttar Pradesh.

(viii) NAB Louis Braille Memorial Research Center

Rustom Alpaiwala Complex

124, Cotton Depot, Cotton Green, Mumbai–400033.

- Geography & Science Appliances :

(i) V. R. Vardhman International, Vardharman House

1. Raj Block Naveen Shahadara, New Delhi–110032

(ii) Bharat Educational Stores, Chippi Tank, Meerut, Uttar Pradesh.

(iii) Krishna Models Manufacturing Co. Ltd., Nai Sarak,

Near Chandni Chowk, New Delhi–110015

(iv) Bharat Graphics, 194, Industrial Area, Phase–II Chandigarh–160002

- Clock & Watches : (i) HES Limited, Patel Estate, Jogeshwari (West), Mumbai–400102

(ii) Hindustan Machine & Tools Ltd. Watch Mrketing Division
26/1, Levelle Road, Bangalore–560001

(iii) ALIMCO, Kanpur

- Recreational : (i) Pneumatic Controls, 35-B, Rama Road. New Delhi–110015

(ii) Pinball Manufacturing Co.
147, GIDC Makapura Industrial Estate, Vadodara

(iii) Latha Industries, 89/1, Triplicane High Road. Triplicane, Chennai–600005

- Indian Suppliers of Imported Appliances :

(i) Karishma Enterprizes, Shop No. 140, Opp. Mariyamma Temple Jesmine Mill Road, Dharavi, Mahim (East), Mumbai–400017

(ii) Sparsh Products, 151–5, Rajpur Road, Dehradun–248001, Uttrakhand,
e-mail : reetarao@de 13.vsnl.net.in

4.5.5. Let us Sum up :

Education of children with disabilites requries special equiments and TLM. Braille ruler, protector and special compass can enable a blind child to draw any diagram in geomety. Low vision children require magnification. In the case of blind child, Braille state/writing frame, Taylor/Arithemetic Board/Frame are essentials. Teachers-students having keen interest, tenacity and inquisitiveness can impart lessons to visually impaired learners with the objects easily available at hand using sas TLM. Sometimes they can also make low-cost or no-cost equipments by themselves for this purpose.

4.5.6 ‘‘Check Your Progress’’ :

(i) Name the low-tech indispensable equipments to teach the children with visual impairment.

(ii) Suggest how you can prepare TLM from locally available materials for teaching children with usual impairment.

(iii) Briefly describe when and where to use particular types of equipments.

- **Activity :**

Go to 3/4 visually impaired students studying either in special school or in inclusive set-up to observe his/her special equipments and techniques of their use.

4.5.7 Check Yourself :

Tick the most appropriae answer :

(i) Type is used by the visually impaired students to—

(a) write braille

(b) read braille

(c) do arithmetic

(d) none of the above

(ii) Top-side braille writing is possible by—

(a) inter-line braille slate

(b) inter-point braille frame

(c) pocket frame

(d) braille

(iii) JAWS for he use of visually impaired is a—

(a) software

(b) mathematical device

(c) money identifying device

(d) duplicating machine

(iv) Braille writing by right and reading by left is done on—

(a) inter-point frame

(b) perkins brailler

(c) worth-trust brailler

(d) stensby braille writes

(v) Optacon is a—

(a) braille writing machine

(b) brailled duplicating machine

(c) mobility device

(d) ink-book reading machine

(vi) Sonic guide is a—

(a) braille writing apparatus

(b) mobility apparatus

(c) braille reading apparatus

(d) type of watch.

- **Answer Key :** (i) c, (ii) d, (iii) a, (iv) a, (v) d, (vi) b.

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- Gunawathy Fernandez, Claudia Koening, MNG Mani, Sian Tesni, Christoffel–Blinden mission, Bengalore.
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- Manie, MNG (1997) : Amazing Abacus : Sri Ramakrishna Mission Vidyalaya College of Education, Coimbatore.

Unit - 5 □ DeafBlindness

5.1 Definition, causes, classification, prevalence and characteristics of deaf-blindness

Structure

5.1.1 Definition of Deafblindness

5.1.2 Causes

5.1.3 Classification

5.1.4 Prevalence

5.1.5 Characteristics of deafblindness

5.1.1 Definition of Deafblindness

Deaf-blindness is a unique disability. It is a condition in which a person may have a combination of both hearing and vision impairments of varying degrees, causing severe communication, developmental, and educational needs. Since 95% of the information is acquired through vision and hearing, restrictions in seeing and hearing means significant challenge in accessing information in a clear and consistent way.

5.1.2 Causes

Deafblindness is not caused by a single medical condition. A child can be born deafblind or a person may acquire deafblindness later in life. A child born deafblind as a result of infection, genetic syndrome or birth defect are termed as having congenital deafblindness or early onset deafblindness. Those who acquire deafblindness later in life as a result of trauma or accident, genetic syndrome, ageing or progressive infection are termed as having acquired deafblindness.

It is important to note that a genetic syndrome can result in deafblindness at birth or later in life. This happens because genes might have an immediate effect on developing foetus or its effects may not be apparent until later in life. Congenital or early onset deafblindness.

1. **Infections as a cause**
    - Historically one of the most common infectious causes was the Rubella virus commonly known as "German Measles", If the mother is infected with this virus during the first trimester of her pregnancy, the child becomes deafblind
    - TORCH syndrome (Toxoplasmosis, Other agents, Rubella, Cytomegalovirus, Herpes Simplex)
2. **Genetic or chromosomal syndromes as cause**
    - CHARGE syndrome
    - Down syndrome
    - Goldenhar syndrome
3. **Congenital birth trauma or infection as a cause**
    - Premature birth
    - Low birth weight
    - Asphyxia or stoppage of breathing due to obstruction in the air passage
    - Anoxia or lack of oxygen
    - Other trauma or birth injury
    - Trisomy 13: in case of three chromosomes in the 13^{th} pair, child develops deafblindness
    - Hydrocephaly
    - Microcephaly
    - Encephelitis-inflammation of the brain cells
    - Meningitis

Acquired deafblindness

1. **Genetic syndromes as a cause**
    - Usher syndrome: Usually hearing loss is present from birth, and progressive visual impairment from late childhood to early adolescence or even adulthood.
    - Norrie Syndrome: born with blindness and later develop hearing impairment

2. **Accidents or other trauma as a cause**

   Accidents or some traumas such as stroke or cerebral haemorrhage can cause deafblindness in people due to injury to parts of the brain that deal with information processing tasks through sight and hearing.

3. **Ageing as a cause**

   After the age of 50 years, hearing and vrsion impairments become more common and prevalence of sensory impairment increases with age.

Other than these significant causes, malnutrition of the mother during pregnancy can cause premature birth or low birth weight. Infants who survive these conditions are more likely to have mental retardation, cerebral palsy, epilepsy and respiratory disease which may result in deafblindness, Maternal jaundice during pregnancy can also be vital for the developing foetus. High level of bilirubin can harm the developing brain of foetus affecting vision and hearing.

5.1.3 Classification

Deafblindness is an umbrella term which is used for children and adult who may suffer from varying degrees of hearing and visual impairments. Total deafness with total blindness is rare. Thus, deafblind would include children and adult who are

Totally blind with profound hearing loss

- Totally blind with partial hearing loss
- Partially sighted with profound hearing loss
- Partially sighted with severe or partial hearing loss.

Another grouping:

- Congenitally deafblind
- Congenitally blind and later acquire deafness
- Congenitally deaf and later acquire blindness
- Acquired deafblindness, meaning people born with hearing and vision, but later lose both senses to varying degrees. The losses may occur at different times.

5.1.4 Prevalence

Of the total world population, 0.02% people are deafblind. It is estimated that, in India, there are about 450000 deafblind people children and adults.

5.1.5 Characteristics of deafblindness

It is commonly estimated that 95% of the information are gathered from vision and hearing. Individuals who have a hearing or vision loss cannot access the same amount of information without accommodation for their sensory loss. Depending on the age of onset, the characteristic features of deafblind individuals vary from one another, thereby giving them unique characteristics. Wide ranging characteristics are observed among diverse group of people with deafblindness.

- Lack the ability to communicate in a meaningful way
- Have a distorted perception of the world
- Deprived of the information necessary to anticipate future events or the results of his close one's actions
- Deprived of many of the most basic motivations
- Have medical problems that lead to serious developmental lags
- Mislabelled as developmentally disabled or emotionally disturbed
- Forced to develop unique learning styles to compensate for the sensory impairments
- Have extreme difficulty in establishing and maintaining interpersonal relationships

5.2 Effects and Implications of deafblindness on activities of daily living and education

Structure

5.2.1 Effects of deafblindness

5.2.2 Implications of deafblindness on a person

5.2.1 Effects of deafblindness

People who are deafblind experience difficulties in:

- **Finding out information**

This does not only mean restrictions In accessing information through newspaper, books, radio or TV channels, but also missing the experience of seeing the face/hearing the voice of an unfamiliar person, the shape of any object larger than the size of the hand to hold, any object beyond one's reach. Therefore, life experience is severely reduced to build up a store of world knowledge. Without that knowledge what is there to communicate about?

- **Communicating with others**

This is perhaps the most obvious challenge to a person who is deafblind. Each person has individual communication needs and ways of communication. Some use simple gestures, facial expressions or movements of the body. Very few people understand these communications of a person who is deafblind. It becomes difficult for him also to understand other's communication and learn to communicate.

- **Moving around the environment**

The person who is deafblind cannot compensate for vision with hearing, or for hearing with vision. This person is cut off from the world into a world of "invisible silence". Due to constrained information through sensory system, they cannot interpret whatever information they have received, and prefers to remain in a secured position.

5.2.2 Implications of deafblindness on a person

➢ **Vision**

Loss of or restrictions in vision may have different implications on persons with deafblindness. These may be:

- loss of visual acuity meaning difficulty in seeing objects accurately
- loss of visual field meaning limited field of vision
- difficulty in moving eyes when fixating, scanning or tracking objects with eyes
- reduced contrast sensitivity meaning difficulty in seeing the relative difference between the lightness and darkness of objects
- processing problems meaning difficulty in making sense out of what she/he is seeing
- difficulty in seeing parts of the image or complete picture together
- squint or Strabismus meaning eyes do not work together
- oculomotor problems meaning difficulty in coordinated movements of the eyes to focus or fixate
- Nystagmus meaning involuntary movement of eyeballs. Due to this child fails to see and understand the object clearly.

➢ **Hearing**

We interpret our environment by hearing different information that comes our way and we develop concepts on our own without being taught by others. But, for a child with deafblindness, these inputs are missing; the use of functional hearing also gets restricted due to lack of intervener.

- Sometimes, a child with deafblindness responds to a particular sound and not to other sounds.
- A child with deafblindness may facej problems related to balance due to the structural impairment in the ear.

- **Motor and mobility**

Children use their vision and hearing to gather information about their surroundings, to understand their own bodies and their own capabilities of movement. The sight of toysor people and the sounds of voices or objects encourage them to move and discover. Children with deafblindness do not experience this due to loss of or restricted visionand hearing. Sometimes, severe medical problems are associated leading to developmental delays affecting motor and mobility. As a result, they face difficulty in independent exploration which restricts the ability to get a control over the environment. Conceptual development and experience of space and direction remains severely restricted and/or totally absent.

- **Behaviour**

A person with deafblindness may acquire behavioural patterns that may not be well understood to others in the society. Some of these are:

- Self-stimulatory behaviours such as eye poking, body rocking, etc.
- May have incorrect manner of eating food
- May have unusual sleep patterns
- May have variety of behaviour patterns to express needs and emotions

- **Socialisation skill**

A person with deafblindness has very limited scope of reaching out to others to share his/her needs, events and entertainment.

- They face extreme difficulty in establishing and maintaining interpersonal relationships with others. As they have different ways of communication, they face difficulty In initiating and understanding conversations.
- Due to communication problem, they remain isolated.
- Their isolation also leads to social deprivation

Accessing information, communicating with others and moving around the environment are central to daily living and learning. All three of these depend on each other. Thus, people who are deafblind experience difficulties in their daily living and learning.

➢ **Implications of deafblindness on education**

Educationally, children with deafblindness are isolated because impairments of sight and hearing require attentive and unique educational approaches in order to ensure that children with this disability can have the opportunity to reach their full potential.

If a child with deafblindness has some usable vision/hearing, as many do, his/her world will be enlarged. Many of them have enough vision to move about, recognise familiar people, see sign language at close distance" and read large print. Others have sufficient hearing to recognise familiar sounds, understand some speech, or develop speech themselves. As deafblind children get fragmented and distorted information from their contact with people and environment, it is important to provide access to opportunities that helps in incidental learning as sighted/hearing children do have.

In other words, deafblind children will need to experience activities in real life settings as they are occurring naturally in the environment around them. They will learn best by doing things together by using his tactile, olfactory, kinaesthetic and proprioceptive senses along with whatever residual vision and hearing they might be having. They must be involved in full sequence of the activity. To reduce the impact of dual sensory loss, it is important to develop routines in the life of the deafblind child.

5.3 Screening, Assessment, Identification and Interventional Strategies of Deafblindness

Structure

5.3.1 Screening and Identification

5.3.2 Assessment

5.3.3 Instructional strategies

5.3.1 Screening and Identification

Screening is a service in which people, who do not perceive that they are at risk of, or are already affected by a disease, are asked a question or offered a test, for early identification. The aim of screening is to identify the number of people affected from suspected eye or ear problems. It reduces the risk of developing further complications through early identification; at the same time, it is not a guarantee of prevention, or of diagnosis and cure.

- **Why screening?**

Because deafblind people remains invisible and hidden from everyone, and are often misdiagnosed as mentally challenged or hearing impaired with vision problem, screening helps in identifying the number of population with these dual sensory impairments.

- **Possible outcomes of Screening Process**

i} No problems are observed. The child ls screened again at the next recommended age.

ii} One or more of the high risk conditions have been identified, but there are no observable problems with visual or hearing performance. Parents should be informed of high risk indicators of visual/hearing problems; how to observe visual/hearing performance and/or resources to contact, if vision/ hearing problems are observed at a later date.

iii} A prompt referral to an eye care or ear specialist should be made if:

a) the child has an observable eye condition such as excessive tearing, redness, eye deviation or misalignment, nystagmus, drooping eyelids, cloudiness of the

cornea or pupil, etc. or the child suffers from frequent discharge from ear, does not respond to sounds, etc.

b) the child has observable difficulty with one or more behavioural items.

5.3.2 Assessment

Functional Assessment is a process using observation, screening test, and test analysis to determine an individual's strength and weaknesses in order to plan educationalservices. It should be set in the context of the clinical information including aetiology, visual acuity and hearing thresholds, and the assessor should integrate the whole information to provide a commentary of the child's needs and provide useful recommendations about strategies to meet them. A proper assessment requiro/' family participation and a trans- disciplinary team.

Purpose of assessment: Assessment is the first step that is taken by an educator/therapist to develop a holistic programme for the child. This includes child's environment, communication, functional abilities of vision and hearing, cognitive abilities, physical difficulties, socialisation skills, child's likes and dislikes and strengths, and where development is required. It must include an evaluation of the child's communication, cognitive, and adaptive and everyday functioning including behavioural concerns. Assessment is not done once for the child; it is periodic, depending on the condition of the child.

Components of assessment: The assessment format must contain questions relating to child's social and communication domain,sensory/motor domain, functional vrsron domain, and functional hearing domain.

Tools for assessment are:

- Learning through doing: This tool was developed by National Institute for the Visually Handicapped (NIVH) and Blind Peoples association, Ahemdabad in 2002. It is an assessment tool as well as a programme manual.
- Screening checklist for sensory impairment developed by National Institute for the Mentally Handicapped (NIMH)
- Callier-Azusa Scale is a developmental scale specially designed to aid in the assessment of deafblind children. This is composed of 18 sub-scales in five

areas. These are motor development, perceptual development, daily living skills, cognition, ommunication and language, and social development.

- Functional assessment for vision and hearing problem in children developed by Sense International (India). Now this format is used for assessment in camps and community, and in special schools.

5.3.3 Instructional strategies

Instructional strategies for children with deafblindness mean intervention into their world of "invisible silence". The strategies to be taken are:

- **Creation of effective environment,** that helps in acquiring maximum learning, is the prime thing that an educator needs to act upon in a systematic way.
- **Adaptations to the physical environment,** e.g. arrangement of the room, lighting, noise level, location of materials and resources, accessibility to other rooms, etc. are all considerations for environmental modifications.
- **Adaptations in the class programme include**

➢ Allowing more time for the task

➢ Pacing the lesson differently

➢ Ensuring a variety of ways of processing information

➢ Setting up structures that enable achieving smaller steps to the goal

➢ Checking more frequently than usual for understanding

➢ Giving more frequent feedback

➢ Simplifying questions/instructions

- **Modifications to resources and materials**

Materials have to be adapted to allow them to access the information or demonstrate their understanding. This can be done by simplifying resources and materials, using different materials, enlarging print, using Braille prints, provision of support personnel. Despite the adaptations and modifications, some children or adults need higher levels of assistance from the educator/caregiver.

Components of Teaching Strategies

1. **Stability :** It refers to the orderly approaches that would help the child to predict about the environment. Structured enironment supports structured learning. It helps in building confidence in the world of the child.
2. **Routine to create stability:** Routines allow the child to experiment with more confidence in a predictable situation Teaching curriculum is embedded around routine activities.
3. **Role of Motivation:** Activity has to be planned in a way tc motivate the child to act and enjoy with the educator. Think of rewarding to maintain the enthusiasm in the child.
4. **Small Steps (task analysis) in implementing the goal:** Before introducing the whole activity to the child, it should be spreac into small steps. Short steps achieved builds confidence in thr child, and s/he loves to learn the next steps.
5. **Pace of learning:** It refers to the time required and taken by the child in learning any task. Based on the individual needs, ead child has his/her own learning pace.
6. **Rep/titions of the task:** Children with deafblindness may neec more repetitions of an activity due to restricted or limited inpu from the senses.
7. **Presentation of the task:** The task has to be designed in such (way that it is of maximum use. The Teaching Learning Material! (TLM), selected on the basis of the needs as well a! strengths/limitations of the child, should be easily seen, hearc or explored tactually.
8. **Prompts:** Prompts are cues/indicationsglven to the child to perform the task. It requires high level of prompting at the initial stage, and reduced gradually.
9. **Working hand over hand:** Before working hand over hand, rapport with the childhas to be built so that the child must fee secured. The educator generally places his/her hand over the child's hands gently to show him/her to perform a task.

5.4 Fostering Early Communication Development : Methods, assistive devices and practices including AAC

Structure

5.4.1 Fostering Early Communication Development

5.4.2 Modes of communication

5.4.3 Using assistive devices and practices including AAC

5.4.1 Fostering Early Communication Development

Communication is the process of transmitting thoughts, ideas, information and messages from one person to another. For children who have vision and hearing problems, communication may be somewhat different. There are a variety of ways through which deafblind children communicate in early years. These are:

- Facial expression
- Vocalisation such as crying, cooing and babbling
- Change in muscle tone
- Touching and manipulating others
- Body movements
- Assuming positions
- Pointing
- Natural gestures
- Behaving aggressively (biting, pinching, throwing things etc.)

For communication three things are required:

- Someone to communicate with
- Something to communicate about
- A means of communication

It is therefore a two way process: receptive and expressive. It is crucial for the child to gain meaning from experience, learn to anticipate and predict, and learn to control the learning environment.

Receptive communication is the process of receiving and understanding the message**.** It is often difficult to determine how a child with deafblindness receives messages and responds to the communication of his/her family members. Expressive communication means sending message to another person for any need or responding to the message already received.

There are certain strategies to foster early communication development. These are

- Good lighting with the light coming from behind
- Create a good listening environment
- Use of hearing aid/s
- Sometimes song helps the child to anticipate or cooperate
- Enhance sensory information
- Use of scented materials to identify places/activities/persons
- Provide consistency
- Routine activity recommended
- Use "Calendar Box" to denote "beginning of activity" and ''finish of activity"
- Different types of cues and objects are used in fostering receptive and expressive communication.
- **Touch Cue:** Cue is given by touching child's body part related to the activity or action; e.g. touching lips for feeding; waist for nappy change
- **Movement Cue:** Moving body part that relates to an activity; e.g. moving hand to mouth for eating; moving two hands for clapping for recreational play
- **Contextual Cues:** Cues given or taken by the child during an activity or in a situation; smell of cooking food from kitchen, tactile feeling of grass in the garden, taste of sour while licking pickle, etc.

  Cues are helpful in developing anticipation and understanding associations, the most vital aspect for developing communication skills. However, certain things to be kept in mind while using cues with the children. These are:

- Cues must be used same way each time by every person working with the child.
- Cues must precede a relevant activity for the child.
- Cues have to be different from one another so that the child gradually understands the differences and later on discriminate and relate to particular activity.
- When a child develops understanding and responding to cues, educators may move to next level of receptive communication through **object cues**. Objects are chosen for daily activities that are presented to the child as cues for activities. For example, spoon for eating, soap for bath, ball for play, cane for outing, etc.

5.4.2 Modes of communication

Children with deafblindness use different modes to communicate. These are :

- **Sign Language**

In visual signing, signs are made in front of the person. Tactile signing involves signing with the receiver's hand resting lightly on the signer's hand. This mode is suitable for people who have very little vision or no vision at all.

- **Print on palm** This mode is used where block capital letters are drawn on the palm of the deafblind person's hand, one after the other.

- **Tadoma**

Tadoma is tactile lip reading. The person reading the speech places his/her thumb on the speaker's lips and his/her fingers along the jaw line, touching the speaker's cheek and throat. From this s/he is able to pick up the vibrations of speech as well as the lip patterns.

- **Braille**

Braille is a system of touch reading and writing in which raised dots represent the letters of the alphabet. Both hands are usually involved in the reading process and reading is generally done with the index fingers from left to right along each line.

- **Gestures**

Gestures or non-verbal communication and body language communicate as effectively

as words and may be even more effective. Some deafblind children express their needs through vocalisations (crying/cooing/babbling).

- **Symbols**

Communicating with the help of symbols is called symbolic communication. Spoken and written languages are examples of abstract symbols and real objects are examples of concrete symbols.

- **Cues**

A cue is a prompt that is individualised for each deafblind child and is used to encourage a specific behaviour. It is dependent on specific activity or context. For example, tapping a child on chin may be a prompt for "open up mouth" for food. Cues are of different types, e.g. touch, movement, contextual cues, and object cues. Gestures and cues are anticipators to let a deafblind child know what is about to happen.

5.4.3 Using assistive devices and practices including AAC

Augmentative and alternative communication (AAC) means methods of communication which can be used to add to the more usual methods of communication including speech and writing when impaired. AAC includes unaided systems such as signing and gesture, as well as aided techniques ranging from picture charts to the most sophisticated computer technology currently available. AAC strategies assist persons with deafblindness with severe communication disabilities to participate more fully In their social roles including interpersonal interaction, learning, education, community activities, employment, recreation, home management and so on. AAC is just the means to develop the abilities to communicate when, where and what is desired. AAC includes unaided and aided methods.

- Unaided communication: This method does not involve a piece of additional equipment. Body language, gestures, pointing, eye pointing, facial expressions, vocalisations and sign language.
- Aided communication: This method involv~additional equipment, e.g. picture chart, a computer. Adults with deafblindness use the Power Braille attached to the computer.

5.5 Addressing orientation, mobility and educational needs of students with deafblindness

Structure

5.5.1 Problems of Orientation and Mobility for persons with deafblindness and strategies to develop mobility

5.6 Let us Sum Up

5.7 ''Check your Progress ''

5.5.1 Problems of Orientation and Mobility for persons with deafblindness and strategies to develop mobility

A child with deafblindness has very limited access to learn skills of Orientation and Mobility. This restricts the child's motivation to explore, initiate interaction or participate in activities. As a resule child becomes dependent on others and becomes passive or engages himself in less meaningful activities.

What is Orientation and Mobility?

Orientation is the ability to locate oneself in one's environment. In absence or significant loss of vision and hearing of a person with deafblindness, orientation requires a skill that is related to using the residual vision and remaining hearing with the sense of touch and smell to establish position in, and in relation to significant objects in the environment. Mobility is defined as action of travelling, going from one place to another, safely and freely. To be mobile, a person with deafblindness should be able to gather and use sufficient information from the environment to avoid hazards, and to reach the destination safely. Orientation and mobility training is important for every child with deafblindness,

The goals of orientation and mobility are

- Enhancement of the sense of orientation
- Development of means of supporting the child to move about and explore the environment freely and safely

- Development of prerequisites for integration of the child into the community
- Development of sense of independence

Focus of Orientation and Mobility training

The training must include

- Sensory awareness: Gaining information about the environment through smell, touch, movement, and using partial hearing and/or vision
- Spatial concepts: Realising that objects exist even if not heard or felt, and understanding the relationships that exist between objects in the environment
- Searching skills: Locating items or places efficiently.
- Independent movements: Such as crawling, rolling, walking and so on.
- Sighted Guide: Using another person to aid in travel
- Protective techniques: Specific skills which provide added protection in unfamiliar areas.
- Cane skills: Use of various cane techniques to clear one's path or to locate objects along the way.

Sensory Training

Sensory stimuli are environmental clues that enable the child with deafblindness to determine position or direction in respect with other objects in the environment. Systematic instruction is needed to develop the other senses for use in travel and finding things in the environment. While providing sensory training, it is of utmost importance to use the fact sheet prepared for the child after functional assessment of vision, hearing and motor control.

- Touch: The children with deafblindness need to learn the use of their hands and feet to explore the environment, to understand spatial relationship, about texture, temperature and weight. Hands give the idea of diversity of objects, while feet provides idea of position, pathways, changes in ground surface, slope and so on. Often the children with deafblindness are found to be tactually defensive; they should be trained to gain information through their whole body, and be able to use that information through auditory, visual and olfactory senses to determine their current location. For example, developing the tactual sense will help the child in finding a toy he dropped on the floor.

- Smell: Smell is useful for orientation both indoor and outdoor.

  Many physical locations can be easily identified through smell: bakery, tea/coffee stall, gas station. Therefore, smell can be a very good clue for directions. A particular place can also be used as landmark. The children with deafblindness should be exposed to a variety of fragrances; but not all at one time; the educator must link a fragrance with any meaningful activity. For example, familiarising the smell of lemon and then the activities of lemon cutting, sqeezing and making juice. Use of smell can be used for a wash by using a particular soap.

- Residual vision: teaching the child with deafblindness to use his residual vision is important and beneficial for his independent daily living. Use the functional vision assessment sheet for activity plan.

- Awareness of body parts: Knowing the names of body parts and their functions develop mobility skill. Because of absence of incidental learning, the child is shaky in movement. Therefore, slowly the fundamental concepts of body awareness, spatial relationship, different tactual feelings relating to objects and surface, smells of objects and the environment have to be provided. Then the educator can initiate assisted movement with a goal. This would build confidence in the child and s/he would develop enjoyment while moving around.

- Once a child with deafblindness learns to walk independently, there are a number of techniques to be taught to the child. This includes

➢ **Protective techniques** help a person to be safe. The upper arm techniques protects the upper body around the chest and head. It can be used from open door, sharp wall curves, cupboards, hanging objects, tree branches and so on. The lower arm technique protects the lower part of the body near waist level. In both these techniques, hands are used like a bumper.

➢ **Trailing technique** is used to trail wall or other similar furniture or object. Extend arm that is closer to the wall or onject. It helps a person to walk straight, and to detect landmark or find doorways. One gets useful tactual information by trailing.

➢ In **Sighted guide technique,** person with deafblindness holds the arm of the guide just above the elbow and maintains the position one step behind the guide. The sighted guide must know the how to guide a person while movmg.

- Cane technique is taught when a child with deafblindness of school age, can walk and maintain balance. Cane should always be in line with middle of the body and in front of the traveller. The cane is moved from side to side by flexion and extension of wrist with tip touching the ground in each movement. The arm should not move.

The aim of training children with deafblindness in orientation and mobility is to create positive experiences of movements, and instill the confidence of moving and travelling independently.

5.6 Let us Sum up

- Deafblindness is a unique disability with a combination of vision and hearing impairment of varying degrees affecting mobility and communication.
- Causes of Deafblindness include congenital and acquired factors.
- After screening and identification, functional assessment of the sensory abilities of the persons with deafblindness by a trans-disciplinary team, educator can adopt instructional strategies.
- Among all the challenges faced by the persons with deafblindness, communication is the most significant. Systematic training helps in developing communication for the persons with deafblindness.
- For orientation and mobility, self awareness and sensory training gives the understanding of self in the environment. Techniques of mobility gives confidence in independent movement.

5.7 ''Check your Progress''

Essay type questions

1. How would you define deafblindness? Discuss the implications of deafblindness in a person.
2. What are the causes of deafblindness?
3. What is assessment? Why is important? Discuss the tools of assessment.

4. Describe the need for functional assessment. What would be the strategies of instruction for a child with deafblindness?
5. Explain different modes of communication used by the persons with deafblindness. What are the strategies to enhance communication?
6. What is Orientation and Mobility? Explain the strategies for teaching orientation and mobility to a person with deafblindness
7. Explain the different categories of persons with deafblindness.

Short questions

1. What are the characteristic features of deafblindness?
2. What are the major causes for deafblindness?
3. What may be the possible outcomes of screening?
4. How will you teach orientation and mobility to a student with deafblindness?
5. Discuss the modes of communication used by the persons with deafblindness.
6. Discuss the role of assistive devices and AAC for persons with deafblindness.
7. What are the protective techniques for safe and independent mobility of a person with deafblindness?

Objective questions

1. Find out the true answer:
    i) Congenital Rubella Syndrome means infection of the ..... baby after birth/ mother during pregnancy/family gene. (mother during pregnancy)
    ii) Persons with deafblindness depend mostly on ... residual vision/ hearing/ touch (touch)
    iii) Socialisation skill can be imparted through individual training/play therapy/ gardening. (play therapy)
    iv) For early intervention of a child with deafblindness, caregiver has to observe the child's behaviour/gesture/total communication. (Total communication)
    v) Before early intervention programme, functional assessment of hearing & vision/neck control/toilet control are necessary. (Hearing & Vision)

2. Find out True or False (Tick in the appropriate answer)

i) Meningitis may damage brain leading to hearing and vision impairment. (True/False)

ii) ep children never have vision or hearing problems. (False/False)

iii) Deafblind persons communicate through gesture and sign. (True/False)

iv) A child with deafblindness requires 1:1 training for future mainstreaming. (True/False)

v) Dual sensory loss detaches a person from environment and community, both. (True/False)

Answer of the objective Question No. 2

(i) T, (ii) F, (iii) T, (iv) T, (v) T.

Notes

Notes

মানুষের জ্ঞান ও ভাবকে বইয়ের মধ্যে সঞ্চিত করিবার যে একটা প্রচুর সুবিধা আছে, সে কথা কেহই অস্বীকার করিতে পারে না। কিন্তু সেই সুবিধার দ্বারা মনের স্বাভাবিক শক্তিকে একেবারে আচ্ছন্ন করিয়া ফেলিলে বুদ্ধিকে বাবু করিয়া তোলা হয়।

— রবীন্দ্রনাথ ঠাকুর

ভারতের একটা mission আছে, একটা গৌরবময় ভবিষ্যৎ আছে, সেই ভবিষ্যৎ ভারতের উত্তরাধিকারী আমরাই। নূতন ভারতের মুক্তির ইতিহাস আমরাই রচনা করছি এবং করব। এই বিশ্বাস আছে বলেই আমরা সব দুঃখ কষ্ট সহ্য করতে পারি, অন্ধকারময় বর্তমানকে অগ্রাহ্য করতে পারি, বাস্তবের নিষ্ঠুর সত্যগুলি আদর্শের কঠিন আঘাতে ধূলিসাৎ করতে পারি।

— সুভাষচন্দ্র বসু

Any system of education which ignores Indian conditions, requirements, history and sociology is too unscientific to commend itself to any rational support.

— Subhas Chandra Bose

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