

visually impaired children studying in a cluster of regular schools located in a particular region by travelling from school to school.

3. **Resource room programme:** Here visually impaired children while receiving instructions in the regular class along with their normal peers are required to attend the resource room programmes at scheduled intervals or as per need of the situations. In contrast with the itinerant teacher who travels from school to school, the teacher-in-charge of the resource room remains available in one specially equipped location for serving the interests of the visually impaired for part of the school day.
4. **Full time special class:** Here in the regular schools, special provision is made to organize full time special classes and activities providing formal instructions to the blind and/or children having low vision under the supervision and guidance of specially trained teachers.

If we try to analyze the practicability and feasibility of provisions mentioned earlier in the schools of the developing countries like India, we have no hesitation to admit that due to paucity of funds and financial restraints, the conditions in most of our schools are not at all favourable for making special provisions like holding of special classes, itinerant teacher programme or resource room facilities, etc. for the visually impaired children especially the blind or the nearly blind children on that proper footings as needed for their appropriate education and adjustment. At the most, it can only be arranged in the residential schools specially meant for the education and adjustment of the visually impaired children (including blind and partially sighted). However, there is a quite shortage of such residential schools meant for providing special education to the vast school going visually impaired population of the children in our country. Moreover, they are not accessible to many of the visually impaired children due to financial restraints, long distances and so many other limitations and obstacles. Therefore, in the countries like ours, where we are not in a position to provide school facilities even for the visually normal ones, then how it can be imagined to have separate special residential school for each and all types of visually handicapped children residing in various regions of the country.

In this way, situations in most of the underdeveloping countries like ours demand that we must somehow plan for the following two types of educational placement for the visually impaired children.

1. *Normal school setting.* Where we can provide education to the children with low vision (capable of using their sense of vision in some or the other ways) by making necessary adaptation in the regular educational set-up by following the principle of inclusion and mainstreaming.
2. *Special residential institution.* For the totally blind, nearly totally blind and children suffering from such visual handicaps and limitations that it becomes difficult to educate them along with the children having normal vision. If these children cannot get the opportunity of studying in these special residential schools, then for the time being, these may be accommodated in the normal school set-up with some needed educational and environmental modifications. However Central and State governments, non-governmental organizations and other social service agencies must come

forward and join hands in setting up required number of residential special schools for those children who are unable to utilize vision as a source of their education.

On account of the available conditions in our normal school class set-up, the author is of the opinion that there must be separate provision for the education of those children who are unable to utilize their sense of vision as a prime source of knowledge and information. Their adjustment and education as per their needs and difficulties definitely requires special arrangement, training and special instructional provisions. However, the children who do not have serious visual problems and are capable of utilizing their sense of vision for educational and adjustment purposes, should be essentially taught in the normal schools (with some needed adaptations in educational approaches and environmental settings) for gaining the advantages of the scheme of inclusion and mainstreaming.

Decision Concerning Curriculum

Curriculum as we know is a guided path filled up with essential learning experiences for attaining the desired teaching-learning objectives as needed in the case of a particular group of learners. Since the needs and requirements of the adjustment and education of the visually disabled are necessarily different and special than those of their non-disabled peers, these children normally require very special considerations in terms of curriculum adaptation.

Apparently in their case, we can come to the conclusion that in addition to catering their academic needs (as per lines on their peers with normal vision), the curriculum should also provide means and ways for the development of all those concepts and skills which are usually denied to them on account of their loss of vision (e.g. communication and listening skills, orientation and mobility skill, daily living and social skills, etc.). In this way, the curriculum adaptation for the visually impaired students essentially requires 'enrichment', i.e., inclusion of various learning experiences and opportunities for the development of specific concepts and skills (critical for their survival and successful living) besides the existing core curriculum, meant for all children.

The elements of such 'enriched' or 'plus' curriculum can be clustered under the following six major headings (Barraga and Erin, 1992).

1. Personal competence, self-adjustment and daily living skills.
2. Orientation and mobility.
3. Communication skills (listening, speaking, reading and writing).
4. Vocational guidance and career development.
5. Use of special aids and equipments like the following:
 - (i) Tape and cassette recorders
 - (ii) Record players and talking books
 - (iii) Personal computers and type writers
 - (iv) Braille
 - (v) Large type materials

- (vi) Optical aids
- (vii) Electronic reading and writing devices

6. Vision stimulation (i.e. maximum utilization of the residual vision capacity).

Decision Concerning Curriculum Implementation

A developed curriculum, how suitable and enriched it may be, requires right ways and approaches for its proper implementation in terms of instructional methodologies, applied aids and devices used and environmental adaptations made for providing as proper learning experiences as possible to the visually impaired in a particular placement situation. Such decisions should necessarily be made in view of the learning needs and learning capacity (in terms of the utilization of the residual sense of vision) of these children. For this purpose, we can make advances by paying attention over the following important aspects like the following.

Development of essential skills for gaining information and knowledge

A child learns and acquires information and knowledge of the sighted work mostly through his sense of sight. The visually impaired children are less or not at all equipped with their sight utilizing capacities as needed on their part for getting formal and informal learning experiences from the classroom instructions, books and other real life events. For this purpose, in any attempt of providing educational experiences to the visually handicapped, the beginning should always be made in terms of developing and encouraging non-visual means as the viable tool for gaining information and knowledge from an ongoing informal or formal knowledge getting process. The measures like below can be adopted for this purpose.

- (a) **Training in the use of Braille system:** Totally blind and severely visually impaired children should essentially be helped in acquiring Braille literacy.

Braille, a tactile system of reading and writing was devised by a French musician Louis Braille, himself blind, in 1829. It consists of a code that uses raised dots instead of printed characters (letters and numerals). A unit in Braille is called a cell. Each cell consists of six dots, three dots high and two dots wide. The dots are numbered from 1 through 6 and Braille alphabet is made of combination of these six dots. While reading the Braille script, the readers are required to make use of their sense of touch. Usually reading is done by both hands, one leading, the other following. After acquiring reading skill, attempts are made for making the students learn Braille writing. Braille is produced on a Braille writer, somewhat resembling a type writer. It has six keys corresponding to the six dots of the cell. Braille can also be produced by using a special slate and stylus. Here students are required to emboss the Braille dots one at a time by hand on a Braille slate with the help of a stylus (a blunt needle).

Computer technology has now introduced revolutionary changes in the reading and writing of Braille. For the production of Braille literature, now the help of computer Braille printers may be taken quite effectively.

The material available in books or classroom lectures and notes, etc. can now be made easily available for the blind students in the Braille script with the help of computer Braille printers. Blind students can also independently take notes and tests in class and prepare assignments and papers at home with the help of personal computers, and portable laptop computers. The key board of such adapted computers has six keys that correspond to the dots in a Braille cell, a numeric keypad, and a joystick. Students can check their work by reading a dynamic tactile display on the top of computer screen. They can also take help of the talk software for this purpose. With this software, everything that is typed on the computer is read out. After checking their work they may store it on a floppy or CD and have its print both in the Braille and standard print formats through the help of Braille and standard printers.

(b) **Provision of low vision aids with necessary training:** Many of the visually impaired children who are enrolled in educational programmes belong to the category of the children with low vision. For them the primary source of information is still visual. Therefore, it becomes necessary to make provisions and also arrange for the required training in the utilization of the proper low vision aids and equipment in order to help the low vision students in acquiring necessary information and knowledge through their residual vision. The following measures may prove helpful in this task.

- (i) There may be a provision of the availability of the text books and other printed material in large print for children with low vision. The size of the print in such books and printing material is usually larger than used in the case of sighted readers. The printed sentence you are reading now has been set in 11 point type. For the low vision students it may vary from 11 point type to 24 to 30 point type. Besides enlarging the size of the print due care should also be taken for enhancing the quality of the printed material.
- (ii) There may be due provision for helping the low vision students to make use of necessary optical aids like hand held magnifying glasses and lenses for being used with normal size type or large type books and reading material. Aids like monocular (one eye) telescope may be used for viewing the distant object of maps, experiments and writing on the chalkboard. These aids may help the children with low vision like hearing aid to a hearing impaired child or brace to a child with a physical handicap.
- (iii) There may also a provision of utilizing such aid material that can provide greater contrast in written and printed matter for helping the low vision students in their reading task. For example, yellow acetate, bold line paper, felt tip makers, etc.
- (iv) There may be a provision of closed circuit television sets helping in the enlargement of printed or hand written material or objects for being shown to the students with low vision on the television screen in the class or any learning situation. In addition to help the reading, this device may also prove quite useful in the task of writing. As the

students write under the camera, an enlargement of their writing may appear on the screen. They can thus view their own writing for its verification, enhancement, etc.

- (v) There may be a provision of proper access to personal computers for helping the students with low vision in their educational activities. With the help of specialized hardware and software, we can be successful in varying type size and type face and get magnified images of the monitor screens.

All these measures listed above are in fact helpful to the students with low vision to receive proper instruction and desired learning experience simply as these are capable of:

- (a) making room for the desired environmental adaptation in terms of making changes in distance, size, contrast, illumination or time, etc.
- (b) enhancing visual skills such as attention, scanning, tracking, etc.
- (c) making the students reach for objects through integration of the first two types of skills into functional activities.

Development of listening skills

Whether blind or having low vision, all visually impaired students have the necessity of developing their listening skills for gaining information from the environment in an effective way. Therefore, proper attempts should always be made for the systematic development of listening skills in any educational programme meant for the visually impaired children. In such attempts, they should learn to pay attention to the heard sounds, discriminating differences in various sounds and assigning meaning to them. It may further lead in building their vocabulary for the development of their speaking, reading and writing abilities. The help of the recorded materials, records and tapes, etc. may be taken for providing practices in the task of developing listening skills. The listening to the recorded material may also help them in covering more learning material much quickly than that displayed through Braille or large print books. The advanced technology involving the use of synthetic speech equipment may also help them in providing enough opportunity for learning as well as making use of their developed listening skills for gaining required information from the environment.

Orientation and mobility training

The visually impaired children suffer seriously from the problems of getting oriented to one's environment and immobility. Therefore desirable attempts should always be made in providing due orientation and mobility training to them through some meaningful instructional activities and experiences. As a matter of definition, while the term orientation in relation to the visually impaired stands for their ability to establish their position in relation to the environment, mobility on the other hand signifies their ability to move about safely efficiently and gracefully in this environment through the use of their residual vision or other senses. In this sense, while orientation training is essential for the visually impaired for getting them

acquainted with their own bodies and their surroundings in relation to their day-to-day living and world of work; the mobility training is needed for helping them to get moved from one point to another in their environment. The following things may prove helpful in providing necessary training to the visually impaired in the acquisition of orientation and mobility skills.

- (i) The visually impaired children should be given opportunity and training for building in their mind a mental image of the space and locations in which they are supposed to move.
- (ii) These children should be provided instruction and experiences for land-marking and taking clue about the positions and locations of the specific things like position of the table, sofa and chairs, doors and windows, curtains or hanging clothes, almirahs, walls, sources of heat, etc. in providing better orientation for them in terms of their position in the room or certain other locations helpful in taking decision where to move.
- (iii) They should be provided instructions in distinguishing between big and small objects, long and short distances/measures, rough and smooth surfaces, etc. helpful in taking judgements about dealing with the objects in their environment and planning for their mobility.
- (iv) They must be helped and trained to align their bodies to the objects and with sounds lying in their environment for keeping them moving in a required direction and straight line while travelling.
- (v) They must be provided instructions for learning how to avoid obstacles in their path. It has been established through systematic researches that the visually impaired children especially the blind make use of sound to detect barriers in their path, in the manner as bats do. Therefore, efforts should be made to exploit their sense of hearing (in natural and artificial way) for increasing their mobility. In addition to train the visually impaired for avoiding obstacles in their path, at their own, we as parents, teachers, school authorities, community people, society and Government authorities should also feel our responsibility to remove obstacles in the path of the visually impaired for their safe and efficient mobility. The living space in the home and work places in the school and workshops must be kept clear of objects cluttered. The place where these children move must be glare free, with high contrast and the objects they use or places where they move should be adapted and organized in a way to offer least restriction in their safe and effective moving.
- (vi) The visually impaired children should be helped in adapting themselves to the following four generally accepted orientation and mobility system, namely human guide, cane-travel, dog guide and electronic travel aids.

In the *human guide system* the visually impaired children may be trained to seek the assistance of their sighted peers or other people for helping them in their mobility.

Cane-travel. This is a system that may help the blind and other visually impaired children to travel independently with the help of a cane. The canes used nowadays for this purpose are mostly made from aluminum and vary in length

according to the users height. The user while travelling with a cane is not required to tap the cane but is instructed to sweep it in an arc, lightly touching the ground in front for getting information about the path ahead. Working on the principle of a scanner system, the use of the cane supplies such echo-ranging cues and force-impact data which may be successfully used by the visually impaired not only for searching their path but also for moving safely and efficiently. It is therefore essential that visually impaired children from their early childhood should be properly trained in the art of using proper canes for developing independent travelling ability.

Dog guide. This refers to a system in which help of a dog is taken as a guide by the visually impaired for guiding his path at the time of his mobility or travelling. However, as mostly happens the guide dog by itself cannot take a person where he wants to go, the visually impaired children as a dog users should therefore be provided adequate training for making use of the dogs as guides in their travelling.

Electronic travel aids. These represent a system of travel aids that include a number of sophisticated electronic devices helpful in sensing the objects lying in the environment of the users. As illustration of such aids we can name here the two more popular devices namely the laser beam cane and sonic guide.

Laser beam cane. This is an electronic device that emits three beams of infrared light (one up, one down, and one straight ahead). These are converted into sound after hitting the objects in the path of a visually impaired. As a result he may be able to get a signal of the objects or hurdles lying in his path (above, below or in front) simply in the same way as bats demonstrate their ability to locate objects by means of echoes. **Sonic guide** represents a sort of an electronic device which after being worn by a visually impaired child on his head is capable of emitting ultrasound and converting reflection from objects lying in the path into audible sound. The characteristic of this sound then may further help the visually impaired child for making judgement in terms of the distance, textures and directions of objects lying in his environment.

Apart from the two above mentioned electronic aids, various other electronic devices have been now searched out for helping the visually impaired in the task of their orientation and independent travelling. Mostly these devices are used in conjunction with a standard cane or dog guide. These are capable of sending out sound waves to bounce off objects for giving information to the visually impaired about their environment through auditory or tactual means.