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INTRODUCTION
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1.1 INTRODUCTION

“When one door closes, another opens. But we often look so regretfully upon the closed door that we don’t see the one that has opened for us”.

- Helen Keller

Low vision is a general term that refers to a permanent functional vision loss that cannot be corrected by medication, surgery or glasses. Low vision patients may experience a wide range of diseases, field defects, and degree of vision loss. In general, low vision can be defined as a bilateral decrement to visual acuity or visual field resulting from a disruption of the visual system. This decreased acuity or field results in an impaired ability to perform work, leisure or daily living activities. According to World Health Organisation, a person with low vision is one who has an impairment of visual functioning even after treatment and/or standard refractive correction and has visual acuity of less than 6/18 to light perception or a visual field of less than 10 degrees from the point of fixation, but who uses, or is potentially able to use vision for the planning and/or execution of a task.

The low vision population is by nature an extremely diverse group. At its extremes, it includes people with light perception as well as those who can read paperback books and newspapers without using any aid or device. The low vision population has certain unique characteristics that set it apart from both the "fully sighted" and "blind" populations. They do not have the same abilities as people with "normal" vision, they do not have the same characteristics as totally blind individuals and they have unique needs that set them apart from either group.
Optical devices, referred to as low vision devices, consist of one or more lenses placed between the eye and the object to be viewed. Such devices are designed to maximize the visual abilities of individuals by altering the size and/or the position of the “projection” of an object on the retina. They may also affect the amount of light transmitted to the eye. Thus, tinted lenses placed on spectacles frames can be considered optical devices when prescribed for the purpose of enhancing impaired vision. Some electronic devices, such as closed-circuit television systems, are also considered as optical devices. Optical devices are widely used by children with low vision in educational settings. The prescription of optical devices can be made on the basis of teacher observations with respect to a child’s measured visual acuity, visual fields, sensitivity to contrast and illumination and visual functioning. Children who are functioning at levels below their chronological age and children who have multiple impairment should be included in these evaluations.

According to Anderson, reading can be compared to the “performance of the Symphony Orchestra”. As reading is an important aspect in education, children with low vision must be encouraged and motivated to acquire reading skills in an early stage of life so that they can utilize the residual vision to the maximum. Large print with more spacing and contrast enhance the children with low vision to achieve greater perception. The large print is comfortable and easier to read, has greater working distance extends the duration of reading before fatigue and enhances the reading accuracy.
Both the use of large print at a normal or near-normal reading distance and the use of standard print at a close reading distance serve the same purpose: both enlarge the size of the retinal "image" of the print. When light that is reflected from the print enters the eye, it is focused on the retina forming a retinal image. As the size of the image increases, the image is magnified. The size of the retinal image of the print increases as the actual physical size of the print increase and as the viewing distance between the eye and the print decreases. When the retinal image is enlarged, print usually becomes more visible to the student with low visual acuity. Books in standard-size print are usually less expensive than large print books. Additional cost is incurred for optical devices that are required for the use of standard print. A book in standard print is also more accessible and is less cumbersome than an often heavy and unwidely large print book. Furthermore, large print books are rarely available to persons with low vision after high school. If a child learns how to use standard print materials, he will be prepared for any type of future employment where the use of standard print is required, but the same cannot be said of the child who reads only large print materials. Considering the importance of print media the researcher has chosen this study of reading efficiency of children with low vision in various print media.

1.2 UNIQUE NEEDS OF THE LOW VISION POPULATION

VISION SHOULD BE ACCURATELY MEASURED

Low Vision is not no vision. The definition of legal blindness is a visual acuity of 20/200 in the best eye with best correction or a visual field of 20 degrees or less. While this definition sounds precise, it is often subjective. An eye specialist who uses an eye chart that does not measure acuities between
20/100 and 20/200 may give "the benefit of the doubt" and declare the patient "legally blind" in order to give the person access to more services. Thus, a person who reads regular print with no aids risks being placed in the same category with people who have a far lesser degree of visual functioning.

The definition of "legal blindness" is not even the same in all countries. It is simply an arbitrary designation arrived at by people with 20/20 vision to determine eligibility for government services.

An oft-repeated truism in the field of visual impairment is that a fully sighted person gets 80 percent of his or her information about the world visually. In the case of a low vision person, he or she is still receiving a vast majority of the sensory input by visual means. The point at which 80% becomes 50% or 5% cannot be easily determined. Attempts to state a "percentage" of vision loss frequently fail to take into account factors other than visual acuity. In my opinion, if an individual demonstrates good visual functioning, this individual's vision should be given "benefit of doubt" while considering educational and rehabilitation programming. Certainly it does not deserve to be ignored as if it were of no importance.

A simple measurement of visual acuity is not sufficient to make blanket decisions regarding a person's education or rehabilitation. Other factors should also be considered, especially when they can have such a profound effect upon programming. Field of vision, the effects of various lighting conditions, and the nature of the eye condition including prognosis, age of onset, and cognitive functioning are important components of visual functioning. While most of these items have long been included in the State of
Texas Eye Report Form, experience has shown that all these factors are seldom addressed. Even though there are many fine eye specialists and low vision clinics that can give definite assistance to persons with low vision, more precise and accurate vision evaluations are needed to ensure that accurate decisions are made.

- **VISION MUST BE RESPECTED**

  Individual's visual functioning is dependent on a great variety of factors. In addition to visual acuity, visual field, and the nature of the eye condition, factors such as lighting, colour vision, and visual experience also play a significant role in an individual's ability to use visual information. This is why educators perform Functional Vision Evaluations and Learning Media Assessments to determine, on an individual basis, the visual abilities of each student. The Learning Media assessment makes further recommendations that will be most effective and the modifications that will enable an individual to function at maximum potential. Admittedly, these assessments are not perfect. No evaluation that depends on observation and a limited amount of contact with a student could possibly make such a claim. That is why the assessment is repeated at least every three years, and it is not relied upon as the sole factor for making educational decisions. It is considered along with medical information, evaluation by educational diagnosticians, teachers and other educational professionals, and parental input.

  Ultimately, the person best qualified to speak about visual needs is the individual with low vision. In the case of young children and people with multiple disabilities, the determination must be made by observation,
interview, professional judgement, and other means. However, in the field of education, it is a decision based upon the characteristics of each individual. It is our function as educators to help the student become increasingly aware of not only his or her visual condition, but also the adaptations necessary to function in a fully sighted world as a productive member of that society. It is the individual's responsibility to demonstrate what role the visual impairment will play in his or her life. When we make assumptions about what a visual impairment means, we run the risk of limiting what the person may ultimately be able to accomplish.

- **LOW VISION SHOULD HAVE ACCESS TO A WIDE VARIETY OF TOOLS**

  The literacy tools of a fully sighted person are print reading and writing. The literacy tools of a totally blind person are Braille reading and writing. Both are likely to use computer technology, listening skills, and other sensory input to supplement these tools. The person with low vision may use either or both of these options. In addition, this person may use a variety of other tools including enlarged print, magnifiers, telescopic aids, screen-enlarging software, and other devices to enhance communication skills. Denying any of these sources, especially print access, to those capable of using them, limits an individual's potential.

  The recognition of individuals with low vision as a distinct population with abilities and needs that distinguish it from both the totally blind and fully sighted people. As a distinct group, it deserves to have programming decisions that are based upon its unique characteristics and needs. More precise vision evaluations, respect for the individual's use of all the sensory channels open to him or her, and access to an increased availability of the
necessary tools for literacy and life would go a long way towards meeting the unique needs of the low vision population.

1.3 MAXIMIZING FUNCTIONAL VISION

People with low vision have different needs and learn to maximize their use of vision in different ways, depending on their visual conditions, age, and other factors, such as the circumstances in which they use vision. Although many persons with low vision perform a variety of daily tasks safely and efficiently with their unaided vision, in some situations, they need to use special devices or techniques for maximizing their functional vision.

A number of factors, ranging from the manipulation of elements in the environment, such as lighting and contrast, to the individual characteristics of the person’s visual impairment, have an impact on the performance of visual tasks. Professionals in the field of low vision can do much to teach and encourage individuals to integrate adaptations and devices into their daily lives. Modifying the environment in which someone lives or works can have a dramatic influence on how efficiently he or she can use vision. Choices related to environmental manipulation are usually based on one or more of the following factors: lighting, contrast, colour, distance, and size.

LIGHTING

Many persons with low vision can determine the optimal lighting for their individual levels of vision. For example, one person may find that a 200-watt light bulb provides just the right amount of light for reading, another person may find it too glare producing, and still another may find that the level of lighting is not crucial for his or her visual functioning.
For some visually impaired persons, low vision devices work best with light hitting the work surface from over a shoulder; others prefer a low vision device with a built-in light source. Thus, persons with low vision need to experiment to find the best lighting for comfortable viewing and the best way to adjust to lighting conditions over which they have no control.

**CONTRAST**

The use of contrast can be beneficial to many persons with low vision. For instance, in the kitchen, a person with low vision may choose to have a cutting board with a dark side and a light side—the dark side to be used for cutting light-coloured foods like onions and the light side for cutting dark-coloured foods, such as green peppers.

Contrast adaptations are usually not difficult to make, but most persons do not automatically think of them until some adaptations have been identified. Thus, it helps persons with low vision to ask themselves frequently, “What could I do to improve the contrast in this situation?”

**COLOUR**

Some persons with low vision who have colour deficiencies do not find techniques for manipulating colours to be useful, but others find the use of colour extremely helpful. Furthermore, certain colours may be more visible, and hence more useful, under particular lighting conditions. Colours and colour combinations that persons who are fully sighted often think are highly visible (such as red on black electronic displays) may not be perceived as such by persons with low vision. Because there are so many variables involved in visual perception, persons with low vision must experiment to
discover the best uses of colour to maximize their visual functioning. School-age children with low vision may use colour-code books and materials - mathematics in green; science in red; and reading in white.

Natural colours in the environment can also provide important clues to persons with low vision. For example, in a grocery store, a person may need only to look for many shelves of red-and-white cans to know that soup is in a particular aisle. And while travelling, a person may identify landmarks on a route by colour, so he or she knows, for instance, to turn left just after the yellow house and right between the white and brown fences.

DISTANCE

Virtually everything that can be said about the use of distance by many people with low vision can be summed up in the phrase, "get closer." Persons with low vision who have peripheral field restrictions will find the opposite to be true; they may choose to increase distance to increase the amount of information in their fields of view.

Some examples of distance manipulation include selecting a pew near the front of the church or synagogue, buying front-section tickets at a theatre, and sitting closer to the television set at home. When it is not possible to move physically closer, one can use a telescopic optical device to make objects appear closer.

In adjusting or manipulating the factor of distance, persons with low vision need to think about the trade-off between the benefits and the disadvantages. For instance, a front-section seat at the opera may help a
person to see better, but it may be much more expensive than a seat in the balcony; thus, the individual must decide whether he or she just wants to hear the music or whether it would be more enjoyable also to see the costumes and scenery. With practical experience and first-hand knowledge of how distance manipulation can assist in optimizing their vision, persons with low vision can make better decisions about how to use distance in their daily lives.

SIZE

The use of optical devices is generally recommended for enlarging materials for people with low vision, although some individuals with low vision choose to use large-print materials. However, commercially available large-print books, magazines and devotional materials are only a few types of print materials that people need to read. Some commonly used size adaptations that persons with low vision can make are large-print lists of telephone numbers and addresses written with felt-tipped pens on bold-line paper and blown-up maps, timetables, and charts, enlarged with a photocopier.

1.4 CHALLENGES OF LOW VISION

The problems of children with low vision are many and it becomes a herculean task when they are forced to challenge them. The individual should manipulate the environment by adapting lighting, contrast, distance and size. The individual can incorporate the use of low vision devices into everyday activities by selecting low vision devices that are portable and therefore easily available when needed, overcoming psychological obstacles to the use of low vision devices and exploring ways to use low vision devices throughout the day for many different tasks in many different settings.
They can maximize the advantages offered by computers by making the least adaptation to a procedure that will enable the individual to function efficiently and striking a balance among low vision devices, environmental variables, hardware, and software. They should use all the senses by exploring the use of non-visual approaches to tasks, when appropriate. They should be sensitive to the impact of factors that affect the choices by understanding the nature of their person’s visual impairment, considering the effects of fluctuating vision, making adjustments for levels of stamina and fatigue and being aware of self-advocacy and self-perception.

The use of optical devices is another approach. Optical devices are maximally integrated into one’s life when they are portable, appropriate, and used throughout the day and for many tasks in many settings. Those who feel uncomfortable or conspicuous using optical devices in public can overcome these obstacles by working with professionals to increase their level of comfort with the devices. The use of computers is still another approach; computers can be integrated into different lifestyles when they provide efficient access to the screen through such options as enlarged image and voice output.

At times, the best method for handling a task is one that does not require vision. Like those who are functionally blind, persons with low vision can benefit from learning to use non-visual approaches and may sometimes combine these approaches with their usable vision.

Approaches to solving the challenges of low vision are not always clearly evident. Because there is not always a single best solution for
performing a visual task, one chooses from among several available options. The type of visual impairment, fluctuations in vision, the level of visual stamina, and the person's self-advocacy skills are among the factors that affect these choices. The professional who takes these factors into account in presenting the many choices that are available will be able to assist the child or adult with low vision to integrate the best visual practices and adaptations effectively into his or her daily life.

1.5 LITERACY OF INDIVIDUALS WITH LOW VISION

Learning reading and writing skills is "usually regarded as a birthright." One of the essential survival skills is the ability to communicate meaningfully through the written word—to gain information from reading and to convey information through writing. To be gainfully employed in the vast majority of jobs and to function independently in life, individuals, regardless of their visual abilities, need to be literate. The value of literacy is held in such high regard in the society that the primary focus of elementary school education is to establish literacy skills. Furthermore, using literacy skills to gain new knowledge and to expand one's experiences is emphasized throughout formal schooling and beyond. In the workplace, literacy skills are required for competitive employment and advancements in almost all occupations.

Literate persons efficiently pick and choose among the multitude of signs, messages, books, magazines, and other forms of abstract symbology to accomplish whatever tasks they are required or wish to perform. Thus, literacy includes not only the selective information but also the use of it to complete a given task.
If a shopper wishes to locate a certain store at a mall, it is much more efficient for him to use literacy skills to read and interpret the mall directory than to walk up and down the aisles in pursuit of the store. If a homemaker wishes to read for enjoyment or to keep a daily journal, she must have the necessary literacy skills to do so.

But in a society that places such a high value on the attainment of literacy, problems and issues abound. As Kozol (1985) succinctly stated, "Twenty-five million American adults cannot read the poison warnings on a can of pesticide, a letter from their child's teacher, or the front page of a daily paper and parents who cannot read often raise children who cannot read" (Bush, 1990). Each time the National Assessment of Educational Progress releases new statistics on the reading and writing achievement of American youths, the general public is assaulted with more bad news on the low level of literacy of young people. In the 1992 writing assessment of students in the 4th, 8th, and 12th grades, researchers found that "fewer than 20 percent of students can write at an 'elaborated' or well-developed and detailed-level to complete a short assignment" ("New NAEP Report," 1994).

Educators and rehabilitation specialists who work with persons with visual impairments deal with weighty issues that confront the phenomenon of literacy. Although a child's congenital visual impairment does not prevent the attainment of literacy, and, similarly, an adult's adventitious visual impairment does not prevent the reattainment of literacy, low vision may present unique challenges that must be addressed to ensure full literacy.
1.5.1 CONCERNS AND ISSUES FOR LOW VISION CHILDREN

Perhaps it is an overstatement to say that a renaissance is now taking place in the way professionals in the field are thinking about, defining, and teaching literacy to individuals with low vision or perhaps not. The term renaissance is defined as "a movement or period of vigorous ... intellectual activity" and as a "rebirth, revival" (Merriam Webster's Collegiate Dictionary, 1993). At present, professionals in the education and rehabilitation of persons with visual impairments are engaged in a vigorous re-examination and restructuring of practices related to literacy, especially for those with low vision. Most would agree that this renaissance is much needed and long overdue. And it is interesting to note that the catalyst for this period of renewal has been the subject of Braille.

The American Council of the Blind, the National Federation of the Blind and American Federation for the Blind - these groups have been instrumental in promoting "Braille legislation". These organizations ensure that the Braille is regarded as an appropriate and important opinion for blind and visually impaired readers.

Students with low vision are at the center of the debate over teaching Braille reading and writing. All agree that Braille must be taught to students who are functionally blind, but the decision is not so easily made with students who have low vision. By definition, individuals with low vision often can use their vision to accomplish a variety of tasks, including reading and writing. Consumer groups, however, question the efficiency of a reliance on print reading and writing for many people with low vision, especially those who are
legally blind. Other issues are issues of definition, emphasis on the use of vision, lack of assessment procedures and various options for quick access to print.

1.5.2 ISSUES OF DEFINITION

Some consumers and professionals believe that the definition of legal blindness is an appropriate mechanism for identifying people who would benefit from braille reading and writing programs. In fact, some state laws use this definition as a criterion for ensuring that braille instruction is considered for a given student. The definition of legal blindness is an arbitrary measure of visual acuity that has little relation to how an individual uses the sensory channels for learning. Therefore, decisions about the introduction of braille reading and writing programs on an arbitrary cutoff point, rather than on the identified needs of individuals suggests that the value of braille in a person's life may likewise be arbitrary—that the person might or might not benefit from braille reading skills.

Persons with low vision are put squarely in the middle of the controversy about the definition of legal blindness simply by how well they resolve letters on a distance eye chart. Since the majority of them have vision that is useful for learning, most will benefit from learning to read and write in print. Legal definitions take into account only distance visual functioning, which is not the type of vision that is used for most literacy tasks. Although no data exists on the proportion of people who are legally blind and who are efficient print readers, a number of people who are legally blind do attain normal reading speeds and are able to sustain reading for sufficient periods to complete desired tasks.
Legislation on braille that uses the definition of legal blindness generally includes a provision stating that braille instruction is not required if direct evidence can be provided to support such a decision. This type of provision is beneficial in that it allows decisions to be made for individual students, thereby reducing the arbitrariness of using legal blindness as the criterion for offering instruction in braille reading and writing. However, such a provision circumvents the process of assessment and instructional planning. A practical approach holds that the findings of an assessment lead to the identification of a student's needs and that these needs are the foundation of a student's Individualized Education Program (IEP). When a braille reading and writing instruction is presumed or determined beforehand, the findings of an assessment must then support what may not be needed, rather than what may be needed.

In contrast to legal definitions, functional definitions of visual impairment provide information about an individual's sensory functioning, generally focusing on whether the person approaches tasks visually or tactiley. On the one hand, individuals who primarily use vision as an approach to learning are likely to use print as a literacy medium, since reading print is a visual skill. On the other hand, those who mainly use touch as their primary avenue of learning are likely to use Braille as a literacy medium, since reading Braille is a tactile skill.

Although functional definitions provide some information on an individual's sensory functioning and approach to learning tasks, they are insufficient to match a person with an appropriate literacy medium. Some
individuals may approach tasks visually at a distance, but prefer tactile methods at close quarters. Others may clearly be visual learners but have a progressive or unstable eye condition that requires attention to learning non-visual approaches. Still others may be auditory learners, but few professionals would advocate relying solely on audio-taped books or live readers as the primary literacy medium.

1.5.3 EMPHASIS ON THE USE OF VISION

Educational practices seem prone to the swinging of the pendulum. During the first half of the 20th century, students who were legally blind were routinely taught braille reading and writing. This was an absolute and therefore arbitrary practice, especially in residential schools, that represented an extreme swing of the pendulum in one direction. During the 1960s, the pendulum began to swing rapidly in the other direction with the advent of research on the effectiveness of instructional programs to increase visual efficiency. This emphasis became so ingrained in the 1970s and 1980s that teachers adopted the philosophy of using vision "at all costs," sometimes even when the use of touch or another sense would have been more efficient.

The focus on the use of vision led to the belief that reading print was the practice of choice if students had any vision with which to do so. Although some students attained only minimal reading rates with print, print reading was often considered to be the preferred practice. At the same time, during this period, Braille was generally considered to be the medium of "last resort." This perception undoubtedly prevented some students with low vision who could have benefited from Braille reading and writing from receiving appropriate instruction in its use.
With the advent of legislation on Braille and the renewed focus on issues of literacy for persons with visual impairments, in the 1990s the pendulum is swinging once more. This time, it is to be hoped that it will stop in a moderate and neutral position. More emphasis is now being placed on using a combination of media to attain full literacy. Braille is included in a repertoire of literacy tools for an individual with low vision more often than in the past. The process of making informed decisions on the contribution of Braille to the total repertoire, though this will become increasingly important to the attainment of literacy by persons with low vision.

1.5.4 LACK OF ASSESSMENT PROCEDURES

Before 1990, there were few, if any, assessment processes and strategies for selecting appropriate literacy media for students with visual impairments. Teachers usually made decisions unilaterally, without much input from other members of the educational team, and on the basis of "professional judgment," which was greatly influenced by the prevailing educational practice of the time that emphasized visual efficiency. When decisions were made on the basis of "conventional practices" and without solid objective data to support them, some students with low vision were not given literacy instruction in an appropriate medium or combination of media. Furthermore, even though many people with low vision were using print as a primary literacy medium, little attention was paid to objective measures of reading rates and stamina.

One of the more positive, although largely indirect, outcomes of the legislation on Braille was the initiation of research on appropriate, objective
assessment strategies for selecting literacy media for students with visual impairments, since most such legislation mandates the use of some kind of assessment to identify students who will or will not benefit from Braille reading and writing instruction. This requirement ensures that all decisions are guided by objective data and informed team decisions. Much work has been accomplished in this area in the past few years, and much more work is being done today.

1.6 DEVELOPMENT OF LITERACY IN LOW VISION

The attainment and improvement of literacy is a basic right of all people throughout life. To help individuals with low vision attain literacy, professionals in the field of visual impairment need to maintain an ongoing involvement in their literacy programs, providing direct instruction or consultation as needed. The following principles will guide professionals in fostering the development of literacy in both children and adults with low vision:

- Ensure that young children have a wealth of basic life experiences and direct access to early literacy events.
- Ensure that students develop academic literacy skills that allow reading with efficiency, stamina, comfort, and enjoyment during the school years.
- Teach persons with low vision multiple strategies for gaining independent and ready access to information.
- Ensure that persons with low vision develop functional literacy skills for completing daily tasks that are important for independent living and work.
• Address the unique needs of adults with adventitious visual impairment in re-establishing literacy by teaching them new approaches to reading with low vision.

• Address the needs of illiterate adults with acquired visual impairments by providing opportunities for literacy to be important and meaningful in their lives.

1.6.1 LEVELS OF LITERACY FOR INDIVIDUALS WITH VISUAL IMPAIRMENTS

❖ **Emergent Literacy**

Characteristics of low vision children are development of awareness of the purposes and functions of reading and writing in the preferred medium during the preschool years and meaningful attempts at early reading and writing tasks.

Sample behaviours of low vision children in emergent literacy are listening to someone read, associating signs in the environment with certain activities or events, scribbling and "reading" a message and recognizing one's name and some letters in print or braille.

❖ **Academic (basic) Literacy**

Characteristics of children with low vision are mastery of reading and writing skills at the eight-grade level in the preferred medium. Sample behaviours of low vision children in academic literacy is demonstrating reading skills at the eighth grade level on objective tests, with commensurate skills in writing, in the preferred medium
Functional Literacy

Characteristics of persons with low vision in functional literacy are demonstration of literacy tasks required for independent functioning at home, in school, in the community, and at work, use of strategies to gain independent access to print and development of additional communication skills as the demands of tasks and needs change and as new options become available. Sample behaviour of persons with low vision in functional literacy are asking a store clerk to state the value of bills, using telecommunications and other technology to read a newspaper in an accessible medium, using accessible word processing to prepare reports in print, requesting assistance from a sighted reader to complete a job application and earning to use a new technological device by reading the owners’ manual and using the company’s technical-assistance hot line.

1.7 CHOOSING THE LITERACY MEDIUM FOR LOW VISION

It is essential that the selection of the initial literacy medium is supported by objective information. Koenig and Holbrook (1989, 1991, 1995) suggested that educational teams gather data in the following areas namely the student’s use of the visual sense for gathering information, the student’s use of the tactile or other senses for gathering information, the sizes of objects and working distances, the stability and prognosis of the eye condition, the influence of additional disabilities on learning to read.

The educational team revises and synthesizes their decision whether the student demonstrates the characteristics of a visual learner who will make
efficient use of print or a tactile learner who will make efficient use of Braille. Characteristics of a likely print reader are: uses vision efficiently to complete tasks at near distances, shows interest in pictures and demonstrates the ability to identify pictures or elements within pictures, identifies his or her name in print or understands that print has meaning, uses print to perform other prerequisite reading skills, has an intact central visual field, shows steady progress in learning to use his or her vision as necessary to ensure efficient print reading and is free of additional disabilities that would interfere with progress in a developmental reading program in print.

The assessment phase is a safety net that continues that each student with visual impairment continues to develop functional literacy skills that he or she needs for independent living and employment. If the educational system has prepared the student to be self-sufficient and to be his own advocate, the low vision student will take over the process of assessing his or her literacy needs and will strive to meet them throughout life.

1.8 SELECTION OF LEARNING MEDIA FOR LOW VISION

The learning media assessment is the key to ensuring that students with visual impairments gain full and meaningful literacy skills. The process of selecting general learning media and specific literacy media begins in infancy and continues throughout the student's school years and, ideally, throughout life. In choosing the initial literacy medium, the educational team gathers objective data on the student's efficiency in using the senses to gain information, preferences for the size of objects and for working distances, the prognosis for the eye condition, and the implications of additional disabilities.
The educational team selects general learning media on the basis of a review of information from the observations of the student's use of sensory channels. Learning media include both instructional materials (such as globes, rulers, models, and charts) and teaching methods (such as demonstrations, verbal guidance, and lectures).

When choosing learning media for a student with low vision, the teacher should keep two issues in mind. First, particular attention must be given to the student's use of distance materials and comfort with certain teaching methods. The effective use of distance media, such as chalkboards and overhead projectors, may require preferential seating, the use of distance optical devices, or other strategies for bringing distance information into useful view. Teaching methods, such as demonstrations and gestures, may be outside the viewing distance of the student unless adaptations are made. And facial expressions, which provide many cues to learning, may not be accessible to the student at a “comfortable” working distance. Thus, thorough functional vision and learning media assessments are needed to determine the type of information the student receives at given distances, the adaptations that are necessary to gain access to visual information, levels of visual comfort and the student's efficient functional use of vision.

Second, the principle of least restrictive materials (Stratton, 1990) is a valuable framework for selecting general learning media. Stratton described four stages of learning from instructional materials namely full learning from the natural environment wherein the regular coloured pictures in a phonics book are used, mediation as a way to learn from the environment in which the
teacher points in the direction of a friend on the playground so a child can use a monocular, adaptation as a means to an end were large type materials are used until the independent use of an optical device is mastered and replacement with adapted materials in which colour labels are placed in the clothing of a child with achromatopsia.

Such an approach prepares the student to live in a world that is largely 'unadapted' and highlights the need for even young students with low vision to begin to develop independent strategies for using regular instructional materials, such as regular lined paper. As students progress through school, the use of specially adapted materials will be reduced. Instead of relying on a host of literacy tools, especially optical and non-optical devices that give them direct and immediate access to regular instructional media.

1.9 SELECTING APPROPRIATE PRINT MEDIA

Assessment of students with low vision involves collecting data on reading efficiency in various print media, such as regular print, regular print with an optical device, large print and CCTV. The appropriate selection of print media must occur within the context of other sources of information, such as clinical low vision evaluations, ophthalmological evaluations, and the administration of general achievements tests.

Teachers sometimes provide students with large print without objectively documenting its value or efficiency for the students. They may believe that large print is more efficient and less fatiguing for students or can be used at a greater working distance. However, such beliefs are not supported by research. An even more serious problem is that the exclusive
provision of large print may actually prevent students from acquiring skills in less restrictive options for gaining access to print, such as the use of optical devices. Given the extensive amount of regular-print materials and the limited amount of large-print materials, the reliance on large print substantially restricts an individual's access to the majority of literacy materials. Therefore, a procedure that helps a special educator make these decisions for individual students is the most appropriate.

1.10 PRINT MEDIA AND LITERACY

Large print is a valuable way for some people with low vision to gain access to print information, but it cannot be the only option. Reliance only on large print restricts one's access to information and requires the use of a photocopy enlarger or another means of enlarging materials that are not commercially available.

Whereas some people believe that Braille and 18-point type (standard large type) are the only options for readers with low vision, others believe that it should first be determined whether students will benefit from using optical devices. If the only option permitted for students with low vision is Braille or large print, then assessment remains incomplete because the size of type and the approach to print access appropriate for the individual may still be issues. However, if those who can read 18-point type are assessed for the use of optical devices, then a meaningful comparison with Braille reading and writing can be made. Some individuals who cannot sustain the reading of large print unaided can be efficient readers with optical devices.
Part of functional literacy is the ability to gain access to print independently when information is not in one's preferred medium. Hence, in developing functional literacy in persons with low vision, teachers and rehabilitation professionals should focus on providing a range of options for doing so. Optical devices are an instant, effective, and inexpensive way to gain such access, both at near point and at a distance. The use of non-visual media, including audiotaped materials, synthetic speech produced on computers, and live readers, should also be learnt. Both teachers of students with visual impairments and rehabilitation specialists should take responsibility for expanding children's and adult's options for gaining access to print and should never restrict options because of personal biases or poor-quality, fragmented services.

1.11 PREVALENCE OF VISUAL DISABILITY

The WHO estimates that approximately 10% of the world's population suffers from disabilities. In the context of India, that would translate into approximately 103 million people with disability in 2001 and 89.3 million in 1991. However, the sample survey conducted concluded that only a 1.9% incidence of disability existed in India.

The Central Coordination Committee (CCC) stated that a figure of 5 million PWDs in the country would be a conservative total given that the consensus among non-official sources, as well as the Rehabilitation Council of India, is that approximately 10% of the country's child population has special needs. Based on a total of 300 million children aged 0-14 in India, the
estimated number of disabled children alone, depending on which estimates are used, would be 6 to 30 million.

According to the India development Report (1999), the incidence of various types of disabilities among the population 0-4 years was 2042 per 100,000 and 2896 per 100,000 children the age group of 5-12 years. In the age group 5-12, the prevalence was as high as 6779 per 100,000, 4670 in Himachal Pradesh and 4519 in Tamil Nadu.

The CCC estimates that there are 2,500 special schools in India that include children with special needs in integrated and inclusive settings, or in non-formal education. These schools educate a total of 100,000 children with special needs.

Out of every one lakh persons, about 269 (240 for male and 301 for female were visually disabled. Among them, 72% were blind and 28% had low vision. The prevalence of visual disability is substantially higher among the females. Also, the rate among the rural residents (296) is significantly higher than among the urban residents. About 24% reported old age as the cause for their blindness. Cataract is also reported to be one of the main cause of blindness. This suggests that blindness is essentially an old age problem. Even for the persons with low vision the situation appears to be similar. The tables below highlights the causes of blindness and low vision and the age at the onset of visual disability identified through the survey.
TABLE – 1
Per 1000 Distribution of persons with blindness by cause of blindness for each sex and sector

<table>
<thead>
<tr>
<th>Cause of blindness / Low Vision</th>
<th>Rural + Urban</th>
<th>Rural + Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>Blindness</td>
<td>Low Vision</td>
</tr>
<tr>
<td>Sore eyes first month life</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Sore eyes after one month</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Severe diarrhea before age six</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Cataract</td>
<td>192</td>
<td>223</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>Corneal Opacity</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>Other eye diseases</td>
<td>183</td>
<td>157</td>
</tr>
<tr>
<td>Small pox</td>
<td>51</td>
<td>40</td>
</tr>
<tr>
<td>Burns</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Injury other than burns</td>
<td>54</td>
<td>28</td>
</tr>
<tr>
<td>Medical/surgical intervention</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>Old age</td>
<td>202</td>
<td>272</td>
</tr>
<tr>
<td>Other reasons</td>
<td>90</td>
<td>55</td>
</tr>
<tr>
<td>Not known</td>
<td>87</td>
<td>92</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
<td>1000</td>
</tr>
</tbody>
</table>
TABLE – 2

Per 1000 Distribution of persons 60 years and above with blindness and low vision by age at onset of disability

<table>
<thead>
<tr>
<th>Category</th>
<th>Disability since birth</th>
<th>0-4</th>
<th>5-9</th>
<th>10-14</th>
<th>15-19</th>
<th>20-24</th>
<th>25-29</th>
<th>30-34</th>
<th>35-44</th>
<th>45-59</th>
<th>60 &amp; above</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blindness</strong></td>
<td>All male</td>
<td>21</td>
<td>5</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>41</td>
<td>214</td>
<td>683</td>
</tr>
<tr>
<td></td>
<td>All female</td>
<td>15</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>25</td>
<td>246</td>
<td>666</td>
</tr>
<tr>
<td></td>
<td>All persons</td>
<td>18</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>8</td>
<td>32</td>
<td>233</td>
<td>673</td>
</tr>
<tr>
<td><strong>Low Vision</strong></td>
<td>All male</td>
<td>13</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>233</td>
<td>729</td>
</tr>
<tr>
<td></td>
<td>All female</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>14</td>
<td>258</td>
<td>708</td>
</tr>
<tr>
<td></td>
<td>All persons</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>248</td>
<td>717</td>
</tr>
</tbody>
</table>

The tables also show that both in rural and urban sectors, regarding the age for onset of visual disability, the percentages tend to be higher in the first three age groups, (birth to four years) than that in age groups upto thirty five years. This also shows that apart from old age, visual disability tends to manifest itself during the early years.

1.12 NEED FOR THE STUDY

The print media assessment is the key to ensuring that students with visual impairments gain full and meaningful literacy skills. The process of selecting print media begins in infancy and continuous throughout the student’s school years and ideally throughout life.

In choosing the print media, first the educational experts should find out the primary sensory channel for low vision children based on preferences for the size of objects, working distances, the prognosis for the eye conditions.
and the implications of additional disabilities. Second the focus of this assessment phase is to ensure that the student learns to use variety of print media to meet the levels of present and future environment.

Every low vision child needs a variety of options for completing reading and writing tasks. Given a full repertoire of literacy tools, they can then deliberately choose – with instruction and guidance – which option or options will be the most efficient for completing any given task. Individual needs of low vision may be changed considerably over the years. Therefore, the instructional programme and strategies should change as well.

The selection of appropriate literacy media has been a primary educational issue for professionals in the field of visual impairment. For students with low vision, an additional component of the assessment process is the examination of their reading efficiency in various print media. This evaluation allows the educational team to judge the relative effectiveness of reading in two or more print options. Such as large print, regular print, closed circuit television and computer.

As students progress in school, they should develop skills and responsibilities for gaining access to information in print that foster their independence in performing a variety of reading tasks. Therefore an assessment of reading efficiency in various print media is important for both children with low vision as well as special educational personnel.
1.13 STATEMENT OF THE PROBLEM

Optical devices do not "cure" impaired vision; they simply allow a child to make maximum use of low vision. Optical devices may be used in conjunction with other strategies to maximize visual functioning such as environmental modification and non-optical devices. Due to the optical restrictions imposed by many devices, some children will require instruction in their use beyond that provided by the clinical low vision specialist, Teacher of Children with visual impairments have a responsibility to offer such instruction. They are aware of the relationships between the use of print media and the visual demands of school tasks.

The sophistication of a visual print media does not necessarily correspond with its usefulness. It is important to note that each media possess advantages and disadvantages, and the use of one type of media may be suitable for one particular child but may not be appropriate for another. Some children will require only one media to meet their visual needs, while other children will require two or more to accomplish the same purpose.