

“CLASSROOM ADAPTATIONS FOR STUDENTS WITH LOW VISION”

By Daniela Gissara (*)

This article provides information about a visual impairment called Low Vision (LV), including the causes and implications in learning and development.

It can help educators to understand the different categories of LV and plan strategies and accommodations to improve visual access to the environment for students with this kind of impairment.

Introduction to low vision

According to the World Health Organization, there are 285 million people with visual impairments worldwide. 16.6% of them live in African countries. 39 million people with visual impairments are categorized as blind and 246 million are considered Low Vision (LV).

Children who are below age 15 and live in developing countries are at risk of visual impairments.

It is estimated there are 19 million children with visual impairments around the world.

The number of children with LV is 3 times higher than the number of children with blindness.

Children with LV need specific educational and rehabilitation interventions in order to achieve a full psychological and personal development.

Topics:

- 1) Definition of concepts: visual impairments, blindness, low vision, multiple disabilities and deafblindness
- 2) Causes of low vision
- 3) Psycho-social barriers faced by students with low vision
- 4) Implications of low vision in learning and development

Topic 1: Definition of concepts

A visual impairment is a condition of decreased vision due to congenital (from birth), hereditary or traumatic causes, remaining even after treatments like surgery and the use of glasses. In other words, it is caused by a visual system that is not working properly or not formed correctly. The term is used to mainly describe blindness and LV.

Children who are completely blind cannot see anything—even light.

Children with low vision still have a visual impairment after correction (glasses or surgery), but with the potential for useful vision. This means they experience difficulties accomplishing every day activities that include visual tasks, even if they wear glasses. However, their abilities to accomplish these tasks can be enhanced by the use of compensatory visual strategies, low vision devices, and modifications to the school and home environment.

When talking about children with visual impairments it is important to understand that not all of them are completely blind. On the contrary, most of the children with visual impairments have LV so they have some useful vision that helps them to visually perform daily activities.

Many children with visual impairments also have additional disabilities. The term multiple disabilities refers to simultaneous impairments (such as intellectual disability-blindness, physical disability-low vision, etc.) and the combination of which causes such severe educational needs that they cannot be accommodated in a special education program solely for one of the impairments. If they are in an inclusive setting, they will need special support as well. When children have a hearing disability in addition to the visual impairment this is called deafblindness. This doesn't necessarily mean they experience a complete loss of vision and hearing. The term actually describes an individual who has some degree of loss in both vision and hearing after correction (e.g., hearing aids or glasses). The amount of loss in either vision or hearing will vary from child to child.

Topic 2: Causes of low vision

Causes of LV vary around the world. In a Sub-Saharan African country like Uganda, it is primarily caused by cataract, glaucoma, corneal opacities (cloudy cornea), trachoma, onchocerciasis, albinisms and uncorrected refractive errors like myopia (short sighted), astigmatisms and hyperopia (long sighted).

LV can also be caused by a vitamin A deficiency and the use of harmful traditional eye remedies.

Some children are born with an anomaly, disease or injury that causes LV and other acquire LV later in their lives.

Visual impairments are diagnosed by doctors. If a student has any of these conditions, an eye exam and/or an interview with an eye doctor will help in understanding the impact of the visual condition in the child's learning and development.

Topic 3: Psycho-social barriers faced by students with low vision

Individuals with LV often say that they are neither blind nor sighted but somewhere in between. Society's perception of vision is also like this, either you are totally blind or you can see. However low vision lies in between thus tends to cause confusion and misinterpretation of the abilities and skills of low vision students.

For example, if a child with low vision has not been diagnosed, he may go unnoticed, and just appear distracted, clumsy or as a slow learner. Furthermore, it may be difficult for parents and teachers to understand that a child may have difficulties seeing things clearly in the distance, but seems to perform well at near distances. Since they might not know about the impact that the amount of light has in visual function they may believe a child has behavior problems just because he doesn't feel comfortable when the lighting changes.

Young children with LV may not understand their visual impairment and might not know what they are not seeing because they don't have any comparison to "normal or typical" vision. For example, they may not know that people with typical vision can recognize faces at further distances. They may not know that people with normal vision don't need to hear someone's voice in order to identify who came into a room.

Older children may feel confused about their identity and self-worth and may have difficulties understanding their position in society. They may become withdrawn.

Therefore, it is important that these children build trust with family members and teachers to talk about their visual impairment.

Topic 4: Implications of low vision in learning and development

80% of the information received from the environment is perceived by the visual system, or sense of sight. The eyes are responsible for collecting and focusing the images of the objects in the retina (in the back of the eye). The brain and the visual cortex (the back part of the brain where visual information is processed) are in charge of receiving, organizing and offering a response to what is perceived.

Human sight provides much more information in a less time than any other sense. It offers such detailed information that the surrounding environment can't be as accurately perceived by the other senses.

Children learn through the visual sense by imitating what they see. This constant visual stimulus encourages movement, exploration and curiosity.

Consequently, when children suffer from a condition that causes LV they can present cognitive/intellectual, communication, motor and social challenges.

The impact that LV may have in learning and development can vary accordingly to the severity of the condition, time of life when the disability developed, cultural environment and socioeconomic level, access to appropriate educational and rehabilitation services and presence of additional disabilities. This means that children of the same age and with the same diagnosis can have different visual performances and diverse educational needs based on their unique characteristics as individuals.

Categories of low vision

When a child with LV is diagnosed by an eye doctor, the professional first identifies the disease and then mainly assesses the visual acuity and the visual fields in order to confirm the presence of LV.

Visual acuity is the eye's ability to distinguish details and shapes of objects at a designated distance. It helps us to determine WHAT the things we see are. A person with normal vision has typical visual acuities in both eyes.

The visual field is the area that can be seen when looking straight ahead and it is measured in degrees. It helps us to determine WHERE the things we see are. A person with normal typical vision has full and complete central and peripheral visual fields in both eyes.

Often, people with normal vision needs glasses in order to better see details but this does not mean they have a visual impairment.

In order to have LV, a child must have a moderate, severe or profound loss of visual acuity and/or very reduced visual fields that cannot be improved by any treatment. But it is important to remember that even with reduced visual acuity or affected visual fields, children with LV can learn to use their vision to plan and execute visual tasks.

Since LV is determined by visual acuity and visual field losses, the diseases or conditions that cause LV can be placed into 4 categories related to these functions and they will be discussed in depth.

Topics:

- 1) Reduced visual acuity
- 2) Central visual field loss

- 3) Peripheral visual field loss
- 4) A combination of categories

Topic 1: Reduced visual acuity

Cataract, corneal opacities (cloudy cornea), trachoma, onchocerciasis (lesions on the eyes caused by worms), albinisms and uncorrected refractive errors are some of the most important conditions that cause LV and severely reduce visual acuity. This basically means that the child does not see clearly.

Children with LV and reduced visual acuity often experience:

- Difficulty when seeing details (either at distance, near, or both)
- The need to be close to an object being viewed (sometimes less than 3-inches)
- Less interest in the visual environment around them
- Preference of using other senses like touch or hearing
- Difficulty judging or calculating distances
- Sensitivity to glare (great discomfort in very bright areas, or when there is a reflection off a smooth surface like floors, white boards, etc.)
- Visual fatigue when their vision is used over an extended period of time (when doing near vision work like reading or distant vision activities like attending to a classroom board)
- In the classroom, these students:
 - May hold a book really close to their faces even while wearing glasses and reading
 - Can have difficulties when reading conventional print materials like the ones used by their classmates
 - May struggle when reading their own handwriting since it could be irregular or even unintelligible
 - Since they have difficulties with distance viewing, looking at and copying from the board could be difficult
 - May need more time to accomplish what was asked by the teacher

Topic 2: Central visual field loss

Ophthalmological conditions like degenerative myopia and Stargardts are some of the most important conditions that cause LV and affect the central visual field.

A central visual field loss usually means that there has been some damage to the center part of the retina (the back of the eye). When a child intentionally fixates his eyes on a target, the object cannot be clearly seen or perceived as a whole. This basically means that the child has a blind spot when looking.

Children with LV and this kind of loss often experience:

- Difficulty when seeing details (either at distance, near, or both)
- Serious difficulties when reading and writing
- Incomplete or “blurred” images
- Loss of color discrimination or difficulties to identify colors (similar colors can be confused like red/orange, blue/black, etc.)
- Difficulties when recognizing faces and maintaining eye contact
- Fatigue so they are at risk of being labeled as inattentive

It is common that these children adopt unusual head positions when reading or writing with the purpose of seeing better. This is their strategy to compensate for their visual loss. If this positioning works for a particular child, not only must he be respected but encouraged in order to improve visual performance.

Topic 3: Peripheral visual field loss

Glaucoma and retinitis pigmentosa are some of the most common conditions that cause LV and affect the peripheral visual fields.

A peripheral visual field loss is the opposite of a central visual field loss. In this category it is the edges of the retina (back of the eye) that are damaged. The peripheral retina does not provide very sharp visual acuity; instead it is responsible for our awareness of the objects around and helps us adjust to changing levels of illumination.

Children with LV and this kind of loss often experience:

- Decreased spatial awareness. They have difficulties to identify obstacles in the environment. When walking, they may bump or stumble into objects. They could lose the ability to quickly form spatial relationships between objects or object to self
- Decreased visual efficiency. Even though the ability to see details is preserved because their visual acuity is good, children may have ocular motility problems. This means difficulties following a moving object (a car passing on the road), problems when reading a line, difficulties when scanning the environment (looking of an empty seat in the dining hall) and changing the gaze between one object and another (looking to the board and then writing on a notebook)
- Need for increased illumination (more light). The peripheral retina helps us to see better when the lighting is dim. When there is a visual field loss that affects the peripheral retina, additional illumination or more light is needed to maintain function. They really have difficulties seeing at night
- Poor light/dark adaptation. As stated earlier, the peripheral retina helps adjust to changing levels of illumination (think about playing outside during break time and coming back again indoor to the classroom). When this area is damaged a child may adjust more slowly or may never be able to adjust at all

Topic 4: A combination of categories

The visual acuity and the visual fields can be affected at the same time when children have more than one disease or condition that reduces vision.

For example, some children can have albinisms and be short sighted. Others can present onchocerciasis and glaucoma.

Strategies and recommendations for addressing low vision

When working with children with low vision it is important to remember that they have the potential to learn to use their vision in a more efficient way. So, what can teachers do to help them reach their maximum level of visual efficiency?

Teachers and other professionals working with these children have to provide the necessary instruction and environmental modifications to help students maximize their visual ability, develop a positive self-image and greater independence in the classroom and the community.

In the following topics, strategies and recommendations to better address the needs of children with low vision will be presented.

Topics:

1) General strategies, activities and materials for students with low vision

Subtopic 1.1: illumination

Subtopic 1.2: color and contrast

Subtopic 1.3: size and distance

Subtopic 1.4: organization of time and space

2) Specific recommendations for students with reduced visual acuity

3) Specific recommendations for students with central visual field loss

4) Specific recommendations for students with peripheral visual field loss

5) Final tips

Topic 1: General strategies, activities and materials for students with low vision

It is important that educators learn to change the environment or alter objects to make them more easily seen for their students with low vision. When planning environmental modifications, considerations about lighting, color and contrast, size and distance and organization of time and space have to be taken into account.

Please remember that even though children with low vision will benefit from the following recommendations, when making specific suggestions to improve vision it is essential to consider the characteristics of the visual impairment (if it causes a reduced visual acuity, a central visual field loss or a peripheral visual field loss).

Subtopic 1.1: Illumination

Some children with low vision are very sensitive to light and glare. Teachers should control the light in the classroom when possible using curtains, maintaining an even amount of light throughout the room, sitting the child against windows, reducing the glare on surfaces and suggesting the child wears a hat/visors or sunglasses even when staying indoors .

Other children need more light and it is recommended to allow the child to position himself around natural light (windows) when possible. When using lamps (if available), they should be placed behind the child's shoulder, on opposite side of writing hand and/or same side as stronger eye.

Subtopic 1.2: Color and contrast

Children with low vision may benefit from high contrast objects and pictures. For example, the lines on a piece of paper are easier to see if they are highlighted with a black marker. When having lunch, the white utensils are better seen if they are placed on a red tray than on the white table. The student will be able to better read his own writing if he uses a thicker black pencil/pen/marker.

Basic principles when using color to create contrast: black and white give highest contrast, do not use dark colors together (like blue and green), avoid using white and gray with other light colors, avoid using pastel colors next to each other, use high colored objects for daily life activities, use masking tape if an object has to be highlighted (like the hanger where the student has to hang his jacket on).

Student may also need a typoscope when reading.

This is a reading shield that it can be made of a black material (or cardboard) in which there is a rectangular (cut out) allowing one or more lines of print to be seen. It reduces extra light reflected from the surface of the paper and helps the student to stay on the correct line while reading.

Subtopic 1.3: Size and distance

Children with low vision might also benefit from magnification. Educators can offer their students pictures/images/maps and enlarged print. These children may also prefer to work at close distances. They can be moved closer to the object (sitting closer to the board) or the object can be moved closer to the student (people can get closer when talking).

Subtopic 1.4: Organization of time and space

To reduce the visual clutter in the classroom, educators should: remove useless objects in general, reduce the number of objects in the immediate working area, use masking tape to improve the color/contrast on doorframes/tabletops/etc., spot lights to highlight a particular area and maintain the place and all the school supplies well organized so the student can easily identify them.

To provide greater physical comfort and encourage appropriate posture, educators can provide their students with: a reading/writing stand, a clip board, a standing lamp and a proper chair/table.

Children with low vision may also benefit from an efficient use of time. Educators can: encourage the child to wear his prescribed glasses (if appropriate) to reduce visual fatigue, propose pre-arranged breaks, allow the student to be visually focused for shorter periods of time, offer more time when visually exploring a material and when concreting a visually challenged task (for example working with a material that hasn't been adapted to the student's visual needs).

Topic 2: Specific recommendations for students with reduced visual acuity

These children may benefit from prescribed glasses (if used as recommended by an eye doctor), magnification (enlarged print and images), high contrast materials (like highlighting reading materials, stairs, doorways) and preferential seating (moving closer to object/board/etc.).

If glare sensitivity is an issue (what is usual in cases of reduced visual acuity), educators can eliminate or reposition the source of light, position the child away from source and/or recommend the use of sunglasses and hats (especially out of doors).

If the student has difficulties with distance viewing, teachers can try to familiarize him with the proposed task and environment. If the area is visually simplified (fewer objects are around his visual target) and a visual break is allowed the student may highly increase his visual performance.

Topic 3: Specific recommendations for students with central visual field loss

Children with this kind of vision loss often benefit from the same implemented strategies than in the case of reduced visual acuity (mentioned above).

What is important to highlight is that these particular students may experience incomplete images or a central “blind spot” when looking. For this reason, qualified vision teachers should teach this specific group of children to visually scan, trace and follow objects. Since they also appear not to maintain direct eye contact, it is recommended to have them practice how to turn their eyes to establish direct eye contact and to give them feedback about this when interacting directly. If they also present a reduction of the ability to see differences in color, clothing and frequently used objects should be labeled with their color.

Topic 4: Specific recommendations for students with peripheral visual field loss

Learning to use a white cane by having access to Orientation and Mobility training might be necessary for this group of children. Since they may not be aware of objects or people moving across their path they may need to rely on their other senses to be aware of their environment. Educators can then teach them to use a multi-sensory approach to gather information; which is based on being more aware about not only visual cues but also tactile and auditory input when travelling.

To help them improve their visual performance it is also essential to eliminate/reduce extreme changes in illumination and to offer enough time for eyes to adjust to changes in lighting before engaging in activities (for example when entering indoor from outdoor the child may need more time for their eyes to adjust).

These students may also need additional, glare-free illumination. Ideally, classroom should have good overall lighting supplemented by task lighting (desk/floor lamps, spotlighting). This can also be achieved by proper positioning of the student’s seat.

Topic 5: Final tips

When educators put the above recommendations in place, they offer their students opportunities for more active interaction while motivating them to use their vision in a more efficient way. Presenting meaningful activities, using age appropriate materials and offering clear information through repetitive routines will be always appreciated by children with low vision.

However, it is important to be aware that these strategies are only intended as suggestions. As studied through the module, children with low vision benefit from specific strategies that consider their particular visual needs. And they will benefit greatly if their teachers start believing that they also can learn despite their reduced, low vision.

(*) Daniela Gissara is an Optician, a Teacher for the Visually Impaired and a Low Vision Therapist. She has been working with children with low vision for more than 10 years and has provided training for Perkins International in Latin America and Asia. She currently works in the United States as an Educational Specialist for the Educational Leadership Program at Perkins School for the Blind.