Visually Impaired and Blindness Information and Research
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Blindness does not have a cure, nor does it truly impede. Blindness within the schools is not as frequently found as other disabilities found today. Often a teacher will not encounter students with blindness or visual impairment for years at a time. Many times the teacher is unprepared and untrained in the inclusion of students with a visual impairment or blindness. There is no reason to doubt the abilities of music and the blind. Many times the students will excel in the music room. Looking at the professional range of musicians we also find great musicians that are highly successful even with visual impairment or blindness. Stevie Wonder, Andrea Bocelli, Ray Charles, Jose Feliciano, and Sammy Davis Jr. are a few of the musicians that have shown the impairment is not indicative of failure or success in music. Individuals with visual impairment or blindness have held positions in nearly all fields of study, political positions, and professions.

In defining blindness and visual impairment it is curious to find that some organizations and groups have different definitions. The common sense (Layman) definition is that Blindness is the inability to see (anything), and Visual Impairment is a percentage of vision. In many places or articles you may encounter the terms low vision, visually impaired, partial vision, legally blind, or 20/200. The American Foundation for the Blind has nine terms to define the visual impairment or acuity one may encounter. Their terms are Vision loss, clinically diagnosed vision loss, self-reported vision loss, legal blindness, total blindness, low vision, visual impairment, functional limitation, and visual acuity. In the "Music in Special Education" book by Adamek and Darrow the number of students treated for visual impairment by the IDEA act in 2005 was over twenty-six thousand. In the same book, Adamek and Darrow speak of the same causes the AFB speaks of with a few additions. The lesser common reasons for visual impairment come from abnormalities in the physical development of the young. Tumors, muscular anomalies, and disruptions of the development behind the eyes are those lesser common reasons for visual impairment in the young.

One of the causes of blindness is a disease (e.g. Trachoma). In many developing countries the necessary medical prevention and treatments of many diseases are not available. In "Turning the Tide of Corneal Blindness" most Asian and African areas show over 10% of the population being afflicted with visual impairment. The article continues to say four factors can promote prevention; *Eyelid Surgery*, *Antibiotics*, *Facial Cleanliness*, and *Environmental improvements to prevent transmission*. This "SAFE" concept is a step towards lowering the percentage. The main focal points of disease prevention and visual health are the treatments of Trachoma (bacterial infection), and Onchocerciasis (river blindness from a parasite). Additionally, vitamin A deficiency and Primary eye care health are areas of concern for third world and developing countries. Another cause of blindness is Glaucoma. This cannot be cured but treatment with eye drops and surgery can help. The National Institute of Health says African Americans and Hispanic cultures have a high percentage of Glaucoma cases. Along with Macular degeneration (age-related) loss of vision, Diabetes can play a huge part in vision loss. The National Institute of Health says that "timely treatment; adequate control of blood sugar, blood pressure, and cholesterol levels; and regular follow up, 90 percent of all cases of blindness from diabetes can be prevented." Genetics plays a huge part in the study of blindness or vision loss from birth. The National Federation of the Blind says Albinism, Amblyopia, Cataracts, Colorblindness, and Congenital Eye Defects are causes for visual impairment or blindness from genetics. Other reasons for blindness or visual impairment are trauma or injury to the eye(s).

The only diagnosis comes from the ophthalmologist and on a regular visit. The typical diagnosis comes from the eye exam and through visual testing. Anyone that has ever had their eyes checked remembers the dilating, reading the lines, comparison lenses, blinking lights, and air pressure test. Advanced techniques are done with computers that will look towards the curvature of the lens as well as other physical aspects of an individual's eyes. The "Care of the Patient with Visual Impairment (Low Vision Rehabilitation)" by the American Optometric Association shows in their guideline a flowchart to diagnose the person which includes history, assessment and diagnosis, and the assessment details (central, peripheral, distance, near, etc.).

Braille is the key assisted device/medium for those without sight. The braille alphabet is made up of 26 variations of 6 raised dots (cells). Each combination provides each letter of the alphabet. In addition to the alphabet, there is a numerical sequence, as well as abbreviations, contractions, and shorthand. In many places, you may also encounter raised pictures or icons on signs instead of braille to indicate a restroom, stairs, directions, exits, etc. In some locations and centers for the blind, there are typewriters, computer programs, printers, label makers, and keyboards for typing, and printing braille. CU Boulder has a department for Disability Services on campus that has Braille writing computer programs, and a printer that will print the raised cells. Braille also has a system for music in which the note duration and pitch are indicated in the cells. While there are many symbols and icons in music the Braille music

combinations are extensive. Some may be written out or some may have combinations of cells. This has a lot to do with the context of the braille. Many people with severe cases of visual impairment or blindness will use a white cane to navigate, sunglasses to protect their eyes from sun damage or objects, and in some cases a service canine for more advanced navigation. Advancements in technology have been very effective and useful for the visually impaired. Cell phones and computers that will speak written words are very common. There is also a great number of computers that have options to dictate what is spoken into a microphone. Aside from the programs in normal computers, there are also computers built for the blind with emphasis on the keyboard being tactile and with braille. As with the cane, many people with blindness can also use sonar and echoes to navigate and know where obstacles may be. Some may use clicking by mouth but there are also handheld sonic devices for sale that will make noise for the echolocation techniques. Other amazing things for purchase that are meant for the blind are watches (by touch), shoes (with proximity sensor), and games. Lastly, some amazing things are being created to enhance the abilities through technology. Cars are being created for the blind that uses robotics, laser rangefinders, and GPS. Glasses are being produced by Verizon that will speak to the wearer about what they are pointed towards. The glasses have a database of information that can tell the wearer who and when specific art was painted when to walk across the street by the lights in front of them, as well as recognition of faces, colors, barcodes, and money.

The people that have visual impairment or blindness have resources at many schools. There are trained professionals that work in the school or come to the school for the assisted training. Colorado Center for the Blind has programs set in place for the training and education of the blind. Several programs include those for independent adults, students in college, youth programs, senior programs, and programs for training professionals. The youth programs are geared for all grade levels (Elementary, Middle H.S., and College Prep) that focus on independence, positivity, confidence, age-appropriate social events, finding sources, and training on technology. Furthermore, each state has schools for the blind and visually impaired. These schools have teachers trained in all the subjects that are also equipped to teach students that are visually impaired and blind. Some states may even have more than one school of the blind when there are multiple larger cities (e.g. Colorado).

In the state of Colorado, there are services for those with blindness. The Department of Human Services and Department of Education both have services for individuals that are blind or visually impaired. The department of Human Services has a Division of Vocational Rehabilitation, Statewide Independent Living Council and Older Individuals who are Blind Program, and Business Enterprise Program. DVR places persons with disabilities into the workforce and assists them to be successful and live independently. Colorado SILC also is in the business of placing people with disabilities, assist in independent living, as well as educating the public on independent living. The American Foundation for the Blind has numerous centers in Colorado alone that offer many different services. The centers have Braille instruction, Counseling, Independent living skills/training, employment and job training, recreation services, travel orientation and mobility, and professional training for internships and in-service programs.

As previously mentioned the students and professionals with blindness and visual impairment have few restrictions and find great success in music. Theories abound about the other senses being heightened when one is taken away. When reading music we know there is a system in place for braille music, other than that hands-on, aural, and experiential learning can be used to teach instrumental or vocal music. Eye-sight is hardly necessary for musicians. In the classroom, I have found that having set places for chairs, stands, percussion, and furniture is helpful. The student can become familiar with the room and location of everything ahead of time and therefore be comfortable in class.

Currently, there are no absolute cures for blindness, the optic nerve cannot be transplanted but cornea transplants can restore some vision. There have been great advancements in laser surgery in the past 20 years as well as the aforementioned assisted technology for individuals with blindness. Without great detail and extensive research, companies and organizations are working on additional implants, new surgery techniques, and stem cell/cell transplants.

Visual Impairment and Blindness are very real and have not seen much development in a cure in a long time but the progress on devices and technology have been vast. Those with partial sight or no sight have organizations, centers, companies, and medical departments working diligently on cures, assisted technology devices, and helpful/useful day-to-day items. In the respect to music, the students have very few obstacles in comparison to other disabilities. The sheet music can be printed in braille and the rest of their senses do the rest of the work. This is the disability easiest to accommodate and should be considered less of a disability and more of differentiated instruction. Conclusively the students that have visual impairment or blindness can be some of the most successful students or professional musicians one encounters.

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