A LOW VISION AIDS AND ASSISTIVE TECHNOLOGIES RESOURCE
HANDBOOK FOR DSP COUNSELORS

A Project

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in

Counseling
(Vocational Rehabilitation)

by
Candido Servera, Jr.

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Graduate and Professional Studies in Education
Abstract

of

A LOW VISION AIDS AND ASSISTIVE TECHNOLOGIES RESOURCE
HANDBOOK FOR DSP COUNSELORS

by

Candido Servera, Jr.

Statement of the Problem

Candace Roe, the DSP Coordinator and Counselor at Solano Community College, recognized that there was a need for information about low vision aids and assistive technologies that could assist students with visual disabilities. It is necessary the students have well informed DSP counselors who can propose appropriate accommodations and recommendations.

Sources of Data

The data were compiled as a result of library database searches using EBSCO HOST, ERIC, journal articles, Google searches, organization websites, state and government websites, personal interviews, and textbooks.

Conclusion

A resource handbook was developed to inform the counselors of the aids and technologies currently available. The handbook is intended to be used by counselors at Solano City College who provide academic, personal, and disability-related counseling
for students with disabilities. The goal is to improve interactions between counselors and students to create an inclusive learning environment.

_________________________, Committee Chair
Guy Deaner, Ph.D.

_________________________
Date
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Chapter 1
INTRODUCTION

Background of the Problem

People with visual disabilities have historically faced discrimination. Individuals who were blind or visually impaired were often discarded at birth, abandoned, housed in sanitariums, or socially excluded from their communities (Koestler, 2004). As recent as the early to middle 20\textsuperscript{th} century, it was the belief that “blindness should be made as inconspicuous as possible, and that the use of a dog guide or a distinctive cane attracted undesirable public attention” (Koestler, 2004, p. 337). Such a belief further marginalized this group and made social and economic advancement difficult (Koestler, 2004).

Legislation was passed to address the inequality experienced by individuals with disabilities. The Rehabilitation Act of 1973 prohibits discrimination on the basis of disability by the federal government or agencies that receive federal funding. This legislation also allocates grants to states for vocational rehabilitation services (Taylor, 2011). The monies are used to provide vocational services and independent living skills to help people with disabilities obtain a desired level of independence. However, this federal law did not provide civil rights protection to those individuals in the private sector. The Americans with Disabilities Act of 1990 (ADA) addressed this issue by prohibiting businesses and other entities outside the federal government from discriminating against people with disabilities on the basis of a disability. The ADA defines disability as:
(A) a physical or mental impairment that substantially limits one or more major life activities of such individual;
(B) a record of such impairment; or
(C) being regarded as having such impairment (Americans with Disability Act, n.d., Sec. 12102, para. 1)

Despite these civil rights laws, people with visual disabilities have experienced a high rate of unemployment (Houtenville; Kirchner, Schmeidler, & Todorov as cited in Capella-McDonnall, 2007). The U.S. Bureau of Labor Statistics (BLS; 2015) defines a person as being unemployed if the person (a) is 16 years or older; (b) has no employment; (c) is available for work; and (d) has made efforts to find employment during the period of reporting. In March 2014, 35.4% of people who reported a visual impairment were employed, 51.5% were not employed or not looking for employment due to age or medical conditions, and 13.1% were unemployed (American Federation for the Blind [AFB], 2015). The unemployment rate of 13.1% is significantly higher than the national average of 6.6% for the same period (BLS, 2015). Some critics argue that the unemployment rate for people with visual disabilities has been distorted in the past to include people not looking for employment (Nyman, n.d.); however, proponents point out that more attention should be given to the number of people not in the workforce because it represents a group that has been disenfranchised from the labor force (AFB, 2015). In September 2010, 56.4% of people with a visual impairment were reported by the BLS as not being in the labor force compared to 30% of people without a disability (AFB, 2015).
Social services are available for those individuals unable to work because of a medical condition that is expected to last at least 12 months (Social Security Administration [SSA], 2014). The Social Security Administration provides Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) to eligible individuals who are legally blind. A person is considered to be legally blind if the person’s vision cannot be corrected to better than 20/200 in the better eye or if the person’s visual field is 20 degrees or less in the better eye (SSA, 2014). A person may still qualify for benefits if the criteria of legal blindness are not satisfied and the visual impairment is an impediment to employment. Although these benefits are provided with well intentions in mind, many people with visual disabilities find the benefits to be a disincentive to obtain employment while others are concerned about losing their cash benefits and health insurance if they obtain employment (Giesen & Cavenaugh, 2013). However, vocational services are available to people with visual disabilities who choose to obtain employment.

Such services are provided by the California Department of Rehabilitation (DOR). The DOR is a department that provides vocational and independent living resources. It was established in 1963 to provide vocational and advocacy services to promote employment, independence, and equality for people with disabilities (California Department of Rehabilitation [DOR], n.d.). Blind Field Services (BFS) is 1 of 14 districts within the DOR that specializes in servicing consumers who have a visual disability (DOR, 2014). The BFS assists people in obtaining blindness skills to achieve a
desired level of independence and promotes vocational services to its consumers who are looking to obtain employment. Some consumers who receive vocational services pursue post-secondary education to meet their vocational goal. One college that provides such services to students is Solano Community College.

Solano Community College (SCC) is a choice for students in and around Solano County. The 192-acre campus is located in Fairfield, California and has a diverse student population of 11,000 students (SCC, n.d.a). The Disability Services Program (DSP) assists students with disabilities by providing accommodations and advocacy services for them (SCC, n.d.b).

**Statement of the Problem**

The problem at SCC is there is a need for information on low vision aids and assistive technologies to inform DSP counselors about products available to assist students with visual disabilities (C. Roe, personal communication, January 7, 2015). There are one and a half counselors in the DSP department. Candice Roe is the DSP Coordinator and a half-time counselor, and Angela Apostal is a full-time counselor. During the spring semester of 2014, the DSP office serviced 417 students with disabilities, including 10 students with visual disabilities (S. Parker, personal communication, January 20, 2015). Ms. Roe stated that more knowledge of and a greater familiarity with low vision aids and assistive technologies would allow the counselors to better assist students with visual disabilities. The purpose of this project is to offer a
handbook of low vision aids and technologies to better inform the counselors in the DSP office about accommodations available to students with visual disabilities.

Limitations of the Project

This project is limited in scope due to the specificity of the population being served: students with visual impairments are a low incidence population at SCC. A further limitation of the project is due to the fact that the resources offered in the reference guide are in the Northern California area, including Alameda, Contra Costa, San Francisco, and Sacramento Counties.

The author’s bias is related to the author being legally blind and a former student at SCC. The author feels the counselors need more knowledge of low vision aids and assistive technologies that could be essential to a student’s success. Furthermore, the author’s opinion is that all counselors should be trained to meet the needs of students who are low vision and blind. The handbook was developed based on information currently available. It is important to recognize that technology is consistently advancing and improving, making the products in the guide a limitation as newer products are introduced into the market.

Definition of Terms

Assistive Technology

Any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or
improve functional capabilities of individuals with disabilities (Iowa Center for Assistive Technology Education and Research, n.d.).

California Department of Rehabilitation

The Department of Rehabilitation (DOR) is a state and federally funded department in California that assists individuals with disabilities to obtain and retain employment and increases their ability to live independently in their communities. Employment preparation services offered by the Department of Rehabilitation include training, education, transportation, and job placement (DOR, n.d).

Legal Blindness

Legal blindness is a visual ability with a best-corrected acuity of 20/200 or worse in the better eye or the widest diameter of peripheral vision measuring 20 degrees or less in the better eye (Brodwin, Siu, Howard, & Brodwin, 2009).

Low Vision Aids

A low vision aid is any tool or device that enhances a visually impaired person’s residual vision. Low vision aids are meant for individuals with usable vision and who depend on their vision (AFB, n.d.).

Reasonable Accommodation

Reasonable accommodation is a modification or an adjustment to a job or the work environment that will enable a qualified applicant or employee with a disability to participate in the application process or to perform essential job
functions. Reasonable accommodation also includes adjustments to assure that a qualified individual with a disability has rights and privileges in employment equal to those of nondisabled employees. The term is routinely used to include accommodations needed under other circumstances such as those administering public programs or providing private services. (Equal Employment Opportunity Commission [EEOC], n.d.).

Social Security Administration

The SSA is an independent agency of the United States federal government that administers Social Security, a social insurance program consisting of retirement, disability, and survivors' benefits. SSDI is an earned benefit that focuses on physical and mental impairments that are severe enough to prevent people from engaging in their normal occupations or any other work. Their impairment must be expected to last for at least 12 months or to end in death. SSI pays benefits to low-income people who are 65 or older, to adults who are disabled or blind, and to children who are disabled and blind. The program is only for people who have very limited income and assets (SSA, n.d.).

Visually Impaired

Visually impaired or partially sighted describes those with a best-corrected visual acuity of 20/170 to 20/180 in the better eye or a peripheral field of vision between 21 and 140 degrees (Brodwin et al., 2009).
Organization of the Chapters

Chapter 1 includes the background of the problem, statement of the problem, limitations of the project, definition of terms, and the organization of the project. The literature review in Chapter 2 covers information relative to the development of the project’s counselor handbook. Details of the methodology and review of sources utilized to develop the counselor’s handbook are described in Chapter 3. A summary and recommendations comprise Chapter 4. The counselor’s handbook follows and is contained in the appendix.
Chapter 2

REVIEW OF THE RELATED LITERATURE

This literature review consists of five parts. First, an introduction of common eye disorders experienced by people with visual disabilities is presented. Next, the need for people with visual impairments to be self-advocates is addressed. Third, a section on the difficulties experienced by and recommendations for blind and low vision students enrolled in online courses is explored. The fourth section examines low vision aids and assistive technology devices being utilized by people who are blind and low vision. Finally, literature on the employment of people with visual disabilities is reviewed.

Common Eye Disorders

According to the Centers for Disease Control and Prevention (CDC; 2014), three of the leading causes of visual impairment and blindness in the United States are diabetic retinopathy, age-related macular degeneration (AMD), and glaucoma. Diabetic retinopathy is a complication of diabetes that causes damage to the blood vessels of the light-sensitive tissue in the retina. This happens when too much sugar in the blood damages or completely blocks the tiny blood vessels of the retina. As more blood vessels become blocked, the blood supply to the retina is cutoff. In response to the lack of blood, the eye attempts to grow new blood vessels, but these new blood vessels do not develop properly and can leak, causing vision loss. Symptoms can include blurred, double or distorted vision, or floaters or spots in the field of vision (Mayo Clinic, 2014).
Diabetic retinopathy is the leading cause of blindness of adults between the ages of 20 and 74 in the United States. After 10 years, more than half the people with diabetes will show symptoms of retinopathy, and after 15 years, this number increases to 90%. The CDC (2012) reported that there 4 million Americans have diabetes-related visual impairments. A 2007 to 2009 national survey reported that in people aged 20 years or older, 7.1% of non-Hispanic whites, 8.4% of Asian Americans, 11.8% of Hispanics, and 12.6% of non-Hispanic blacks were diagnosed with diabetes (CDC, 2011).

Age-related macular degeneration (AMD) is an irreversible destruction of the macula (the central area of the eye's retina), which leads to the loss of the sharp, fine-detail of the central vision. There are two forms of AMD. The dry form is more common and occurs when the light sensitive cells in the macula slowly break down, gradually blurring central vision in the affected eye. The wet form is considered advanced AMD and can be more severe. It happens when new blood vessels under the macula leak blood and fluid. Damage to the macula can occur rapidly with the wet form. AMD is usually painless and symptoms may include shadowy areas or distorted central vision. The cause of AMD is not fully understood, but research has cited that, in addition to aging, genetic variations and oxygen-starved cells within the retina may contribute to the development of AMD (Hadrill & Slonim, 2015).

Age-related macular degeneration is the leading cause of visual impairment in the aging population aged 65 years and older. Some 9.1 million people in the United States have some form of age-related macular degeneration. There is little difference in
prevalence between men and women. However, in regard to race, Whites are more likely to have AMD than African Americans (Bressler, Munoz, Solomon, & West, 2008).

Glaucoma can be either congenital or acquired. There are different types of glaucoma, but the most common form is a result of elevated fluid pressure in the eye that leads to damage of the optic nerve. The optic nerve receives light-generated nerve impulses from the retina and transmits these signals to the brain where it recognizes the electrical signals as vision. The elevated fluid pressure damages the optic nerve, leading to gradual loss of peripheral vision and can lead to the loss of central vision and blindness. The cause of glaucoma is the failure of the eye to maintain an appropriate balance between the amount of internal (intraocular) fluid produced and the amount that drains away (Hadrill & Slonim, 2014). In many instances, a person may not experience any symptoms or know they have glaucoma. There can be no pain associated with glaucoma and people can unknowingly compensate for the loss of peripheral vision by turning their head. There is no cure for glaucoma, but it can be treated and it must be monitored for life (Hadrill & Slonim, 2014).

Over 2.2 million Americans have glaucoma with only half of these people knowing they have it. Glaucoma accounts for 9% to 12% of cases of blindness in the United States. Glaucoma is six to eight times more likely to cause blindness in African Americans than Whites, and African Americans are 15 times more likely to be visually impaired than Whites (Glaucoma Research Foundation, 2013). Other high-risk groups
include people over 60, people with diabetes, and family members of those already diagnosed with glaucoma (Glaucoma Research Foundation, 2013).

**Self-Advocacy**

Prior to entering college, most students with disabilities rely on parents, educators, counselors, caregivers, and others to arrange educational accommodations; in college, this becomes the student’s responsibility (McCarthy, 2007). A disability services program (DSP) counselor can offer a variety of accommodations, such as a note taker, alternate media, seating preference, and extended time on tests. However, the process of a student taking charge of his or her own accommodations can be intimidating, confusing, and lead to anxiety and isolation (McCarthy, 2007). To help the student be self-reliant, a counselor should facilitate self-advocacy in a student. According to Worman (2014), self-advocacy involves being able to communicate one’s needs and desires in a confident and assertive manner; understanding one’s disability, unique strengths, and needs; knowing one’s rights and responsibilities; and locating support and resources.

The term “self-advocacy” emerged from the civil rights movement of people with learning difficulties or intellectual disabilities during the latter 20th century (Walmsley, 2014). The terms *standing up for myself* and *learning to speak for myself* were part of a movement (Walmsley, 2014) that redefined people with disabilities as people as citizens with rights, rather than as victims and beneficiaries of the charities of society (Williams & Schoulz as cited in Walmsley, 2014). Ultimately, self-advocacy has come to be used
as the individual or collective voice of people with disabilities (Walmsley, 2014). This has encouraged research and the promotion of self-advocacy for students with disabilities.

Research shows that youth and young adults with disabilities who have acquired self-determination skills have enhanced academic performance and more active class participation (Gilberts, Agran, Hughes, & Wehmeyer as cited in Hart & Brehm, 2013), improved employment and independent living opportunities (Wehmeyer & Palmer as cited in Hart & Brehm, 2013), and more positive quality of life and reported more life satisfaction (McDougall, Evans, & Baldwin as cited in Hart & Brehm, 2013). All these outcomes provide great reasons to teach self-advocacy skills to empower students to have as strong of future outcomes as possible. Self-determined students will assert themselves when appropriate, take pride in their accomplishments and abilities, and are able to act as self-advocates (Zionts, Hoza, & Banks as cited in Hart & Brehm, 2013).

The University of Maryland University College (UMUC; n.d.) states that becoming an effective self-advocate means having the ability to effectively communicate your needs to others. The UMUC makes the following recommendations:

- Know your rights so that you may ask for what is available to you.
- Know your strengths and challenges and how they affect you.
- Plan ahead to make your semester a success.
  - E-mail or speak to your instructor to identify yourself and explain the academic challenges you experience as a result of your disability.
• Ask each instructor about his or her course content and what kinds of tests, papers or other assessment tools will be used during the semester.

• Review your course syllabus, and address your questions or concerns with the instructor. If you need additional accommodations, make sure you have registered with the DSP office).

• For on-site classes, students who need special seating should contact the DSP office at the beginning of class to ensure a proper seat or table will be available in the classroom.

• For on-site classes, students should arrive to class early and secure an additional seat for any notetaker or interpreter. The student should share his or her class schedule with the attendant.

• Work to find solutions to overcome barriers to reaching your goals.

• Identify your needs, and come up with a plan to support those needs.

• Identify your support systems.

• Get to know the instructors and administrators in your program.

• Know how to communicate about your disability and how it impacts your academic performance.

• Know how to ask for help and seek out resources when difficulties arise.

• Recognize that long-term goals are reached by meeting many short-term goals.

• Recognize and celebrate your successes. (para. 3)
In their roles as self-advocates, students gradually assume a more proactive role and have a greater say in their accommodations. The students will have knowledge of their own strengths, needs, and interests, and they will learn to effectively communicate their own choices and decisions (Kleinert, Harrison, Fisher, & Kleinert as cited in Hart & Brehm, 2013). By being patient and persistent, prospective self-advocates will learn these skills gradually and eventually flourish in their new roles and have the potential to meet their goals (Walmsley, 2014).

**Online Learners**

Students who are blind or visually impaired are increasingly pursuing higher education. According to the National Center for Educational Statistics (NCES) of the United States Department of Education, 11% of postsecondary students had documented disabilities, including 3.8% of students who were visually impaired or blind whose vision could not be corrected by wearing glasses (Horn & Nevill as cited in Moh, 2012). Students transitioning from high school to college often find they must manage their accommodations more independently. These accommodations vary depending on the type of classes taken (Moh, 2012). An enticing option for students with visual disabilities is to enroll in online classes. Online learning has advantages of convenience, flexibility of scheduling, and the elimination of transportation concerns (Candido as cited in Moh, 2012). However, blind and visually impaired students often find online courses to be challenging (Moh, 2012). Online courses are often difficult to navigate and inaccessible, making it difficult for blind and visually impaired students to be successful. A problem
often encountered by these students is that adaptive software, such as screen magnifiers and screen readers, are not always compatible with their online courses (Candido as cited in Moh, 2012). This compatibility issue often makes it difficult for students to access instructional material, Blackboards, and electronic resources (Candido as cited in Moh, 2012).

Candido (as cited in Moh, 2012) recommended that online learners with visual impairments investigate the compatibility between the student’s adaptive software and the online website prior to taking an online course. Students should inquire if a demonstration or trial connection can be tested to explore the website’s platform compatibility prior to taking the course. Students should also communicate with staff and the technical help desk to inquire about the platform and the staff’s familiarity with the student’s adaptive software. Students should have a basic level of computer knowledge and technical ability, as it can increase the student’s ability in the class.

According to Muwanguzi and Lin (2010), blind and visually impaired students are continually frustrated and feel marginalized due to the lack of usability of online websites. Developers often design websites with accessibility in mind, but not usability. The concepts of accessibility and usability are closely related, but differ in that accessibility is focused on making a website available to a wider user population and usability is aimed at making users' experiences with the websites more efficient and satisfying (Leporini & Paterno as cited in Muwanguzi & Lin, 2010). When designers consider people with disabilities, they tend to address only accessibility issues and ignore
those regarding usability. This is because the available screen reading software or synthesizers used by people who are blind, including Job Access with Speech (JAWS), Braille displays, Window-Eyes, Magic, and ZoomText, cannot navigate certain environments due to a lack of website configuration (Muwanguzi & Lin, 2010). This configuration conflict is due to most adaptive software utilizing linear navigation, while most web designers are designing web pages in a non-linear layout (Muwanguzi & Lin, 2010). Studies around the globe have found serious accessibility and usability obstacles to web navigation by students who are blind and visually impaired who use a variety of adaptive software to access educational materials on the Internet (Muwanguzi & Lin, 2010).

Muwanguzi and Lin (2010) recommend that academic institutions should offer Blackboard training to students who use adaptive software. Also, tutorials on how to navigate Blackboard should be available on the Blackboard website. The authors also recommend that academic website designers should be more inclusive to students who are blind and visually impaired by working with adaptive software developers to ensure that academic websites are more compatible. Lastly, Muwanguzi and Lin (2010) stated that students have acknowledged that they should be better prepared by getting adequate training using adaptive software prior to enrolling in online courses.

Low Vision Aids and Assistive Technologies

According to Kaldenberg, Fok, Polgar, Shaw, and Jutai (2011), when low vision assistive technology devices are selected and used appropriately, they can enhance
employment, quality of life, and health. Low vision assistive technology devices (ATDs) may be defined as any item, piece of equipment, or product system acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of people with vision loss (Kaldenberg et al., 2011). The literature reflects that there is no global definition of low vision, and the inconsistency at local, state, national, and international levels within community and governmental agencies make classifications of visual acuities difficult (Kaldenberg et al., 2011). However, there is a general consensus that low vision is a visual impairment that is not correctable and interferes with daily occupational tasks (Kaldenberg et al., 2011).

Kaldenberg et al. examined which ATDs were being used by people who fit the above definition of low vision. The study polled individuals with visual impairments who fit into several occupational criteria, including individuals working, working/volunteering, volunteering/retired, in school, and with long-term disability. One of the objectives was to identify which ATDs were deemed most important to the participants. The results showed that the ATDs most important were as follows, in order of importance: glasses/sunglasses, screen magnifier software, everyday high technology (e.g., large monitor, large screen TV), handheld magnifier, specialized computer peripherals (e.g., specialized mouse, keyboard), built-in computer accessibility, screen reader software, white cane, CCTV (e.g., standalone), handheld magnifier (with illumination), CCTV to TV, OCR software, portable CCTV, audio books (e.g., Daisy, mp3), monocular/binocular, and task lighting.
It was not surprising that sunglasses and glasses were very important as people with visual impairments use glasses to compensate for vision loss and sunglasses to combat glare. The data showed that adaptive computer software, such as screen magnifiers and screen readers, were deemed more important by participants who were working and in school, but as the participants transitioned or left the workplace or school, these ATDs became less important (Kaldenberg et al., 2011).

Another finding of the study refuted the belief that high technology is more important than low technology. High technology are advanced technology devices that are expensive, more difficult to make, and more difficult to obtain while low technology are inexpensive devices that are simple to make and easy to obtain. Two of the commonly owned and used ATDs were glasses and handheld magnifiers, and the most frequent ATD needs were for reading small print and close, intermediate, and distant viewing. This is consistent with the research that suggests ATDs are most relevant to reading-related occupations for people with vision loss (Kaldenberg et al., 2011).

Appropriately selected ATDs are essential for people with vision to obtain productive and gainful employment. When selected, accepted, and used appropriately, ATDs have the potential to facilitate occupations that may increase productivity, independence, self-confidence, and overall quality of life (Kaldenberg et al., 2011). For this reason, the authors urge further research on the use of ATDs by people with visual impairments.
Mobility and orientation are important aspects of safety for people with visual disabilities. A study by Roentgen, Gelderblom, and de Witte (2011) evaluated 18 individuals who were blind and visually impaired and their experiences using four navigation systems: BrailleNote Power QT v.8 using HOLUX M-1000 Sendero GPS V6.0, Dell Axim X51 PDA using Globalsat BT-33 Trekker 3.0.8, All-In-One device with built-in Trekker Breeze 1.0, and a Nokia E51 cell phone using HOLUX M-1000 Way Finder Access V1.24 GPS. The purpose of the study was to investigate the functionality and usability of different navigation systems for persons who are blind. The participants had to be able to travel outside their homes independently but be reliant on a guide dog or a long cane, have basic computer skills, and be aged 18 or older.

The participants were asked to complete 11 tasks and travel a predetermined outdoor route in a residential area. The results of the study showed that one group did feel the navigation systems met their needs and expectations; however, the participants noted that the navigation systems were not yet fully adapted to meet the needs of pedestrians who are visually impaired because they did not announce crossings and did not route pedestrian paths. The second group found the navigation systems useful for navigating unfamiliar places. These participants likely had more orientation and mobility training and some experience traveling independently. Some of the limitations of the study were the short time the participants had to familiarize themselves with the devices and poor GPS reception. The authors suggested future studies should look at long-term
use of GPS navigation devices and stressed the importance of individuals carefully selecting the most suitable device for the individual (Roentgen et al., 2011).

**Employment**

The U.S. Department of Education (as cited in Bell, 2010) maintains the Rehabilitation Services RSA-911, a national database of Rehabilitation Services Administration that collects data on consumers of vocational rehabilitation (VR) throughout the life of their case. Bell (2010) reported that the literature on the RSA-911 showed that the employment rate for people with disabilities has increased year-to-year from 1997 to 2007. Bell (2010) examined the RSA-911 to determine if this trend was similar for consumers who were legally blind. The author found that the employment rate of people who were legally blind had increased to 31.79% in 2007 up from 25.14% in 1997. Other findings were that in 1997, men obtained a competitive employment outcome at closure of 34.20% compared with women who obtained a competitive employment rate of 21.30%. In 2007, the rates had begun to level off when men were employed 39% at closure compared with women who were employed 35% of the time. The hourly wages of men and women increased in the same period, but the disparity in wages between men and women grew with men earning even more than women. A variable Bell identified to increase competitive employment and earnings was the level of education achieved at closure. A higher education correlated positively with higher employment, and consumers who had earned a Master’s degree and obtained employment at closure earned 40% more (Bell, 2010). The data showed that a positive
trend of competitive employment year-after-year for people who are legally blind existed, but that this group is still under-employed and more needs to be done to assist this group (Bell, 2010).

Capella-McDonnall (2005) examined the variables that contributed to vocational rehabilitation consumers who are blind or visually impaired obtaining competitive employment. The research question was to identify which variables were associated with people with visual impairments obtaining employment at case closures and identifying the impact of each variable. There were 11 independent variables: gender, age, level of vision loss, the presence of a secondary disability, the receipt of financial assistance, race, educational level, having worked since the onset of the disability, having received education as a service, the result of this service, reason for applying for services related to seeking employment, and the rated quality of the consumer-counselor relationship. The dependent variable was the successful placement into competitive employment. The author stated in the results that four variables were significant in predicting successful employment for consumers of VR who were blind or VI:

(1) receiving education as a service resulting in an educational certificate or degree, (2) having worked since the onset of the disability, (3) reason for applying to vocational rehabilitation being related to obtaining a job, and (4) the relationship between the counselor and the consumer. (Capella-McDonnall, 2005, p. 303)
The author emphasized that education leading to a degree or certificate and the relationship between the counselor and the consumer are very important aspects of the counseling process and should be considered for improving future services.

Employers’ attitudes are another variable important to examine when looking to increase the employment of people with visual impairments. Wolffe and Candela (2002) interviewed employers who hired, accommodated, and trained people with visual disabilities to develop a model to improve the hiring rate of people with visual impairments. As a result of the interviews, the authors found that employers spent a significant amount of time discussing accommodations needed to assist people with visual impairments followed by the importance of using helpers, such as VR counselors, to assist people with disabilities before and during employment.

The employer interviews revealed that many of the employers who hired people with visual impairments were inexperienced in hiring this group. However, as they acquired the knowledge of working with this group, they began to share this information with other hiring managers in other departments within their organizations. The employers’ statements supported the idea that a network of experienced employers responsible for hiring can help decrease anxiety in hiring and accommodations and decrease the skepticism associated when working with people with visual impairments (Wolffe & Candela, 2002).

The authors suggested a model in which an electronic database was created to collect and maintain information that is searchable online so inexperienced employers...
hiring people with visual impairments could contact an employer who has hired a person with a visual disability. Information maintained would be related to occupation, accommodations, and geographic area. Wolffe and Candela (2002) stated that employers who can benefit from this network will be more inclined to recruit people with visual impairments and integrate them into their workforce as the vast majority of the respondents in this study (89%) reported positive attitudes toward their workers who were visually impaired.

Golub (2006) explored employers’ attitudes to identify the variables they perceived to contribute to a successful work experience for their employees with visual disabilities. Golub used these responses to create a model for employees to be more successful in the workplace. The first step of the model is to have the employee be comfortable with his or her visual disability and ask for help if needed. This can help employers and employees get past the discomfort they perceive about visual impairments. The second step is blindness competency. Employees should be proficient and up-to-date with their mobility and orientation training, Braille reading, and assistive technology. This can provide the employee different strategies to manage a variety of situations. The third step is for the employee to be an ambassador for blindness. Employers stated that employees who were visually impaired and who engaged their co-workers in conversation eased co-workers’ discomfort. The employer stated that this discomfort resided with the co-worker, but that the employee with the visual impairment could discuss common interests and engage the co-worker in a conversation to ease
misconceptions. Step four was to have a positive attitude. Employers suggested that employees who are visually impaired should be positive, competent, work hard, avoid using their blindness as a crutch, and view challenges as new opportunities to learn from. The fifth step was to have good etiquette by approaching fellow co-workers and listening for cues for interacting with others. The sixth step was insisting to be held to the same standards as colleagues. After workers with visual impairments have the necessary accommodations, they should have the same expectations in work performance and assume full responsibility for their duties. The seventh step was mutual accommodation. This means that all parties involved should be comfortable talking about different ways to accomplish tasks, and acknowledge differences while respecting and valuing the differences in others (Golub, 2006). The author suggested that using this model can improve the work experience of all parties involved and lead to more employment success for people with visual impairments (Golub, 2006).

**Summary**

The literature review showed that people with visual disabilities experience many challenges. The side effects of common eye disorders can lead to vision loss and blindness, which interferes with daily occupational and educational tasks. Self-advocacy was encouraged to increase self-reliance and help students become more independent. The research also demonstrated that students in college face difficulties navigating instructional material in online courses. An overview of the literature discussed how people who are blind and low vision utilized aids and technologies in occupational
settings and traveled using assistive technology devices. Lastly, the research highlighted barriers to employment for this population and recommendations are made to increase integration of people with visual disabilities into the workplace. The literature showed that people who are blind and low vision face challenges that need to be addressed.
Chapter 3

METHODOLOGY

Method

The author developed the idea for this project while volunteering at the Disability Services Program (DSP) at Solano Community College (SCC) during the EDS 299 Special Problems course in the spring 2014 semester. In conversations with DSP Coordinator and Counselor Candace Roe and DSP Counselor Angela Apostle, the author learned about the limited resources in the DSP for students with visual disabilities due to budget cuts. The author also learned that students with visual disabilities were often referred to Alternate Media Specialist Max Hartman to arrange the student’s alternate media and computer training. While conversing with Mr. Hartman, the author learned that the DSP’s High Tech Center did not have Zoomtext or any other screen magnifying software for students with visual disabilities, but instead relied on Microsoft’s integrated screen magnifier. The author recognized that a lack of assistive technologies could be a problem for students. He proposed the idea of creating a resource handbook of low vision aids and assistive technologies for counselors to Mr. Hartman so students who were blind and low vision could be better informed about aids and technologies available to them on their own. Mr. Hartman agreed that this could be a useful resource and suggested the author propose the handbook to Ms. Roe. Mr. Hartman also offered to assist the author in developing the handbook.
The author proposed the idea for a resource handbook to Ms. Roe who thought it could be a useful tool for DSP counselors. She acknowledged that her knowledge of such aids and technologies was limited and that she felt the students could be better served if all DSP counselors had a better knowledge on the topic. In summer 2014, the author met with Mr. Hartman to begin discussing ideas for the handbook, and an outline of the handbook began to develop. A section on disability etiquette, self-advocacy, aids and technologies, and community resources were included in the outline. The section on Disability Etiquette was adapted from the *Disability Etiquette* information guide from the United Spinal Association. A section on self-advocacy was developed from the author’s review of the University of Maryland University College website. The section on low vision aids and assistive technologies was developed using information obtained from the National Federation of the Blind (NFB) and the American Federation for the Blind (AFB) websites, discussions with vendors, and Internet searches of aids and technologies using the Google web browser. The last section of community resources was developed from information obtained from searching on Google about resources for the blind and visually impaired in Northern California.

**Review of Sources**

The author began researching peer-reviewed journal articles on the California State University, Sacramento library databases EBSCOhost and ERIC during summer 2014. The author also began to look at other students’ Master’s projects to understand how to format Chapters 1-4.
In the beginning of spring 2015, the author began compiling information from journal articles, Google searches of material on the National Federation of the Blind (NFB) and the AFB websites, the BLS website, Department of Rehabilitation website, ADA website, and textbooks. The author was limited to using the two textbooks he bought because the author required his reading material in an alternate media, such as PDF and Word files. Further information of new assistive technologies from vendors, such as Baum Retec and Innovative Rehabilitation Technology, Inc., were obtained during the spring 2015 semester while the author was interning at the Department of Rehabilitation Blind Field Services at the Northern Sierra Office in Sacramento.
Chapter 4

SUMMARY AND RECOMMENDATIONS

Summary

The purpose of the project was to produce an informative handbook that the DSP counselors at SSC could utilize when counseling students with visual disabilities. The literature review included information on self-advocacy and low vision aids and assistive technologies that were integrated into the handbook. Other information included common eye disorders and employment-related literature.

The author compiled information from the end of the spring 2014 semester through the completion of the project. Candace Roe and Max Hartman discussed ideas and feedback that contributed to the content of the handbook. The author met with Ms. Roe and sent her revisions of the handbook by email. The author also met with his academic advisor Dr. Guy Deaner for advising and revisions to the handbook. The project was completed at the end of the spring 2015 semester.

Recommendations

The author recommends that the handbook be updated every two years because of the rapid advancement in technology. Another recommendation is that DSP counselors can continue their own research to stay updated on low vision aids and assistive technologies, as these tools are constantly changing and improving. By having a better understanding of the technology, counselors can discuss aids and technologies with their students to find the appropriate tools to assist the students at SCC.
Another recommendation is for DSP counselors to encourage students with visual disabilities to apply for assistance from the DOR Blind Field Services (BFS). The BFS can assist students by referring them to low vision specialists who can make recommendations about aids and technologies, and BFS can assist the students by purchasing the appropriate assistive technologies. DSP counselors can also converse with the students’ BFS counselors about services, not just the DOR counselors who visit the campus weekly. By speaking directly to a student’s BFS counselor, the DSP counselor will be able to coordinate services with BFS.

Finally, the author recommends the DSP explore allocating additional funding for assistive technologies that students can utilize in the DSP office and High Tech Center. For instance, DSP does not currently provide JAWS or Zoomtext in the DSP testing rooms or in the High Tech Center. Providing these softwares will make these facilities more accessible to students who are blind and low vision and create a more inclusive learning environment on campus.
APPENDIX

A Low Vision Aids and Assistive Technologies Resource Handbook for DSP Counselors
SOLANO COMMUNITY COLLEGE

A LOW VISION AIDS AND ASSISTIVE TECHNOLOGIES RESOURCE HANDBOOK FOR DSP COUNSELORS

Disability Services Program
Building 400, Room 407
4000 Suisun Valley Rd.
Fairfield, CA 94534
(707) 864-7136
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About the Handbook

This handbook contains information for DSP counselors to use for assisting students with visual disabilities. Sections on Visual Disabilities, Disability Etiquette, and Self-Advocacy are included at the beginning of the handbook. The following section reviews low vision aids and assistive technologies. The end of the handbook contains community resources that offer services to people who are blind and low vision.

When informing students of low vision aids and assistive technologies, the DSP counselor must have a thorough understanding of the degree of vision impairment and functional vision of the student. This can be done by evaluating medical reports, case notes, and a student self-report. Through the assessment of the documentation and self-report, the counselor should have a well informed understanding of the student’s diagnosis, visual strengths, and limitations.

In many cases, the counselor can recommend that the student apply for services from the Department of Rehabilitation (DOR) if the student is not already a consumer of the DOR. The DOR can refer the student to a low vision specialist who can perform a more thorough evaluation and make recommendations. The DOR can also assist with purchasing appropriate aids and technologies as many of these devices and equipment are very expensive.

The author has compiled a list of low vision aids and assistive technologies that are commonly recommended to students with visual disabilities. Unfortunately, there is no strict classification that neatly categorizes which aids are appropriate for students who are totally blind, legally blind, or low vision. In fact, many people who meet the criteria of legal blindness have some residual and usable vision, and many aids and technologies can be used by both students who are blind and low vision. However, the author does his best to make recommendations of appropriate aids through the author’s research on this topic. A table of recommended low vision aids and assistive technologies for students who are totally blind, legally blind, and low vision is included. Keep in mind that these are only recommendations, and the counselor’s assessment of the student’s abilities and limitations will further guide the counselor when making recommendations.
Visual Disabilities Definitions

A visual disability is vision loss that constitutes a significant limitation of visual capability resulting from disease, trauma, or a congenital or degenerative condition that cannot be corrected by conventional means, including refractive correction, medication, or surgery.

Definitions of visual terms:

- Total blindness describes individuals who are not able to perceive light.
- Legal blindness or severe vision loss is visual ability with a best-corrected acuity of 20/200 or worse in the better eye or the widest diameter of peripheral vision measuring 20 degrees or less in the better eye.
- Low vision or visually impaired describes those with a best-corrected visual acuity of 20/70 to 20/180 in the better eye or a peripheral field of vision between 21 degrees and 140 degrees.
Disability Etiquette

This section is for counselors who want to interact more effectively with students who have visual disabilities. An understanding and sensitivity toward people with disabilities promotes inclusion and equality.

When the DSP uses disability etiquette, students with visual disabilities feel more comfortable and perform more productively. Practicing disability etiquette is an easy way to make people with disabilities feel welcome. This section provides some basic tips for staff to follow.

Ask Before You Help
Adults with disabilities want to be treated as independent people. Don’t assume students need help just because they have low vision or are blind. Offer assistance only if the student appears to need it. Students with visual disabilities will oftentimes communicate when they need help. And if they want help, ask how before you act.

Assisting Students Who Are Blind
- Introduce yourself when meeting a new student and let him know if you are extending your hand to shake hands.
- Address a student by his name, as he may not know you are speaking to him.
- Identify yourself before you make physical contact with a person who is blind. Tell him your name and your role if it’s appropriate, such as receptionist, counselor, student aid, or other staff. And be sure to introduce him to others who are in the group, so he’s not excluded.
- When taking a student to your office, ask if he would like to be guided and offer your elbow for assistance.
- If the person has a guide dog, walk on the side opposite the dog. As you are walking, describe the setting, noting any obstacles, such as counters, chairs, or any item that may be an obstruction. Keep in mind that a blind student is just as curious of his surroundings as any other student. Describe his surroundings to him as the student may be wondering who or what is around him.
- If a new student enters the office, describe the office layout and offer her a tour of the High Tech Center.
- When giving directions, be specific and avoid using visual information. For example, instead of saying “Go to the other counter for assistance.” which assumes the student can see where the other counter is, say “For assistance, please make a full right and walk forward to the end of the aisle and you will reach the counter.”
• Be certain to point out hazards, including half-opened filing cabinets or doors, boxes against a wall, and objects protruding from the wall at head level, such as fixtures.
• If you are going to give a warning, be specific. Hollering “Look out!” does not tell the person if she should stop, run, duck, or jump.
• If you need to leave a student who is blind, inform her you are leaving and ask if she needs anything before you leave.
• Don’t touch a student’s equipment, as it is part of the student’s personal space.
• Don’t touch the student’s guide dog. The dog is working and needs to concentrate. Distracting a student’s guide dog can be hazardous for the student.
• Don’t touch a student’s cane. The cane is part of the individual’s personal space. If the person puts the cane down, don’t move it. Let her know if it’s in the way.

Assisting Students with Low Vision
• A student who has low vision may need written material in large print. A clear font with appropriate spacing is just as important as the type size.
• Labels and signs should be clearly lettered in contrasting colors. It is easiest for most people with low vision to read bold white letters on black background. Avoid using all uppercase letters because it is more difficult for people with low vision to distinguish the end of a sentence.
• Good lighting is important, but it shouldn’t be too bright. In fact, very shiny paper or lamination can produce a glare that disturbs people’s eyes.
• Keep walkways clear of obstructions.
• Inform students about any physical changes, such as rearranged furniture, equipment or other items that have been moved.

Be Inclusive
• Offer to read written information, such as flyers, notices, and newsletters—these postings can contain pertinent information that may be of interest to the student, such as clubs, job fairs, and school activities.
• Ask students about their interests. Students with visual disabilities have hobbies like any other group. Students may enjoy sports, TV shows, music, audio books, yoga, and Star Wars!
• It’s okay to use idiomatic expressions when talking to people with disabilities. For example, saying, “It was good to see you,” and “See you later,” to a person who is blind is completely acceptable. People with visual disabilities use these expressions themselves.

* Note: We should think of people who have disabilities as individuals, so rather than repeatedly using the amorphous group term “they” for people with visual disabilities, I use the pronouns “he” or “she” in this section.

Self-Advocacy

Prior to entering college, many students with visual disabilities depend on parents, educator, counselors, and caregivers to coordinate school accommodations. In college, this task becomes the student’s responsibility. A student is expected to work in tandem with a DSP counselor to arrange appropriate accommodations for college courses and related school activities. However, many students find the process of taking charge of one’s own accommodations to be confusing, overwhelming, and a source of anxiety. It is important for a counselor to recognize if a student is struggling to manage his accommodations. A counselor can assist the student by encouraging a student to practice self-advocacy.

Self-Advocacy can be defined as follows:

- Being able to communicate one’s needs and desires in a confident and assertive manner.
- Understanding one’s disability, unique strengths, abilities, and needs.
- Knowing one’s rights and responsibilities.
- Being willing and able to locate support and resources
- Making informed decisions and taking responsibility for those decisions.

Self-advocacy is a strength that must be learned and constantly practiced. A student who acquires self-advocacy skills will be more confident of his abilities and will have enhanced academic performance and more active class participation.

Some self-advocacy guidelines to recommend to a student are as follows:

- Know your rights so you may ask for what is available to you.
- Know your strengths and challenges and how they affect you.
- Register with the DSP office prior to the semester beginning. Meet with a DSP counselor to arrange your accommodations.
- Plan ahead to make your semester a success.
  - Get your textbooks early and make your request for Alternate Media prior to the semester beginning.
  - E-mail or speak to your instructor to identify yourself. If necessary, explain the academic challenges you experience as a result of your disability.
  - Ask each instructor about his or her course content and what kinds of tests, papers, or other assessment tools will be used during the semester.
  - Let the instructor know if you will need the class material in an alternate media. Ask if PowerPoints will be made available to you. Let the instructor know if you will be requesting a note taker. And have conversations with your counselor and instructor if testing accommodations are necessary.
• Review your course syllabus, and address your questions or concerns with your instructor.
• For on-site classes, students who need special seating should contact the DSP office at the beginning of the semester to ensure a proper seat or table will be available in the classroom.
• For on-site classes, students should arrive to class early and secure an additional seat for any note taker or interpreter.
  • Work to find solutions to overcome barriers to reaching your goals.
  • Identify your needs, and come up with a plan to support those needs.
  • Identify your support systems.
  • Get to know the instructors and administrators in your program.
  • Know how to communicate about your disability and how it impacts your academic performance.
  • Know how to ask for help and seek out resources when difficulties arise.
  • Recognize that long-term goals are reached by meeting many short-term goals.
  • Recognize and celebrate your successes.

It is important for students who are blind or visually impaired to identify resources, such as low vision aids and assistive technologies, that are not available from the DSP. Practicing the self-advocacy skills outlined above, a student will be encouraged to locate services and resources from the appropriate departments, such as the Department of Rehabilitation (DOR) or other sources. By being self-reliant, a student may find his experience to be more satisfactory leading to more successful outcomes.

Guidelines adapted from *Self-Advocacy for Students with Disabilities*, by University of Maryland University College, n.d.
Low Vision Aids and Assistive Technologies Definitions

Low Vision Aids
A low vision aid is any tool or device that enhances the residual vision of a person who is visually impaired. These aids are meant for individuals who have some usable vision who depend on their vision. A low vision aid can be as simple as a 20/20 pen (bold felt pen) or a magnifying glass, or as advanced as a bioptic telescope.

Assistive Technology
Assistive technology is any item, piece of equipment, or product system, whether acquired commercially off the shelf or modified, that is used to increase, maintain, or improve functional capabilities of individuals who are blind or who have low vision. An example of an assistive technology device is a video magnifier.

Author’s Note
The terms low vision aids and assistive technologies have been used interchangeably, as certain devices can fit the definitions of both terms. For consistency, electronic devices will be listed as assistive technologies.

*The author does not endorse any products mentioned in this handbook. Rather, these products are mentioned to inform the counselors of the products’ features and functionality."
Table 1. List of Low Vision Aids and Assistive Technologies

<table>
<thead>
<tr>
<th>Product</th>
<th>Page #</th>
<th>Low Vision</th>
<th>Legally Blind</th>
<th>Totally Blind</th>
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<td>Bar Magnifier</td>
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Low Vision Aids

20/20 Low Vision Pen: A 20/20 pen is a felt pen that creates bold, easy to read, and highly visible lines. An advantage of a 20/20 pen is that the ink does not soak through the paper. Using a 20/20 pen can make the writing on a surface easier to read for a person who is visually impaired.

Bioptic Telescope: Bioptic telescopes are eyeglasses that contain miniature telescopes mounted toward the top of the eyeglass lens. They function in much the same way as binoculars by enlarging images. Bioptics can be used to read and to see distant objects. Low vision users using bioptics to see distant objects do not use bioptics to make objects larger, but to see objects that are further away. While bioptics (also called bioculars) might be used continuously, users using bioptics look through their regular eyeglass lenses most of the time, and only sight through the telescope for short periods of time. A biopic can be used to view a classroom board, an overhead screen, or any other distant object.

Magnifiers: Magnifiers are inexpensive and accessible low vision aids that come in all sorts of shapes, sizes, and magnification powers. The type of magnifier needed varies depending on the user’s residual vision and activity. Choosing the right magnifier is very important. Once the user moves past 4X or 5X in magnification power, magnifiers get increasingly more difficult to use as their size and “field of vision” gets smaller, and their “focal distance” (the distance a magnifier must be held to the page) decreases. This is crucial when considering higher strengths of magnification. Magnifiers come in different types, such as domes, bars, loupes, hand-held magnifiers with or without illumination, magnifiers on stands, and head mountable magnifiers. It is recommended that the user visit a low vision specialist or demo the magnifier before purchasing.

Bar Magnifier: A bar magnifier is shaped like a ruler but is made with a domed topped cylindrical shape that rests directly on a page of text or numbers, slides across a page, and allows the user to read one text of line at a time. The magnification power varies from 1.5x to 3.5x or more.

Dome Magnifier: A dome magnifier, also known as a hemispherical magnifier or bright field magnifier, is a light gathering magnifier that is uniquely shaped in a half circle. They are constructed from pressure formed and polished solid acrylic. The magnifier is placed flat on a page or surface that the user wants to read. Magnification powers vary from 1.5x to 6x or more.

Tinted Lenses and Filters: Tinted lenses and filters are added to spectacles (eye glasses) and are used to enhance a user’s vision. Depending on the tint, these lenses can block harmful UV rays and radiation, enhance depth perception, increase contrast, and decrease
light sensitivity. For instance, a doctor may recommend adding a tint or anti-glare filter to computer glasses to reduce glare caused by harsh overhead lighting and to block short-wavelength "blue" light emitted from computer screens that is associated with glare and eye strain. An eye doctor and low vision specialist can help a user choose the right tint for the right situation.

Assistive Technologies

Braille Users

Braille Notetaker
Braille notetakers are mobile information management devices. These devices use either a Braille or QWERTY keyboard for input and voice and/or refreshable Braille for output. Notetakers can be connected to other storage media such as compact flash cards, USB memory sticks, and SD (secure digital) cards to expand onboard memory storage capacity. They can be connected to desktop or laptop computers via a USB cable or Bluetooth so information can be transferred between devices. A user can read, write, and edit text documents, browse the Internet, and check email accounts with a notetaker.

Braille Sense: This line of notetakers is based on Windows CE technology. There are multiple models of this notetaker available. Software on all devices in this line includes file management, a word processor, a scheduler, email, a media player, digital audio recording, an Internet browser, a DAISY player, and a scientific calculator. Furthermore, these devices can be used as Braille displays for computers or iOS devices. Optional multi-lingual dictionaries and GPS software are also available. The U2 is the newest and most powerful product in the line. It is offered with either a Perkins or QWERTY keyboard, 32 cells of Braille, 32 GB of internal storage, Ethernet, Bluetooth, Wi-Fi 802.11B/G/N, 3 USB ports, a SDXC card slot, and internal GPS. The Perkins model also offers a small LCD screen. System events can be announced through speech, Braille, or vibration as appropriate. The Braille Sense U2 Mini has an 18-cell Braille display, Perkins keyboard, and smaller footprint than other models in this series. This device has the same internal specs as the larger U2. All models can open and read PDF, Excel, and PowerPoint files. HIMS. Price: Braille Sense U2 (Braille or QWERTY) $5,595. Braille Sense U2 Mini $3,995.

Braille Display
A Braille display is a tactile device consisting of a row of special “soft” cells. A soft cell has six or eight pins made of metal or nylon that are controlled electronically and move up and down to display characters as they appear on the display of a computer or portable device (e.g., smart phone). A number of cells are placed next to each other to form a soft or refreshable Braille line. As the pins of each cell pop up and down, they form a line of Braille text that can be read by touch. Users can read a computer’s desktop, documents,
email, an Internet web page, or any other text, as well as a mobile device’s display. Compatible screen access software must be installed on the computer or mobile device to use.

Vendors offer a number of different sizes of displays from 80 cell units that work best when users need to work with long lines; models with 40- and 32-cell displays work well with laptops; and smaller 12, 14, 16 or 18 displays cells are intended for use with smart phones or other mobile devices.

**ALVA Comfort**: This 40-cell display connects to any Windows computer or an iOS smart phone. It has full Braille entry plus control, windows, alt, and enter keys for maximum compatibility. Long range Bluetooth enables the display to operate from up to 300 feet away from the device. The display also contains 4 GB of internal storage for creating, editing, and reading notes and books. Irie-AT. Price: $2,995.

**Braille Embosser**: Embossers have the ability to produce Braille on small single-page documents up to large magazine- and book-style production documents. In order to produce Braille, users must have Braille translation software to convert an electronic document into Braille before the document can be embossed. Braille embossers can be compact like paper printers and used by users at home.

**ATC Braille & Print**: This print and Braille embosser uses single sheets of paper and can emboss at 100 characters per second. It is compact and has a Braille and print control panel. Price: $5,995.

**Video Magnifiers**

Video magnifiers are electronic magnification devices that are available in desktop and hand-held designs and enable users to modify the image of the object being viewed. Video magnifiers can be used to read printed materials (e.g., textbook) or distant objects (e.g., classroom board) or both. Options include a variety of text colors and contrasting backgrounds (e.g., white letters on black background), brightness and contrast can easily be adjusted to make the object or text easier to see. Video magnifiers provide many levels of magnification from 1.5x to 95x and more depending on the model.

**Clearview+**: The Clearview+ is a tabletop digital magnifier that will magnify up to 60x to 95x, depending on the version. It has extremely simple controls, with one round control for the basic functions; it consists of a button in the center to change color settings/reading modes, and a dial around it to adjust the magnification. The on/off button is a small round button just above it. The other controls (brightness, etc.) are hidden under a small panel. The monitor is on an adjustable arm, allowing the user to reposition the screen for the best advantage. The X-Y table allows a user to place printed material on the X-Y table and scroll easily. The split screen model lets the user view computer and

**Clearview+ Speech HD:** The Clearview + Speech HD is a tabletop video magnifier that has optical character recognition (OCR) capability integrated into the unit. The text-to-speech unit has a 24” HD touch screen monitor that activates natural sounding speech by touching the screen, and the user can scroll through text by swiping the screen. The 1x to 95x magnification power and contrast capabilities allow the user to adjust the image for reading comfort or use the text-to-speech option to have the unit read the text—this is ideal for reading long documents. There are 60+ voices and 30+ languages available. Optelec. Price: $3,895

**VisioDesk:** VisioDesk is a portable HD video magnifier with a compact design. With a 15.6” LED display and weighing only 10 pounds, it is ideal for students with portability in mind. When open, the user can read printed material with the camera pointed towards the desk. The camera can also be pointed forward for distant viewing, such as viewing the classroom board and projector screen. The unit folds down flat and fits neatly in its carrying case. It displays a full HD 1080p image and 1.7x to 35x magnification power. The VisioDesk has several color modes and a six-hour battery life. Baum Retec, Inc. Price: $3,995

**Compact 5 HD:** The Compact 5 HD is a handheld video magnifier with a 5” High Definition display. It magnifies up to 18x and has a number of different color settings. The stand folds out to stand/tilt the screen up for easier reading. Place the handheld magnifier on a textbook or any printed material and scroll to read the text on the magnified screen. The device has a rechargeable battery with three hours of continuous use. Optelec. Price: $895.

**Ruby:** The Ruby is a handheld magnifier with a 4.3” screen. It magnifies up to 10x flat on the page and has five color presets; it also allows the user to freeze a frame. The handle of the unit folds back to form a stand, placing it at the optimal distance from the page. The buttons are high contrast and in primary colors to simplify use. The device has a rechargeable battery with up to two hours of continuous use. Freedom Scientific. Price: $545; HD version, $645.

**Media Players and Voice Recorders**

Accessible media players are intended for blind and low vision users and can play DAISY books and other audio files. Many books, magazines, newspapers, and textbooks are available in various audio formats, which can be played using these devices. Many players also have a built-in voice recorder, which allows the user to record memos,
dictations, and lectures. High contrast and tactile buttons and audio feedback make navigating by touch ideal for users who are blind and low vision.

**Blaze EZ:** This digital book player can play a wide variety of audio, text, and DAISY content, as well as access a variety of services via its wireless capabilities. The player can also make recordings via an internal or external microphone. Additionally, the Blaze EZ has a built-in camera which is used to scan and convert printed documents to text. HIMS Inc. Price: $695.

**PlexTalk PTR2:** The PlexTalk PTR2 is a stand-alone hardware unit for reading and recording DAISY audio books. It can read and write to CD or a Compact Flash storage card. The PTR2 offers simple DAISY recording mode or advanced authoring mode, which reveals more control over recording and DAISY structure editing. When attached to a computer, the PTR2 can be used as a CD RW drive, and included DAISY authoring software can be used with the product. Plextalk. The PTR2 is sold in the U.S. by Perkins Products. Price: $895.

**Victor Reader Stream:** The Victor Reader Stream has customizable tone and speech rates, and two human-sounding voices to read aloud functions when the high contrast and tactile buttons are pressed. The player plays a variety of files, including DAISY books, MP3, MP4, EPUB, and many other media formats. The player has two built-in microphones for recording memos and lectures. The built-in wireless network capability allows users to listen to Internet radio and download podcasts and other files via the Internet. The player reads books from DAISY libraries: NLS Talking books, Bookshare, and Learning Ally. Audio can be heard through the speaker or headphone port. Humanware. Price: $369.

**GPS Systems**

GPS systems are used to assist people who are blind and low vision to navigate city or particular locations. A vehicle or pedestrian route can be created and interactively followed with a GPS. The system also provides directional information. A GPS system is not a replacement for a cane or a guide dog; however, it can be very useful in certain situations.

**Kapten Mobility GPS:** The Kapten GPS provides spoken GPS directions for walking, driving, or public transportation, descriptions of the environs, and saved favorite locations. The user can use speech input or the tactile controls on the Kapten device. It also works as an MP3 and DAISY player, and will record voice memos. Kapsys. Irie AT. Price: $499.
**Trekker Breeze:** The Trekker Breeze is a stand-alone unit with nine tactually discernible buttons and a volume wheel. The device uses GPS signals to plot your position on a digital map stored on an SD card inserted into the unit. Speech output for GPS and battery status, location, points of interest, and landmarks can be heard through the unit's built-in speaker, headphones, or a clip-on speaker provided in the package. Maps for the United States are provided with your Breeze, and more can be purchased separately. A carrying case with a belt clip and a wrist strap, a shoulder strap, AC Adapter, companion CD, and a User Guide audio CD are also included. Humanware. Price: $699.

**BlindSquare:** This iPhone app provides information about businesses and street crossings around a given location. Additionally, the app can give the distance and direction to a selected location, as well as provide real-time updates as you travel. The app pulls data from Foursquare, as well as Open Street Maps. Available from the Apple app store. Price: $29.

**Seeing Eye GPS:** This iPhone app, developed in collaboration with The Seeing Eye and Sendero group, provides spoken turn-by-turn directions when navigating. It also provides announcements of nearby intersections along with descriptions, as well as nearby points of interest. Available from the Apple app store. Price: $9.99/month, $69.99/year, $129.99/three years.

**Nearby Explorer:** Developed by the American Printing House for the Blind, this app for Android provides descriptions of the local street network, turn-by-turn announcements when traveling a route, nearby points of interest, and more. The software will run on any device running Android 2.3 or later that has at least 3.7 GB of storage space available. Available from the Google Play store. Price: $99.

**Mobile Devices**

Users are increasingly using their smart phones as assistive technology devices. Many platforms have accessible features built into the phone’s operating systems, and the numbers of third-party accessible apps are growing. There are accessible apps to turn a phone into a voice recorder, video magnifier, currency reader, color identifier, GPS, and OCR reading device. It is recommended that users explore compatible apps on their platform’s app stores.

**Android phones:** Many Android phones now come with some accessibility features installed, though these vary depending on the phone and the version of the operating system. The official Google screen access (reader) product for users who are visually impaired is called Talkback and it is gesture-based. Zoom and color inversion features are also available.
Apple iPhones: The iPhone 6 and 6+ are the latest iPhone models currently sold by Apple. The touch screen devices are made accessible for users who are visually impaired with VoiceOver, which provides speech through specialized gestures tailored for allowing non-visual access to the system. A zoom function and color inversion are available.

DAISYBook Apps

Learning Ally Audio: Learning Ally Audio is an app created by Learning Ally to read its DAISY content on iOS devices. In order to use this application, a user must be a member of Learning Ally. Content may be synced to the iDevice via iTunes or downloaded via the app. It allows for listening to, and navigation of, Learning Ally’s DAISY collection. Created by Learning Ally. Available from the Apple App Store. Price: Free.

Read2Go: Read2Go is an iOS application for reading books from Bookshare. It allows a patron to download DAISY files from Bookshare and read them via its own text-to-speech engine, or VoiceOver. It is also possible to enlarge and highlight text for magnified reading if the user chooses to do so. To use the application or to download new books, you must be an active Bookshare subscriber. Created by Benetech. Available through the Apple App Store. Price: $19.99

VoiceDream Reader: Developed for the iPhone, VoiceDream Reader can read a number of file formats including Word, DAISY, HTML, etc. It can also import books directly from Bookshare, Project Gutenberg, or a Dropbox account. It can also handle audio DAISY books. Price: $9.99.

Math Hardware and Software

Access to mathematics and scientific materials is handled in a variety of different ways. The needs of the student, the level of interaction with the material required, and the nature of the work will determine the best type of tool for the occasion. This section encompasses many different models for accessing math and scientific data. Students should be encouraged to contact manufactures about compatibility questions.

Hardware

Orion TI84+ Accessible Graphing Calculator: This calculator is a Texas Instruments TI84+ Graphing calculator, with the addition of a module on the top edge which provides speech output of the calculator’s functions, equation results, and graphs. Additionally, audio representations of the graphs, as well as embossed Braille versions, can be created. American Printing House for the Blind. Price: $599.
Math Window: This product consists of a magnetic board and magnetic tiles with large print or Nemeth math symbols. Blind students can arrange math equations linearly or vertically, similar to how equations are arranged visually. This product is available in a basic edition or with additional add-on kits. Wolf Products. Price: Math Window Braille Basic, $144.95; Math Window Braille Algebra Add-on Kit, $80.75; Math Window Braille Geometry Kit, $406.80;

LabQuest Logger Pro: The combination of the LabQuest hardware interface module with the Sci-Voice Software and Logger Pro software allows students and professionals who are blind to independently carry out laboratory assignments for chemistry and physics using a variety of probes that are connected through a hardware interface module to a PC. The LoggerPro software, Sci-Voice Software manufactured by Independence Science, and the LabQuest interface module, manufactured by Vernier Software & Technology, LLC., form the heart of this system. The LabQuest module is connected to a PC using a USB cable. Various probes are subsequently connected to the LabQuest module. Probes are available for biology, chemistry, and physics. Note: If a school already uses a Labquest, the Sci-Voice Software can be added to the Labquest to make it a talking Labquest. Independence Science LLC provides all the necessary components including JAWS or Window-Eyes scripts that make it an accessible turnkey system. Users should work with Independence Science when adding components to ensure that the resulting system will be accessible. A short list of some of the probes is below. Independence Science LLC. Price: Logger Pro, $229; talking LabQuest, $1,494.00; Sci-Voice Software, $728.00; Window Eyes Software Download, $499.00; Temperature Probe, $29; pH Sensor, $79; Relative Humidity Sensor, $39; Scout Pro Scale (400 g) including USB connection kit, $442; Scout Pro USB Connection Kit, $95; Tactile Adaptation Kit, $249.

Software

Audio Graphing Calculator: This software emulates the functions of handheld graphing calculators found in many classrooms. The software is self-voicing, meaning that menus and user input and program output are spoken without additional screen access software. Graphs can be presented to the user with audio tones and cues. Options to produce tactile output with the Tiger line of Braille embossers are also available. ViewPlus Technologies. Price: $295.

MathType: MathType integrates into Microsoft Word 2003, 2007, 2010, 2013 and 365 and a variety of other environments such as iWork, InDesign Wordpres, and others. MathType is the professional version of the Equation Editor in Microsoft Office. It is used to enter equations into Word. MathType also works with TeX and LaTeX. This allows blind users to enter equations into Word. Note that for those needing to produce
DAISY books containing equations, MathDAISY is also required. Duxbury users translating Word documents containing equations created with MathType must run Duxbury software on a PC that also has MathType installed. Design Science. Price: $97 (academic pricing $57); a thirty-day free downloadable demo is available.


MathPlayer: Available as a free download from Design Science, MathPlayer integrates into Internet Explorer 6 and above. It renders math equations that are written using MathML on a website. A screen access software application is needed to hear what is on the screen. Using a refreshable Braille display, math equations are translated as computer Braille rather than in the Nemeth Braille math code. Design Science. Price: Free.

MathTrax: This library of interactive software combines mathematical analysis, graphing, and sonification to represent math and science information. The purpose of MathTrax is to dynamically generate accessible text descriptions of graphs to make data which is traditionally conveyed in visual graphs available to blind and visually impaired users. Students can create graphs by entering an equation, selecting an equation from a drop-down menu, entering raw data to be analyzed, or activating a physics simulation. MathTrax graphs the equations and provides descriptions of those graphs using text and sound. The curves currently described are first and second order equations in two variables (i.e., line, parabola, ellipse, hyperbola, circle, null set, single point, and two lines). Java-capable screen access programs can read the dynamic text descriptions and sonification makes the graphs accessible to students who are blind. NASA Learning Technologies. Price: Free.

Quickbooks 2014 with scripts: Intuit and My Blind Spot are working together to make Quickbooks 2014 and later accessible. The package consists of the latest version of Quickbooks Professional, Premiere, or Enterprise, plus specially developed JAWS or NVDA scripts. Only the core functions of Quickbooks are currently accessible, but this will be improving with future versions of Quickbooks and the scripts. Price: JAWS scripts start at $125, packages including a version of Quickbooks and the scripts start at $249. The NVDA add-on is free.

Print-Reading Software

Print-reading software is installed on a desktop or laptop running Windows. Images from a printed page are converted into a standard computer file, which can be read, edited, and...
saved. Compatible screen readers use speech synthesizers to read aloud the text in these softwares. A commercial scanner is necessary to use print-reading software.

**Kurzweil 1000:** This is a Windows-based reading software designed to convert scanned images from printed material into a computer file that the speech synthesizer reads aloud. Documents can be written and edited in Kurzweil 1000, and documents can be converted into an mp3 file for audio listening. Additional features include a dictionary and thesaurus. A scanner is necessary to use this software. Kurzweil Educational Systems, Inc. Price: $995.

**OpenBook:** This is a Windows-based software designed to read printed documents using a commercial scanner to convert the documents into synthesized speech. Documents can be read, written, and edited. Other features include a dictionary and thesaurus. OpenBook works well with JAWS and MAGic and shares many of the same hotkeys as it is made by the same manufacture. Freedom Scientific. Price: $995.

**OBR (Optical Braille Recognition):** This software allows the user to scan a Braille page and translate it into text. A printed version of the Braille document can be produced, and the document can be embossed by a supported Braille embosser. Neovision Industrial Vision Systems. Sold in the U.S. by Enablemart. Price: $1,385.

**Screen Magnification Software**

Magnification software is intended for users who are visually impaired and have some residual vision. Installed on a desktop and laptop, it provides adjustable magnification of a computer’s screen. The operating system’s environment (email, Internet, word processor, etc.) is magnified to the user’s preference, and usually allows the user to change the colors and contrast as well. Many versions provide text-to-speech so the user can rely on the speech to render longer text items in a browser, text editor, or other application.

**Note:** Apple computers provide native screen magnification, as well as fully-fledged screen access software (VoiceOver). Zoom can be toggled on and off by pressing Command-F8. Inverted color and grayscale settings are also available.

**MAGic:** This is a powerful magnification program which integrates well with JAWS, using many of the same keystrokes. There are many options for customizing speech, magnification, color, and, if present, speech settings. MAGic is available with or without speech; versions with speech offer a choice of RealSpeak Solo or Eloquence. Citrix and Terminal Services support is available. MAGic can be used with all 32-bit versions of Windows 7 and Windows Vista Service Pack 2 (SP2) or later and all 64-bit versions of

**SuperNova Magnifier/Reader Magnifier:** SuperNova Magnifier/Reader Magnifier is a magnification program from the Dolphin product line. It provides basic magnification at login and has a variety of color, magnification, and speech options available once the user is logged in. It lets the user create hooked areas, fixed areas of the screen (such as the clock, weather, or news widgets, etc.) that remain magnified regardless of what other actions the user performs. The user can also set application-specific settings. Many functions are keystroke-driven. Scripting capability is integrated, and a library of scripts is available on the Dolphin site; scripts can also be encrypted. SuperNova Magnifier and Reader Magnifier run on Windows XP, Vista, Windows 7, and Windows 8. Version 13.03 is the last version to support Windows Vista. Dolphin Computer Access. Price: SuperNova Magnifier (no speech), $395; SuperNova Reader/Magnifier (with speech), $595.

**ZoomText:** ZoomText is a popular magnification program, available with and without speech, which presents a simple user interface to change magnification, color, contrast, and, if applicable, speech features. Dual monitor support is available for those wanting to use a larger screen area. In the versions with speech, the SpeakIt function reads any text the mouse points at; the App and DocReader automatically read documents and applications. Scripting capability is now available. The magnifier allows for full or partial magnification of text up to 36x. Features include enhanced screen colors, visible pointers and cursors, web link finder, and support for some PDF documents. ZoomText Camera can use any HD webcam to magnify hardcopy print items. The ZoomText Magnifier/Reader has additional features, such as screen access, automatic document reading, text navigation, and some special application support. ZoomText runs on Windows 2000, XP, Vista, and 7. Ai Squared. Price: ZoomText Magnifier (no speech), CD version, $399; USB version, $499; ZoomText Magnifier/Reader (with speech), CD version, $599; USB version, $699.

**Zoomtext Mac:** ZoomText Mac works with MacOS versions 10.7 and 10.8 (Lion and Mountain Lion). Note that the Mac hardware must meet additional requirements as listed on the Ai Squared website. It offers magnification up to 36x, cursor and focus enhancements, and font smoothing, improving on Apple’s built-in magnification. No speech function is available with this version, but it does run with VoiceOver. Ai Squared. $399.

**Screen Readers**

Screen readers are software programs intended to be used by blind or visually impaired users. A voice synthesizer reads aloud the text that is displayed on a computer’s screen, and text can also be read on a Braille display using the software. A screen reader is the
interface between the computer's operating system, its applications, and the user. The user sends commands by pressing hotkeys (combinations of keys on the keyboard) or Braille display to navigate the screen and to instruct the speech synthesizer what to speak.

**Job Access with Speech (JAWS):** JAWS converts text on the computer's screen and components of Windows operating system into synthesized speech. JAWS does not utilize a computer mouse. Instead, hotkeys are used to perform reading functions. Users who are blind can complete computing tasks, such as work with word processors, browse the Internet, read various file types, and perform other activities. Freedom Scientific. Home Edition Price: $895.

**Window-Eyes:** Window-Eyes uses a voice synthesizer to read the text on a computer’s screen. The software uses hot keys to navigate and read Windows desktop, PDFs, Internet browsers, Microsoft Office components, and other applications. Users who are blind can also utilize a Braille display to read text by touch. Currently, users who have Microsoft Office 2010 or later can download a free version of Window-eyes onto their computers. Ai Squared. Price: $895.

Adapted from the National Federation of the Blind (n.d.)
**Community Resources**

**California Department of Rehabilitation**  
450 Chadbourne Rd, Ste A  
Fairfield, CA 94534  
Voice: (707) 428-2080

The Department of Rehabilitation (DOR) is a state and federally funded employment agency that assists individuals with disabilities obtain and retain employment and increase their ability to live independently in their communities. Employment preparation services offered by DOR include training, education, transportation, and job placement.

The Department of Rehabilitation Blind Field Services (BFS) is 1 of 14 districts within the DOR which specializes in servicing consumers who have a visual disability. The BFS provides employment preparation services and blindness skills training. The BFS promotes four blindness skillsets to its consumers to increase independence: (1) Rehabilitation Technology includes training to use a computer, adaptive software and peripherals more proficiently; (2) Orientation and Mobility training to travel independently and safely in the community; (3) Daily Living Skills (Independent Living Skills) training to perform home maintenance tasks, such as cooking, cleaning, laundry, and organization; and (4) Braille instruction.

**California Department of Rehabilitation**  
**Orientation Center for the Blind**  
400 Adams Street  
Albany, CA 94706  
Voice: (510) 559-1208

The California Department of Rehabilitation (DOR) operates the Orientation Center for the Blind (OCB) to assist adults to adjust to vision loss by participating in an immersion program. Students stay on the three-acre campus in dormitories and have instruction five days a week and can go home on the weekends. The program is individualized to each resident and program instruction averages six to nine months.

With an emphasis on Independent Living and Pre Vocational Skills training, credentialed teachers and qualified rehabilitation professionals provide a full curriculum of classes and experiences individually tailored to assist each student to reach their full potential for self-sufficiency. Students learn Orientation and Mobility skills, Daily Living skills, and Communication Skills with an emphasis on Braille instruction, Computer Access with specialized technology, Technology solutions for vision loss, Pre-Vocational Preparation, Personal Adjustment Counseling, and other instructional training.
East Bay Center for the Blind, Inc.
2928 Adeline Street
Berkeley, CA 94703
Voice: (510) 843-6935
Fax: (510) 843-6006

The East Bay Center for the Blind is a non-profit group that provides various services to people who are blind and visually impaired. East Bay provides an informal mutual support model and is a member-based organization. Services offered include classes for free computer training, ceramics, Braille instruction, exercise, chorus, and a book club. East Bay offers a casual environment where people can use the resources at their own pace. This center can be beneficial for people who want a less structured environment.

Lighthouse for the Blind
214 Van Ness Ave
San Francisco, CA 94102
Voice: (415) 431-1481
Fax: (415) 863-7568

The Lighthouse for the Blind and Visually Impaired is an organization that provides occupational training, group support, counseling, advocacy, and a wide range of services to people who are Blind or visually impaired. The Lighthouse has several locations in California: San Francisco, Berkeley, San Rafael, Napa, and San Leandro. The Lighthouse organizes a variety of programs for people who are blind or visually impaired. They provide independent living training, training with Braille, support groups, and advocacy.

Other services include the Deaf-Blind Program and the Employment Immersion Program. The Deaf-Blind program provides training, resources, and support to persons who are both visually and hearing impaired. The goal of the program is to ensure that individuals who are deaf and blind have access to information and the skills needed to live independent and productive lives. The Employment Immersion Program is a job skill and mentor program. People who are blind and visually impaired can go to workshops, learn resume preparation, interview skills, and receive job coaching.

The Lighthouse has a Low Vision Clinic, which is run in partnership with the UC Berkeley School of Optometry. The Low Vision Clinic specializes in working with people who are visually impaired. They provide evaluations and a wide range of assistive technology equipment and training.
Lions Center for the Visually Impaired
75 Alvarado Avenue
Pittsburg, CA 94565-4862
Phone: (925) 432-3013
Fax: (925) 432-7014

The Lions Center provides comprehensive services to seniors aged 55 years and older. Consumers can receive free vision screenings and treatment. In-home services include counseling for dealing with social and psychological issues related to visual impairment and blindness, daily living skills for living independently, and assistance providing independent living aids. Orientation and mobility training, arts and crafts classes, cooking classes, and a bowling group are other services provided by this organization. Lions also have a computer lab for training and offers support groups.

Meredith W. Morgan University Eye Center
School of Optometry
200 Minor Hall
University of California at Berkeley
Berkeley, CA 94720-2020
Voice: (510) 642-2020

The Low Vision Clinic offers comprehensive evaluations to people with low vision. Located at the Meredith W. Morgan University Eye Center on the UC Berkeley Campus, they have a highly qualified staff specializing in assessing people with low vision and recommending appropriate assistive technology and training. Similar to the other two low vision clinics, this clinic offers a wide variety of low vision aids and assistive technologies.

Society for the Blind
1238 S Street
Sacramento, CA 95811
Voice: (916) 452-8271
Fax: (916) 492-2483

Society for the Blind is an organization that provides a wide variety of services to people who have a visual disability. Society for the Blind’s mission is to empower individuals who are blind or have low vision to live productively and independently by building confidence through training, tools and mentorship. A few of the services provided include training students to use Braille, Daily Living Skills (independent living skills) training, orientation and mobility training, and computer training using assistive technologies. The organization offers a Senior Impact Project for senior citizens teaching life skills and promoting independence, and support groups for senior citizens, youth, and all people who are blind and low vision.

Society for the Blind also has a comprehensive Low Vision Clinic. The clinic offers evaluations by a low vision specialist and provides assistive technology and
training to consumers with low vision. Furthermore, the organization has a store with many Independent Living Aids, low vision aids, and assistive technologies that is open to the public.
REFERENCES


Social Security Administration (SSA). (2014). *If you are blind or have low vision—how we can help* [Brochure]. Washington, DC: Author.


