LONG-TERM OPTICAL DEVICE USE BY YOUNG ADULTS WITH LOW VISION

By

Cynthia Susan Bachofer

Dissertation

Submitted to the Faculty of the

Graduate School of Vanderbilt University

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

in

Special Education

May, 2013

Nashville, Tennessee

Approved:

Deborah Hatton

Steve Graham

R.A. McWilliam

Deborah W. Rowe

To my very wise father, Rodney Michiel Bachofer, and

my beautiful mother, Kathryn Ann Swedenburg Bachofer, in loving memory.

Your lifelong example taught me to be strong, work hard, and always care for the children.

ACKNOWLEDGEMENTS

My learning for this project began long before the dissertation itself. I am grateful to Dr. Anne Corn, founder of Project PAVE, and Dr. Randy Jose and Dr. Ana Perez, for their invaluable knowledge and guidance with my many, many questions as a new teacher in Project PAVE. I thank Dr. Jeffrey Sonsino, Vanderbilt Eye Institute, for his support of this research and his continuing work with Project PAVE. I appreciate the patient guidance in research and writing provided by Dr. Steve Graham and support in the final steps provided by Dr. Deborah Hatton. I also thank Dr. Robin McWilliam and Dr. Deborah Rowe for their helpful comments and insightful discussion as committee members. I am especially grateful to my brother Andy and my sisters Chris, Cathy, and Connie for their belief in my endless scholarly work and for putting up with this process. Finally, to latte and wine. I could not have done this without you.

SPECIAL EDUCATION

LONG-TERM OPTICAL DEVICE USE BY YOUNG ADULTS WITH LOW VISION

Cynthia Susan Bachofer

Dissertation under the direction of Deborah Hatton/Steve Graham

The purpose of this study was to investigate the long-term use of optical devices by individuals who participated in a school-based comprehensive low vision program focusing on use of devices, both near and distance. Thirty-seven participants (five non-users), ages 18–28, completed phone interviews giving information on their personal characteristics, functioning with devices, and psychosocial responses to using devices. Thirty (81%) of the participants were enrolled in college or had graduated from college. Only 11 (29.7%) participants were currently employed. The most common near vision tasks were reading pages in a book and reading cooking directions, whereas the most common distance tasks were reading travel signs and viewing an activity in the distance. The 32 participants (86.5%) who reported using optical devices were positive about their experiences with optical devices, reported being comfortable when using the devices, and seemed to value their use of devices. They were less positive, however, about the use of devices to support independence. Confidence in using optical devices was associated with gender, central visual field, and years of device use.

Approved:

Deborah Hatton

Steve Graham

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Introduction

Being successful in completing tasks is a universally desired goal. Persons with disabilities have additional challenges in meeting this goal. Rehabilitation, the process of reestablishing functioning through intervention, is a recognized means of achieving success when a disability impedes the completion of daily living tasks and employability. Measuring success of rehabilitation services in the United States has gained increasing attention as taxpayers and legislators want public dollars to support services proven to be effective. Rehabilitation for persons with low vision is a growing industry, in part due to the aging population, as industrialized countries face a national epidemic of age-related vision loss (Brody et al., 2002; McCabe, Nason, Demers, Friedman, & Seddon, 2000; Schmier, Halpern, & Covert, 2006). The majority of people eligible for services, however, retain functional vision. By learning to use tools and strategies as part of the rehabilitation process, they can continue to complete daily tasks efficiently.

Habilitation goals for children and working age adults with congenital eye conditions have increased with greater accessibility to materials and a wider range of tools. This accessibility was made possible through new technology and legislation such as Americans with Disabilities Act (ADA; 1990) and Individuals with Disabilities Education Act (IDEA, 2004) and has helped to integrate people with disabilities into typical settings. Research is critical to increase our understanding of the most appropriate support and training needed for young people with low vision. The purpose of this study was to identify the characteristics of young adults who received school-based services in use of optical devices who continue to use the devices, their goals for functioning with optical devices, their confidence and comfort in using devices in public, and factors that predict long-term use. This introduction presents background information important to understanding the four research questions driving the

study, a summary of research studies directly related to each question, and an explanation of the impact of prior research on the current study. Based on a recent review of the literature, I found no published studies with this specific focus.

Background of Low Vision Services

Definition of terms and prevalence of low vision

Low vision is a term that came into use during the 1980s and has gradually replaced terms such as subnormal vision, partial sight, and visual handicap. Defining low vision is an evolving process and a reflection of our changing knowledge of this disability. This disability is an international concern, and global efforts such as Vision 2020 established by the World Health Organization (WHO; 2004) have raised worldwide awareness of this disability. The sources cited in this paper focus on low vision care provided in industrialized countries such as the United States, Australia, and Scandinavia.

Professionals in the field of visual impairment use both clinical and functional criteria to explain low vision. The definitions that follow refer to the person's better eye with best correction. The label of legal blindness was first used by the American Medical Association in 1934 and then by the Social Security Administration in 1935 (Hatlen, 2000) to identify those with a visual impairment who were eligible to receive economic support. This term caused more confusion than clarification for those with impaired but useful vision**.** The criteria for legal blindness as defined by Lighthouse International are a central visual acuity of 20/200 (Snellen eye chart) or worse or a visual field no greater than 20 degrees. A definition of low vision that emphasizes a person's ability to function rather than their extent of disability states that a person with low vision ". . . has measureable vision but has difficulty accomplishing or cannot accomplish visual tasks even with prescribed corrective lenses, but can enhance his or her

ability to accomplish these tasks with the use of compensatory visual strategies, low vision devices and environmental modifications" (Corn & Lusk, 2010, pp. 4–5). This definition is helpful in considering the broad range of functioning for persons with low vision.

Visual impairment, or any degree of vision loss that affects a person's ability to perform routine tasks, is considered a low incidence disability for children in industrialized countries. The percentage of 0.2% is the often quoted figure estimating the number of young persons, aged 3 to 21, who meet eligibility for services from a teacher of students with visual impairments (Mason, Davidson & McNerney, 2000; Nelson & Dimitrova, 1993). According to the U.S. Department of Education's National Center for Education Statistics (2006) in 2003, approximately 109,720 children with visual impairments were eligible for special education services. Young people who acquired visual impairments through circumstances such as accidents or health conditions increase this number slightly. Providing services to children with visual impairments is complicated by factors such as the heterogeneous nature of visual conditions, developmental delays due to primarily congenital onset of the condition, and the possible presence of additional disabilities.

History of low vision rehabilitation

Low vision is a subspecialty of optometric and ophthalmic care and an evolving discipline. The first low vision clinics in the United States such as New York's Industrial Home for the Blind were established in the 1950s (Hellinger, 1977; Mogk & Goodrich, 2004). Adults with age-related visual impairments or adventitious vision loss were the primary recipients of this care. Low vision clinics are now available in industrialized countries where school attendance, access to technology, and literacy are the expected norm. Services available to clients may include instruction in safe travel skills, known as orientation and mobility (O&M), independent living skills, such as food preparation and self-care, and recreation and leisure

activities. Counseling services to help the person with low vision, as well as family members, adjust to managing life with this disability may be available. Assessment of visual functioning followed by prescription of optical correction or devices by an optometrist or ophthalmologist trained in low vision is the most common feature of a clinic's low vision evaluation. The most common optical devices are magnifiers, handheld telescopes, and high-powered reading glasses. Most rehabilitation services focus on helping adults who have relied on vision throughout their lives to regain functioning.

Young persons with congenital visual impairments were rarely referred to these services. Clinical low vision evaluations are still not considered standard practice for students with low vision (Corn & Koenig, 1996; Hall-Lueck, 2004; Hyvarinen, 2000). Specialists often recommend that children be reevaluated when they are older, visual tasks change, or interest in using optical devices increases. Providing instruction in managing everyday tasks for those who had never known typical vision was much less clear than instruction for those with established habits who had recently lost vision. Barraga's 1964 study of visual efficiency, maximizing the ability of persons with low vision to use available vision rather than conserve limited vision, prompted a new era of educational practice. Building visual efficiency in children with visual impairment is a recent and challenging topic in rehabilitation.

Identifying and providing appropriate services for young persons with low vision is too often a matter of chance rather than eligibility. The Project Providing Access to the Visual Environment (PAVE) is an example of a state-funded program for children with low vision age 3–21 in Tennessee. The program is in its 20th year of operation. Project PAVE staff complete evaluations, prescribe optical devices, and provide instruction in the use of devices to children who are eligible for this service. Programs in other states such as South Carolina (Farmer & Morse, 2007), Florida (Guerette, Lewis, & Mattingly, 2011), and Iowa (Wilkinson & Trantham,

2004) also provide prescribed optical devices to school-age children. A unique feature of Project PAVE is follow through of instruction during the school year to ensure integration of device use into routine tasks (Corn et al., 2003.) Outcome studies of such programs are needed to determine efficacy of the service, and longitudinal studies are needed to assess the continuing use of optical devices on minimizing the impact of the disability on multiple aspects of adult life (e.g., employment, social goals).

Research Questions

Little is known about optical device use and characteristics of users and non-users in the young adult population. In fact, 90% of low vision research focuses on older adults (Goodrich & Arditi, 2004). Many of these researchers report on the response of older adults with acquired vision loss to use of devices (Lowe & Rubinstein, 2000; Myrberg, Bachman, & Lemerstrand, 1996; Spafford, et al., 2010; Stelmack, Rosenbloom, Brenneman, & Stelmack, 2003; Watson, De L'Aune, Stelmack, Maino, & Long, 1997).

A limited number of studies with school-age children who use optical devices document their characteristics, habits, functioning, and response to using devices. I identified five studies (Corn, Wall, & Bell, 2000; Guerette, Lewis, & Mattingly, 2011; Leat & Karadshe, 1990; Mason & Mason, 1998; Zammitt, O'Hare, Mason, & Elliott, 1999) and two related studies (Corn, Wall, Jose, Bell, Wilcox, & Perez, 2002; Mason, 1999) with school-age children. I summarized pertinent data from these studies in the context of the four research questions of this study.

Question 1: What are the characteristics of PAVE participants who use and do not use optical devices?

Determining the characteristics of users and habits of use is essential to deciding on initiation of and type of instruction needed to meet individual needs. What are the possible characteristics that influence use of devices for these participants? Does level of acuity or does age of initiation of device use seem to affect willingness to use devices? Does reevaluation by a low vision specialist or does employment affect use? Can we positively affect outcomes if we tailor instruction to potential users? This first research question focuses on describing the characteristics of individuals who do and do not use devices. Previous studies provide limited descriptive data on the characteristics of low vision students who do or do not use devices (see Table 1).

Visual Information

Information on vision included the etiology in the five located studies and acuity in four of the studies (not reported in Mason & Mason, 1998; Mason, 1999). A wide range of etiologies (between 13–57) was noted, with albinism being named as the most common condition in three of the five studies, and second and third most common in the remaining two studies. The majority of the participants in the two more recent studies (Corn, et al., 2002; Guerette, et al., 20011) had a better level of acuity. Sixty-eight percent of the Guerette et al. participants and 53% of the Corn et al., participants had an acuity better than 20/200. Eleven of the participants in the Leat and Karasheh study (1991) noted a trend, not statistically significant, of prescription of devices for children (n = 20; 48.8%) with distance visual acuity of 20/200 or better. Specific acuity information was not provided in the remaining studies.

Type of Device Use

Participants in the five studies reported the types of devices used. Magnifier use was especially high with between 80% to 93% of the sample using near devices (Leat &

Table 1: Optical Device Use by School-Age Students

Study	Age	Etiology	Visual acuity (distance)	Device use
Guerette, Lewis, & Mattingly, (2011). *Students with low vision describe their visual impairment and visual functioning.*	*N* = 51; from 6.75–19.25 years of age; mean age of 12 years (*SD* = 2.93)	24 causes: Nystagmus (*n* = 11, 22%); Albinism (*n* = 7, 14%); High myopia, glaucoma, Achromatopsia (*n* = 3 each, 6%)	Range of 20/40–20/600: <20/100 (*n* = 18, 35%); 20/100–20/199 (*n* = 17, 33%); 20/200–20/399 (*n* = 11, 22%); 20/400–20/600 (*n* = 5, 10%)	Magnifiers: *n* = 32, 63%; Glasses: *n* = 42, 82%; Telescopes: *n* = 33, 64%
Corn, Wall, & Bell, (2000). *Impact of optical devices on reading rate and expectations for visual functioning of school-age children and youth with low vision*; Corn, Wall, Jose, Bell, Wilcox, & Perez, (2002). *An initial study of reading and comprehension rates for students who received optical devices.*	Study 1: *N* = 43; from 4–18 years; mean age of 10 years, (*SD* = 3.76); Study 2: *N* = 185; preschool to Grade 12 with a mean age of 10.5 (*SD* = 3.85)	Study 1: 14 causes: Albinism (*n* = 12, 28%); ONH (*n* = 6, 14%); ROP (*n* = 5, 11%); Coloboma (*n* = 4, 9%) Study 2: 57 causes: Albinism (*n* = 39, 21%); Macular impairment (*n* = 34, 18%); ROP (*n* = 19, 10%); Coloboma and nystagmus each (*n* = 14, 8%); Other (*n* = 46, 25%)	Study 1: (2000) 20/40–20/600 acuity; Study 2: (2002) a. Near normal acuity 20/32–20/63 (*n* = 28, 15%); b. Moderate as 20/80–20/180 (*n* = 69, 38%); c. Severe as 20/200–20/400 (*n* = 72, 39%); d. Profound as 20/500–20/1000 (*n* = 15, 8%)	Study 1: Referred to magnifiers, glasses, and telescopes. Study 2: Magnifiers prescribed for *n* = 130, 70.3%; telescopes prescribed for *n* = 157, 85%
Mason & Mason, (1998). *The use of low vision aids in*	Study 1: (1998)	29 causes:	None reported	Magnifiers: *n* = 68, 80%;

mainstream schools by pupils with a visual impairment; Mason, (1999). *Blurred vision: A study of the use of low vision aids by visually impaired secondary school pupils.*	*N* = 85; secondary students (11–18 years, no *SD*); Study 2: (1999) extended report for same group.	Albinism (*n* = 12, 14%); Cataract (*n* = 12, 14%); Unknown (*n* = 9, 11%); Nystagmus (*n* = 7, 8%); Myopia (*n* = 6, 7%);RP (*n* = 5, 6%)		Telescopes: *n* = 41, 48%
Zammitt, O'Hare, Mason, & Elliott, (1999). *Use of low vision aids by children attending a centralized multidisciplinary visual impairment service.*	*N* = 20; from 3.8–17.7 years of age; mean of 12.2 years (*SD* = ± 3.8)	13 causes: Albinism (*n* = 4, 20%); ROP (*n* = 3, 15%); Retinoblastoma and Nystagmus (*n* = 2, 10%)	Acuity better than 20/400 with full fields; 20/160 if moderate field loss; 20/120 if gross field loss	Stand magnifiers: *n* = 16, 80% Telescopes: *n* = 7, 35%
Leat & Karadsheh, (1990). *Use and non-use of low vision aids by visually impaired children.*	*N* = 41; from 8–18 years of age (no *SD*)	14 causes: Cataract (*n* = 8, 20%); Nystagmus (*n* = 6, 15%); Albinism (*n* = 5, 12%); Optic atrophy (n = 5, 12%)	20/40–20/400	Stand magnifiers: *n* = 23, 55% Handheld magnifiers: *n* = 8, 20% Reading glasses: *n* = 6, 14% Telescopes: *n* = 14, 35%

Note: *SD* = standard deviation. Decimals omitted in percentages.

Karadsheh, 1990; Mason & Mason, 1998; Zammitt et al., 1999). For these same participants, researchers reported that from 35% to 48% of their samples used telescopes.

Researchers in two more recent studies (Corn et al., 2002; Guerette et al., 2011), both state-funded projects in Tennessee and Florida respectively, reported a different pattern of usage. Magnifier usage was 62.6% (Guerette at al., 2011) and 70.3% (Corn et al., 2002), and telescope usage was 64.3% and 84.9% respectively. Guerette et al. noted that 82% (*n* = 42) used glasses for near tasks.

Leat and Karadsheh (1991) identified a number of factors that affected frequency of use of near devices. These factors were increase of age, a poorer unmagnified reading performance, and presence of central field loss. The authors suggested that the upper elementary years brought a decreased ability to accommodate (maintaining clear focus for near work) and a decrease in print size for students.

These five studies over two decades present a snapshot of school-age students who use optical devices. A wide range of etiologies was noted across the participants and, in the studies that provided acuity levels, the majority of users had a recorded acuity of 20/200 or better. Researchers in each of the studies focused on functioning in school settings. Use of near devices was more prominent than use of distance devices in the 1990s while the latter two studies showed a greater balance of device use. My study replicated the information presented in these studies (e.g., etiology, acuity, and type of device) and extended this picture of device users by including data on additional factors of vision (e.g., field of view, contrast sensitivity), optometric care (e.g., frequency of visit), and length of time with vision services in school.

Education

Across disability groups, academic students who are visually impaired show a history of college attendance but these studies did not distinguish between blind and low vision participants. No published study was found that has focused on students with low vision and college attendance. However, demographic data indicate that the great majority of college students who identify as visually impaired had low vision and used print as their primary medium. Wagner, Newman, Cameto, Garza, and Levine (2005), using data from the National Longitudinal Transition Study 2, compared patterns of postsecondary education across disability groups. Data were taken during phone interviews with approximately 1,000 youths (ages 15–19) following postsecondary school or with their parents (L. Newman, personal communication, March 17, 2012). Participants were grouped as visually impaired and not identified as blind or low vision. The authors compared academic success of youth with sensory impairments (e.g., hearing or vision) to youth with disabilities as a whole and concluded that: (1) about 90% or more graduated from high school with a regular diploma; (2) they were more than twice as likely (69%) to enroll in a postsecondary school and two-thirds had done so within two years following high school graduation; and (3) they were more likely to attend a four-year college or university (42%). This report does not single out young adults with low vision, but the study supports the anecdotal history of postsecondary academic success noted in the field of visual impairments.

Employment

The NLTS2 study (Wagner et al., 2005) also reports on postsecondary employment data. Those with visual impairments are among the least likely across disability categories to be currently employed, although half were employed at some time following high school. In considering employment-only (no schooling) as an activity, only 16.5% of youth with visual impairments were employed. The next closest of ten disability categories was hearing

impairment at 21.6% and autism at 14%. The employment picture for working-age adults (age 18-69) who are visually impaired has traditionally been dismal with about 70% unemployed, under-employed, or inconsistently employed (Dickerson, Smith, & Moore, 1997; Wolffe, 1998). More optimistic numbers of 40-45% employment for those with visual impairments were given in an online report by the American Foundation for the Blind (n.d.) still noting that a majority are unemployed.

A 2009 study (Capella-McDonnall & Crudden) also focused on transition-age youth (ages 14–21; 61% were age 17 or younger). The authors identified 54% of the 41 participants as legally blind. They noted that previous employment significantly predicted employment for job-seeking applicants. The 22 participants whose cases were closed with an employment outcome had all listed prior work experience. Academic competence, self-determination skills, and use of assistive technology for visual needs (including low tech devices such as handheld magnifiers) were additional factors associated with successful employment and the closing of a client's case. These studies highlighted the importance of studying this transition-age population with goals for employment. My study is unique in presenting educational and employment history of participants.

Question 2: How frequently do optical device users use an optical device for specific near functioning and distance functioning tasks?

Defining standards of functioning (task, frequency, and duration) with optical devices is essential to developing an instructional curriculum on device use. What tasks are students completing with devices? What routine tasks are students not using devices to complete? This information is necessary to understand how and when devices make a difference in meeting functioning goals. The studies (see Table 1) on school-age children and device use have focused on the near task of reading. Telescope use (e.g., accessing information on the board)

received far less attention than near device use. Examination of tasks is important both for what is and what is not being completed. This group of studies provides the most relevant research on children and long-term use of optical devices.

Data from the five located studies (see Table 1) primarily fell into two categories—tasks the device were used to accomplish and student response to using devices. More specific information on reading was provided by authors in the two more recent studies (Corn et al., 2002; Guerette et al., 2011). Oral reading rates based on fall and spring assessments improved for participants in Project PAVE (Corn et al., 2002). The students in Florida gave a very positive response to reading (Guerette et al., 2011). The authors reported that two-thirds (66.7%) of the students or 34 in the group "read for pleasure" while 14 students (27.5%) did not. The remaining three studies gave examples only of reading tasks.

Reference to tasks beyond the classroom was also a topic in the more recent studies (Corn et al., 2000; Guerette et al., 2011). Participants (students, TVIs, parents) completed an Expectations of Visual Function measure using a Likert-type scale in both fall and spring (Corn & Webne, 2001). The authors defined expectations as "an educated guess" on actual performance of tasks. This instrument listed 20 visual tasks, both near and distance. Examples were "can read prices on food products" and "can read the name of a street while standing across the street." Significant gains were shown in Expectations scores for students and for TVIs while parent scores showed a decrease, though not significant. Device use at school may have been more consistent for students than at home where parents did not see a change in behavior or a greater confidence in accomplishing visual tasks. These results suggested that students felt more capable of accomplishing typical tasks throughout their day.

Participants in the 2011 study (Guerette et al.) gave preferences for their use of devices. They answered several questions on what was easy or hard to see at school or at home and

what they wished they could see more clearly. The top two hard-to-see items were: (1) the whiteboard at school for 36 students (70.6%) and (2) print around me, such as street signs and fast food menus for 15 students (29.1%). The top two easy-to-see items were: (1) books at school for 23 students (45.1%) and (2) print (e.g., worksheets, copied material) for 10 students (19.6%). The top three responses for "What would you like to see better?" were "nothing" for 15 students (29.4%), the board for 13 students (25.5%), and print in the environment for six students (11.8%). These responses gave a view of the visual demands in a typical day in the student's world.

The three studies in the 1990s (Leat & Karadhseh, 1991; Mason, 1999; Zammitt, O'Hare, Mason, & Elliott, 1999) provided a range of responses from student interviews on using devices. Leat and Karadsheh reported that 38 of 41 participants (93%) had near devices and 27 students (66%) described them as useful—used sometimes, often, or always. Twelve of 18 telescope users (67%) described it as a useful tool. Twelve of the 19 device users in the study in Scotland completed interviews (Zammitt et al., 1999). Eleven of the 12 students (91.7%) stated that the devices were easy to use. Students were more willing to use the devices at home than in the school setting.

Students described mechanical limitations with these tools in two studies (Leat & Karadsheh, 1991). The magnifier restricted the field of view when reading or cast a shadow on the print; looking through the telescope lens was too disorienting when locating an object far away or the telescope's field of view was too small for the television. In addition, the magnifier did not help with certain activities (e.g., typing) or made it too difficult to complete a reading and writing task. Overall, the device caused muscle pain over long periods of use. The authors hypothesized that children have less expectation to access distance work in school settings and fewer opportunities to try telescopes.

Mason's 1999 qualitative study with 85 participants was especially detailed in student reluctance to use devices. The most frequently reported response by 43 students (51%) was "makes my eyes tired." Functioning problems related to mechanics of the device included "restricted field of view" for 31 students (36%), "slows me down" for 30 (35%), and "difficult to use," e.g., big, heavy to hold for eight students (9%). In comparison, teachers did not identify these as central concerns; "restricted field of view" was listed by 5%, "eyes get tired" and "slows student down" by only 3%. Finding a strategy to keep up with peers was a primary goal for device users.

Overall, these studies provide a very limited picture about how students use devices throughout their day. Reading material in the classroom received the bulk of research attention. The three studies from the 1990s reported difficulties that children found in using the device to accomplish a task. The two more recent studies reported on a range of tasks to gain some understanding of functioning throughout a student's day (Corn et al., 2000; Guerette et al., 2011). The single replicated factor in my study was device use for academic tasks (e.g., reading textbooks). My study extended previous research by asking about device use in college, at home, and in the community.

Question 3: How do optical device users' describe their confidence, social acceptance, personal value, and independence in optical device use?

Developing a positive attitude about using an optical device is considered critical to its use and an integral part of the user's psychosocial awareness (Riemer-Reiss & Wacker, 2000). This topic is wrapped within complex views in our society on disability, use of assistive tools, and competence. The four qualities addressed in Question 3—independence, confidence, social acceptance, and personal value—are four distinct domains within the psychosocial construct (Day, Jutai, & Campbell, 2002; Renwick, Brown, & Raphael, 1994; Schwartz &

Sprangers, 2000). Examining psychosocial aspects of using optical devices is a subset of the larger group of literature focusing on quality of life and the self-image of persons with low vision. In this context I define psychosocial as the interrelation of one's psychological development and social environment. Vision related factors include personal autonomy, functional independence, and psychological well-being (Riemer-Reiss & Wacher, (2000). More studies on these psychosocial factors are available with older adults (Chase, 2000; Copolillo & Teitelman, 2005; Hocking, 1999; Lund & Nygard, 2003; Mehr & Mehr, 1970; Ringering & Amaral, 2000; Robbins & McMurray, 1988; Williams, Brody, Thomas, Kaplan, & Brown, 1998) than with children (George & Duquette, 2005; Lifshitz, Hen, & Weisse, 2007; Sacks, 2010).

What domains of the psychosocial aspect are affected, positively or negatively, by use of optical devices? Can instruction in raising awareness of psychosocial domains increase willingness to use devices? No published studies were found focusing on psychosocial aspects of young adults with low vision following high school as they transitioned to a new phase of life. Gaining a clearer understanding of the impact of personal feelings on device use for this age group is essential to updating instruction models. The five studies focusing on device use by children also provided varying levels of attention to psychosocial issues. Participants' comments in the three older studies (Leat & Karadsheh, 1990; Mason, 1999; Zammitt et al., 1999) reflected two themes: frustration with the device and discomfort with using devices. Students noted that using the device slowed them down (Leat & Karadsheh, 1990; Mason, 1999). The authors explained that this affected their participation, flexibility, or timeliness with completing tasks. Mason also gave an example of ambiguous feelings from one student who explained, "It helps me to be independent" but "I sometimes have to catch up with work as it slows me down."

Another group of students were reported to differentiate their device use between school and home (Zammitt et al., 1999). The students ranged in age from preschool to high school. This may have been related to the pace of activity. Eight of the 12 students who completed interviews (75%) chose not to use the device at school, while four (50%) of these said the device was “no help at school,” but they would use it at home. In comparison, four of the 12 children (25%) did find the device useful at school and explained that it “helped me see better” and “was fun to use.” Students using devices were concerned with how they came across to their peers.

Awkward feelings or emotional discomfort was the second theme in the older studies. Students voiced a concern about being self-conscious or embarrassed to use a device in front of others. In the Zammitt et al. (1999) study, seven of the eight children (87.5%) felt that it “drew attention to their visual impairment,” and four of the seven (57%) stated they would not use the device in front of other children. The authors identified “earlier age for referral” and “more attention to training” as two factors likely to positively affect device use. A group of secondary school students (Mason, 1999) responded to the question “What are the worst things about your low vision aid?” Responses included “feeling different” by 36 students (42%), “feeling embarrassment” by 30 (35%), 23 named teasing (27%), and six said “feeling negative attitudes from teachers” (7%). Awareness of what others thought about them as a device user was an overriding concern in this group.

Researchers in the two more recent studies gave more attention to noting participation and less on psychosocial response to using devices. The increase of Expectations of Visual Functioning scores ICorn et alk, 2000) from fall to spring suggested a positive attitude toward increased participation and independence. This group also provided personal responses to perceived benefits of device use in interviews conducted at the end of the school year. The

results were not published but were used as outcome data in the Project's annual report and in presentations (Bell, Andersen, & Bachofer, 2001). Students (*N* = 42) ranked the benefits they found with using a device: better social skills and joining in more social activities was first; using my eyes better (improved visual efficiency) was second; and access to more recreation and leisure activities was third.

The Guerette et al. study (2011) noted that participants could easily name what items were important to see for their joining in activities. In response to their participation in the program, a majority (59%) or 30 of the students named reading as a task they love or like to do and 45% or 23 reported that schoolbooks were "easy to see." The items that were important, yet still difficult to access, were whiteboards (70.6%), print around me (29%), and TV screens (19.6%). These responses showed an interest both in personal independence and social participation, aspects of the psychosocial construct.

Research on children's psychosocial response to using optical devices is just beginning. Functioning was first considered in these studies followed by the underlying feelings the device user has about needing to use this tool. The researchers noted that the reality of inconsistent access to devices was a complicating aspect of their studies. The three older studies gave the most focus to psychosocial information and reported on children's resistance to as well as difficulty using devices. Feeling different or self-conscious was a primary objection. Not being able to keep up when using a device was another significant concern. The two newer studies focused on a desire for independence and interest in participation. The different interview forms used in each study brought out valuable data on user satisfaction and dissatisfaction, though little replication of information. The psychosocial section of my study extended the research by measuring four specific domains of device users. This broader investigation is a start to identifying the primary domains within the psychosocial constructs that influence device use.

The studies on school-age children provide a foundation to understanding the psychosocial impact of device use and spotlight the need in the field of low vision for more extensive research on this topic.

Question 4: What factors predict confidence, social acceptance, personal value, and independence in optical device users?

Identifying factors that can predict, for example, the level of confidence a person feels when using an optical device is a topic of new exploration. Identifying predictive factors for desired behavior such as use of optical devices is a powerful element in building effective instruction and service delivery. No published studies were found that assessed this with students with low vision. Researchers in the five studies described made summary comments only on factors that may predict use, but three of the studies also named current practices that they felt negatively affected device use. These included hand–eye coordination, training, level of self-consciousness, and amount of whiteboard work (Leat & Karadsheh,1991); delayed introduction to devices, failure to provide timely reassessment, lack of involvement of the child's teacher and parent, and insufficient training (Zammitt et al., 1999). Mason and Mason (1998) provided a list of recommendations: national guidelines for standards of referral for low vision examinations, support of a multidisciplinary team with the assessment, and requirement of a training program to build skills with devices. Guerette et al. (2011) indicated that knowledge of and ability to communicate about one's visual impairment may have an impact on positive response to using optical devices. My study differs from previous investigations by extending the unique variance accounted for by four psychosocial factors.

Summary

The available research shows that the field has made some progress on defining personal characteristics of device users and patterns of functioning. In these studies, for example, albinism is the most common etiology of students who were prescribed optical devices, and reading is the most common functional task given attention. Measuring psychosocial aspects of device use is more challenging and is in imminent need of investigation. This review of literature on the use of optical devices presents a developing foundation on who uses devices, what tasks are completed, and level of satisfaction/dissatisfaction the users feel towards devices. I expect to find patterns in the personal characteristics of young adult users, including limits on acuity levels and number of years of vision services, distinctions of tasks for this population where device use was necessary and where avoided, and a ranking of importance across the four psychosocial domains for those who have demonstrated long-term use of devices. Predictive factors of device use that I expect to find include an acuity level falling within the moderate to severe category of visual impairment(20/200–20/400), introduction to devices in the early elementary years, and strong confidence in their skill with optical devices among long-term users. This information is essential to refining instruction and age-specific service delivery models.

Methods

Participants

Participant inclusion/exclusion criteria: Five criteria were established for inclusion of participants. The criteria were: (1) participation in Project PAVE for at least one year from 1994–2006; (2) participation in Project PAVE at least one year prior to their senior year in high school; (3) participation in a low vision examination and instruction in the use of devices prescribed through a low vision clinic; (4) print as a primary learning medium; and (5) participation in the general curriculum. Three exclusion criteria were established for participants. They: (1) did not complete instruction with a PAVE teacher or were unwilling to use optical devices following instruction, (2) withdrew from school prior to graduation, and (3) were not regularly included in academic instruction.

Recruitment: The Project PAVE electronic database listed former students who received services in the program (Inclusion criteria 1). The database included 665 people who received Project PAVE services between the years of 1994-2006. I identified 226 people (34% of the original sample) who met the inclusion/exclusion criteria described above from the Project PAVE database. Unfortunately, contact information for all of the students enrolled in Project PAVE was kept in student folders only and not included in the electronic database. This made obtaining contact information for all of these past participants a challenging task. The table below shows the results of using four sources to contact and recruit participants. Some participants were listed in more than one of the sources, such as Tennessee School for the Blind (TSB) alumni list and Facebook, and received duplicate information about participation in the study.

Table 2: Results of Contact Efforts and Recruitment of Participants

Recruitment methods	Requests sent	Participants responded	Returned due to incorrect address
TAER Teacher Listserv	65	13	0
TSB Alumni Database	16	3	0
Vanderbilt Eye Institute	170	4	6
Internet (including Facebook)	76	17	2
Total	**327**	**37**	**8**

Note: TAER = Tennessee Association for the Education and Rehabilitation of the Blind and Visually Impaired; TSB = Tennessee School for the Blind.

The four sources for making contact with former Project PAVE participants occurred in the following order. First, an email, describing the study and requesting assistance, was sent with my contact information to teachers of students with visual impairments (TVIs) who were members of the Tennessee chapter of the Association for Education and Rehabilitation of Blind and Visually Impaired (TAER). The president of TAER distributed this message on the organization's listserv. The email requested that the teachers contact former students to determine if they were willing to share contact information with me. Thirteen former Project PAVE participants gave permission to the teachers to share contact information or responded directly to me.

Second, because Project PAVE provided services to a number of students at the Tennessee School for the Blind (TSB), names of former Project PAVE students were given to the TSB Alumni Office to assist with contacting students. Three alumni who were in Project PAVE contacted me following this request.

Third, names of former Project PAVE students were given to the Vanderbilt Eye Institute (VEI) Department of Ophthalmology to identify addresses in their current database. Four people who were continuing as patients at VEI contacted me.

Fourth, Internet resources (e.g., Reference USA white pages, Google People Search, and Facebook) were used to obtain participant contact information. These resources are commonly used by the public to establish contact with a person. Facebook proved to be the most valuable source, with 24 former students responding to a message and 17 of these former students participating in the study. If the address of a former Project PAVE participant was obtained through the TVI or through an online source, then I sent recruitment material to the participant directly.

The recruitment material consisted of a letter briefly describing the study, the recipient's past enrollment in Project PAVE, and my contact information. If an address was available at TSB or the VEI Department of Ophthalmology database, an employee in each organization sent potential participants the recruitment material in the mail. I provided the material in stamped, sealed envelopes. The TSB Alumni Office sent recruitment material to 16 alumni and the Vanderbilt Eye Institute sent material to 176 people on the list. As a result of contact efforts using these four sources, 37 former Project PAVE participants agreed to be interviewed.

Development and Field Testing of the Optical Device Questionnaire

Development of the questionnaire was a lengthy process, and it is described here to provide the reader with a history of the development of the questionnaire and how it evolved. Copies of four drafts, a version of the instrument tested in a pilot study, and the final version of the survey can be found in Appendices A-F. The initial development of the questionnaire began as a graduate class assignment and was completed in the spring semester of 2007. At that

time, no published questionnaire focusing on this young adult population was found, but I obtained and consulted other questionnaires targeting visual tasks and adjustment to vision loss with older adults experiencing the onset of low vision. These questionnaires served as the initial source for questions and included the Visual Functioning Questionnaire (VFQ-25; Mangione, Lee, Gutierrez, Spritzer, Berry, & Hays, 2001), the Psychosocial Impact of Assistive Devices Scale (PIADS; Day & Jutai, 1996; Jutai & Day, 2002), and The Low Vision Quality of Life Questionnaire (LVQOL; Wolffsohn & Cochrane, 2000).

Early drafts of the first version of the questionnaire underwent significant changes in structure, category labels, and focus of questions. For example, an initial decision regarded how to assess functioning on specific tasks with devices. To illustrate, asking participants to give a percentage (e.g., 20% or 50%) on the amount of time or number of uses (e.g., 1-3 times/week, 7-9 times/week) to estimate how often they used a magnifier to read cooking directions from a food package was deemed as an unreliable measure. Giving a list of items used in typical daily tasks (e.g., store receipt, travel sign) and asking the respondent to indicate if a device was or was not used quickly became lengthy and was also ineffective as a method of measurement. A Likert-type scale became the preferred format.

The original draft (see Appendix A) had a very limited demographic section and placed emphasis on outcomes of Project PAVE participation, with five questions asking about the impact of instruction or willingness to use devices. Functioning and psychosocial questions were not separated as distinct categories in this first draft. This early set of psychosocial questions lacked focus. They ranged from personal emotions on using devices to opinions on society's awareness of optical devices. For example, "Do you have positive or negative feelings about using devices?" and "Do you think the public awareness of devices has changed over your time of use?" This draft was an initial attempt to identify the information critical to device use.

The second draft of the questionnaire (see Appendix B) involved changes in three major areas. This version gave greater attention to four categories of psychosocial issues and the topic of reading. A section of open-ended questions was also added. The labels on the psychosocial categories were Completion of Task, Effect on Behavior, Personal Concerns, and Social Issues. Questions phrased as negative, such as “I am not comfortable talking to others about why I use devices” were more common in this draft. As a result, the overall tone of the questionnaire came across as negative. Attention to reading increased in this draft. Questions using a Likert-type scale included, “I feel comfortable reading for a half hour or more,” and “I read to complete necessary tasks but not for pleasure.” These questions were more about purposes for reading or attitudes towards reading than use of optical devices.

The third draft of the questionnaire (see Appendix C) gave attention to completion of tasks before participation in Project PAVE. For example, “Before your participation in Project PAVE, how did you complete the following task?” using the response options of I for independently, W for with assistance, or N for not completed. Three example tasks were listed (e.g., copying from a whiteboard). The section on functioning used a Likert-type scale and was expanded to 24 questions. Functioning in a range of environments (home, work/school, and community) was included with specific tasks identified such as reading cooking directions and using the computer.

This draft had a shortened psychosocial section of six questions and included different response options. A question-stem stated, “People responded to my use of devices in different ways,” using the Likert-type scale of 1-unsupportive, 2-somewhat supportive, and 3-supportive. A list of people followed the question stem including parents, siblings, and teachers. Another question asked, “Did you have positive or negative feelings about using your devices?” with five options on a Likert-type scale ranging from extremely negative to extremely positive.

The section for non-users of devices questions on Past Use of Devices and Psychosocial Aspects. Reasons for non-use were also explored: "I stopped using devices for the following reasons" with seven response options, including "Difficult to use" and "Preferred other methods of accessing information."

The fourth draft of the questionnaire (see Appendix D) showed the four distinct sections of the final questionnaire: information on personal characteristics, functioning questions with a Likert-type scale, psychosocial questions with a Likert-type scale, and open-ended questions. The organization of this six-page questionnaire was easier to follow with question formats that could quickly be recorded in a phone interview. An important addition to the characteristics section was questions on eye care such as "Was your eye doctor an optometrist or ophthalmologist?" and "When was your last low vision evaluation?" The functioning section was now six questions with three items asking about near tasks and three items asking about distance tasks. The four psychosocial categories each contained five questions This draft had a consistent number of questions within each section.

I developed the final questionnaire (see Appendices E-F) for the pilot and final version with guidance from experts in the field following IRB approval. The form consisted of four sections: Personal Characteristics, Functioning, Psychosocial Aspects, and Open-ended questions. Several drafts of the guided interview described above were needed before a set of questions was selected that allowed for developing an adequate assessment of device users that accurately depicted their functional and psychosocial responses to using devices. The personal characteristics section was comprised of five sub-sections: demographics, factors of vision and vision services, education, employment, and reading. These topics addressed a variety of vision-related factors that can help to describe this group of device users.

The questionnaire was pilot tested on a range of persons knowledgeable about low vision. These included three optometrists who work with Project PAVE, three TVIs who work with a range of students, three adults with low vision, and two teenagers with low vision. The functioning section listed six tasks, three for near items and three for distance. To confirm the assignment of the 20 psychosocial questions into the four domains, three graduate students in the Special Education Department, Program for Visual Disabilities, were asked to sort individual questions. The open-ended questions concluded the psychosocial section. These were valuable for confirming participant responses. Five questions seemed a reasonable number to ask considering the interview length and participant time.

Feedback on the instrument identified unclear questions, additional questions on pertinent information, and suggestions for organization of the guided interview. I incorporated these comments into the final draft for the pilot study. Through many discussions with colleagues and Project PAVE staff, criteria for good interview questions became clear. Each question had to apply to a wide range of device users, focus on a psychosocial domain not an opinion, and use phrasing that was nonjudgmental. The nine-page length of the instrument was a concern but I received no requests to end an interview early or to continue at a later time.

The instrument gave limited attention to non-users. These participants completed two sections of the interview: personal characteristics and reasons for not using devices. The reasons for non-use were extended to ten different options. Participants noted all that applied to them in the list.

Description of the Pilot Study

A pilot study was conducted in the fall of 2007 following IRB approval. This study provided an opportunity to test the instrument and focused on the psychosocial impact of long-

term use of optical devices by young adults with low vision. Twelve participants (10 current users) agreed to participate in the study and completed the interview process. The research questions were:

1. What demographic and personal characteristics indicate a relationship to use of devices?
2. What differences exist among high, moderate, and low users of optical devices on a functioning continuum and on four dimensions (independence, personal value of devices, social acceptance, and confidence) of a psychosocial continuum? (Likert-type questions)
3. What factors do participants identify as encouraging or discouraging in their regular use of optical devices? (open-ended questions)

The pilot study differed from the larger study in three ways; the analysis of results focused on categorizing participants as a type of user, use of a follow-up interview, and recruitment.

Attention to differences among users defined by their level of use or psychosocial response to devices (e.g., high, moderate, or low) rather than differences between users and non-users was distinctive to the pilot study. The percentage of total possible points for each participant on the Likert-type scales used for functioning and psychosocial questions determined type of user. For example, a participant who scored 12 out of 15 possible points on functioning with near devices (80%) or 20 out of 25 possible points (80%) on the confidence questions was a high user. Level of visual acuity was related to high, moderate, and low users. Five of the six persons with psychosocial scores of 80% or better in possible points and who commented on regular use of devices had acuities better than 20/400. Analysis of results in the larger study focused on use or non-use of optical devices.

A second difference in the pilot study was use of a follow-up interview on functioning. Half of the participants who currently used devices (n = 5) agreed to be called a second time two weeks after the initial phone interview. In this short conversation, participants answered the same six Likert-type scale questions on functioning. Responses for three of the five participants stayed the same while responses for two participants gave increased point totals and moved them into a higher category of device usage (e.g., low usage to moderate). This procedure was helpful for confirming question reliability. The order of these six questions was changed in the second interview.

Recruitment procedures were also different in the pilot study. Teachers of students with visual impairments (TVIs) of past Project PAVE participants were my most helpful recruiting source. I attended statewide conferences to request support from TVIs in sharing information on the study with their former students or their families. I talked with TVIs and gave copies of a letter approved by IRB describing the study. In seven instances, the participant's former TVI provided information on the study to the person or a family member who assisted with the contact. I made contact with three participants whose addresses were available in the telephone white pages. I also met two participants by chance and shared study information.

The pilot study and the larger study were nearly identical in three primary aspects: the interview instrument, the interview procedure, and the focus on psychosocial impact of long-term use of optical devices. The final instrument is described below (see Appendices E and F), and few changes occurred between the pilot study and conducting the primary study. Procedures for gaining consent and conducting the interview were identical in both studies. The psychosocial section of the instrument was the longest in both number of questions and time used by participants to give responses and to elaborate on their answers.

Changes to the pilot study instrument: Feedback from participants in the pilot study brought changes to the functioning section. The distance item “to find a friend in a crowded place such as a mall” received negative feedback from participants as something they were very unlikely to do and was omitted. This list proved to be too short as a reliable measure since one or two items did not apply to several of the participants. The revised questionnaire for the primary study added three new distance task items and two new near task items resulting in a total of ten tasks. This increased number of tasks gave a stronger chance of measuring functioning on typical activities of daily life.

One new question specific to Project PAVE was added to the questionnaire at the end of the functioning section (Likert-type scale). “To what extent did involvement in Project PAVE help you achieve your post-secondary goals (e.g., attending college, employment)?” Inclusion of this question gave an outcome measure that is critical to long-term program evaluation and continuing state support.

Changes to questions within the psychosocial section also occurred following feedback from the pilot interviews. The item “I am as likely to use my devices in my free time as when I am working” received negative feedback from pilot participants as not applicable and was omitted. The item “I have a specific spot for my devices at home or at work…” was added to the final version. This section required the most attention to find words and frame familiar situations that best captured a complex emotion such as confidence.

Field instrument: The 82-item interview contained four sections in the following order: questions on description of device use, functional use, psychosocial factors of use including a section of open-ended questions, and personal characteristics with five sub-sections. The order of the questions was based on the goal of keeping participants engaged in the interview. Use of the interview format relied on self-report of all data through telephone interviews.

Device use and personal characteristics are described first. These were factual fill-in-the-blank or forced-response questions (e.g., yes/no/don't know). Examples from the five questions on device use were "How many years have you used optical devices?" and "Have you used your devices consistently since working with Project PAVE (Yes/No)? Demographic information with six questions was the first section of personal characteristics. For example, participants identified gender, race, and age. The section on factors of vision and vision services was longer and more detailed with 24 questions. Participants named their eye condition and visual acuity in each eye. Six factors of vision such as contrast and depth perception were next listed. To help describe their vision, participants answered yes, no, or sometimes to the question "Are the following aspects of vision affected by your eye condition?" for each of the six factors. Type and frequency of optical care was next: "Was your doctor an optometrist or an ophthalmologist?" and "When did you last see your eye doctor?" with six options ranging from less than six months to more than five years. What years in school did you receive services from a vision teacher?" was also asked. Participants chose from yes, no, or don't know to the span of school years (e.g., elementary, high school).

Sections on education and employment were next with nine and eleven questions, respectively. Again these were factual, fill-in-the-blank questions. "How many years did you attend a local public school or a school for the blind?" "Did you attend college or a training program after high school?" Work history was the focus of the employment questions. Questions included "Are you currently working (Yes/No)?" and "What is the longest amount of time you have held a single job?"

Six questions on reading concluded the interview. Participants chose one of six reading formats (e.g., standard print with optical devices, large print) to answer the question "How do you read most often?" A second reading example is "I am able to read as fast as I want to

(yes/no). Participants were asked if they had any additional comments to make and thanked for completing the interview.

The section on functioning with devices gave ten examples of typical device use. The five near task items appeared first followed by the five distance task items. Participants identified a level of frequency of using the device (never, rarely, some of the time, most of the time, all of the time) to complete the task. On a scale of one to five for each question, a total of 25 points was possible. Examples are “to read cooking directions from a food package or a cookbook” and “to read information in the mail.” Next, participants identified level of device use from the same five choices to complete the distance task items. Examples are “to watch a presenter who is speaking to a large group” and “to identify my location on signs or buildings when traveling.” A Cronbach’s coefficient alpha of .81 was obtained for near tasks and .85 for distance tasks. Participants were also asked to give their own examples of using devices to complete near and distance tasks.

The psychosocial section on aspects of device use in the interview consisted of 20 Likert-type questions under the four constructs of confidence in device use, social acceptance, personal value, and independence. Participants responded to five questions for each construct, and these were randomly sorted within this section. On a scale of one to five (never true, rarely true, sometimes true, often true, or always true), each section was worth 25 points. Participants answered how frequently the statement referred to their use of optical devices.

Reliability scores for the four constructs varied. Cronbach’s coefficient alpha for confidence was .72. An example of a confidence question is “Using my devices is a skill that I am proud to have developed.” Cronbach’s coefficient alpha for social acceptance was similar with a score of .70. “I continue to use my device even when someone is watching me” is an example of a question from the social acceptance category. Cronbach’s coefficient alpha was

low for the remaining two categories. Personal value was .38. An example question in this category is “I have a specific spot for my device at home or at work, so if I need one I know where it is and I can grab it quickly.” Finally, Cronbach’s coefficient alpha for independence was .32. An example question is “Using my devices sometimes takes more time than if I ask for help, but I prefer using them and being able to do things for myself.”

Participants were encouraged to ask for clarification if they were uncertain of a question’s meaning. This section often prompted elaboration on the topic or situation presented. The open-ended questions that followed were used to verify and clarify responses, but the data were not analyzed in this study.

Participants who described themselves as non-users completed all portions of the questionnaire except for open-ended questions. Non-users were also asked to select their reasons for non-use from a list of ten possible reasons. Users completed the entire questionnaire. The scope of this study was not able to include a more detailed examination of non-users.

Procedures

The researcher obtained approval for the study from the Institutional Review Board (IRB) at Vanderbilt University. Once addresses were obtained, staff and I at TSB and Vanderbilt Eye Institute sent recruitment material to potential participants. The recruitment letter gave a brief summary of the study and provided my contact information for asking additional questions or obtaining a consent form. A second and final mailing was repeated 2 weeks later to those who did not respond.

Contact Record: A log of contact (phone, mail, and e-mail) alphabetized by the student’s name was kept. This document and participants’ signed consent forms providing the

information were stored in a locked office. The log included date of contact, contact information used, and date of scheduled interview, or no reply if applicable. Seven people responded with contact information but did not return consent forms despite additional requests following study protocol. The contact log was necessary to ensure an appropriate and organized search.

Interview: Once a participant agreed to be interviewed, I provided a consent form through the mail, fax, or e-mail as requested. The participant and I agreed on a phone interview time within a 2-week period. I conducted the interviews in a private room for confidentiality. I read instructions on the interview form to the participant before we began. The typical amount of time to complete interviews ranged from 30–40 minutes. I recorded the responses on paper during the interview, and these documents were stored in a locked cabinet in my office.

I conducted the interviews over a 5-month period (May–September, 2010). My qualifications for this role are appropriate. I hold expertise in the area of low vision both personally and professionally. I worked for 5 years as a teacher with Project PAVE and have personal experience with congenital low vision. I continue to work with students with low vision in my current job and am a certified low vision therapist (CLVT). I use optical devices regularly and am particularly interested in psychosocial responses to using devices.

Telephone interviews are recognized as a valid method for data collection (Day & Campbell, 2003). This method holds a number of advantages over face-to-face or mail interviews. The interviewer is able to monitor quality control by limiting the number of omitted items and clarifying questions. Honest responses are more likely over the phone when the participant is giving negative information. This interview format is more efficient in terms of cost, time to complete, and coverage of a larger geographical area. Request for telephone interviews has a higher refusal rate than face-to-face, but the personal interest of the participant on this topic limited that concern. Environmental factors such as the presence of a third person during

the interview may compromise the honesty of responses, but this concern was addressed when giving instructions to the participant. Day and Campbell also pointed out that limited testing of this method has occurred with longer interviews or use of open-ended questions. These two concerns were not raised by participants.

Procedural fidelity: The researcher was the only person to have contact with the study participants. The following steps were taken to ensure procedural fidelity. Use of the guided interview form was followed consistently. The questions and the instructions for each section of the interview were read. The researcher recorded the participant's responses on all questions as the interview took place.

Data analysis: In this section, I discuss the statistical analysis to be used in the study based on the following research questions:

1. What are the characteristics of PAVE participants who use and do not use optical devices?
2. How frequently do optical device users use an optical device for specific near functioning and distance functioning tasks?
3. How do optical device users' describe their confidence, social acceptance, personal value, and independence in optical device use?
4. For optical device users, what factors predict their confidence, social acceptance, personal value, and independence in optical device use?

The data were entered into the SPSS system for analysis. The outcome measure in this study was use or non-use of optical devices. Descriptive statistics revealed patterns within demographic and personal characteristics (Question 1). Frequencies, ranges, means, and standard deviations were reported. Items such as employment history, measure of visual

functioning, and low vision services received were examined for patterns related to device use. Four participants did not know their visual acuity and all other data collection was complete.

Frequencies, ranges, means, and standard deviations were also used to report on functioning (Question 2) and psychosocial (Question 3) data. An analysis of response options (number and percentage) was also conducted to define group response to each item.

Multiple regression analysis was used to answer Question 4. The psychosocial constructs are a continuous variable therefore this method was selected. The number of participants in the study limited the number of factors to three that could be considered as predictors in each model based on relationships found in previous analyses. Identifying the combination of factors was necessary to gain a clearer understanding of the impact of low vision and device use.

The methods of statistical analysis selected for this study were appropriate for examining the data collected. Each method gave a more in-depth view of identifying the predictive factors related to optical device use.

Results

Characteristics of Respondents

This section summarizes demographic and descriptive data for participants who received services from Project Pave and completed a phone interview regarding the psychosocial impact of long-term optical device use. The use of handheld optical devices (e.g., magnifier for near tasks and telescopes for distance tasks) was the focus of the study. The information in this section responds to Research Question 1: What are the characteristics of PAVE participants who use and do not use optical devices?

Optical device use by participants completing the questionnaire. A total of 226 individuals were eligible to participate in the study. A total of 37 participants (16% of those eligible) completed the interview, and 32 of these 37 participants (87%) were current users of optical devices (five were self-identified non-users). Of the current users, 29 (90.6%) commented that they had used optical devices consistently since participation in Project PAVE, whereas three noted that they had stopped using devices for a period of time, but had subsequently resumed use. Five participants used near devices only, and two used distance devices only, whereas 25 participants used both near and distance devices. A handheld telescope was the primary distance device used by respondents, and nine participants regularly used a bioptic telescope for driving. Participants reported using a total of 46 near devices and 33 distance devices. Types of near devices used included stand magnifiers (dome), handheld magnifiers, and reading glasses. Table 3 shows the number of devices used as reported by respondents during the interview.

Table 3: Number of Participants Using Specific Devices (*N* = 32)

Near devices	Distance devices
Dome (14)	Telescope (24)
Handheld (12)	Bioptic (9)
Reading glasses (20)	

Note: 30 participants (number in parentheses) used near devices, and 27 participants used distance devices.

The non-users identified reasons from a list of ten options for why they did not use devices. Two people marked only one reason, one person gave two reasons, and two marked four and five reasons, respectively. Six reasons each received two marks: (1) vision improved and no longer needed; (2) lost or broken device and have not replaced; (3) I don't like people seeing me use them; (4) students teased me about using them; (5) devices didn't help that much and weren't worth carrying around; and (6) I don't want to show that I am visually impaired. One respondent marked that devices were awkward or difficult to use. Three responses received no marks: (1) vision became worse and the devices no longer worked; (2) friends or family were not comfortable with me using devices; and (3) teachers were not supportive of me using devices.

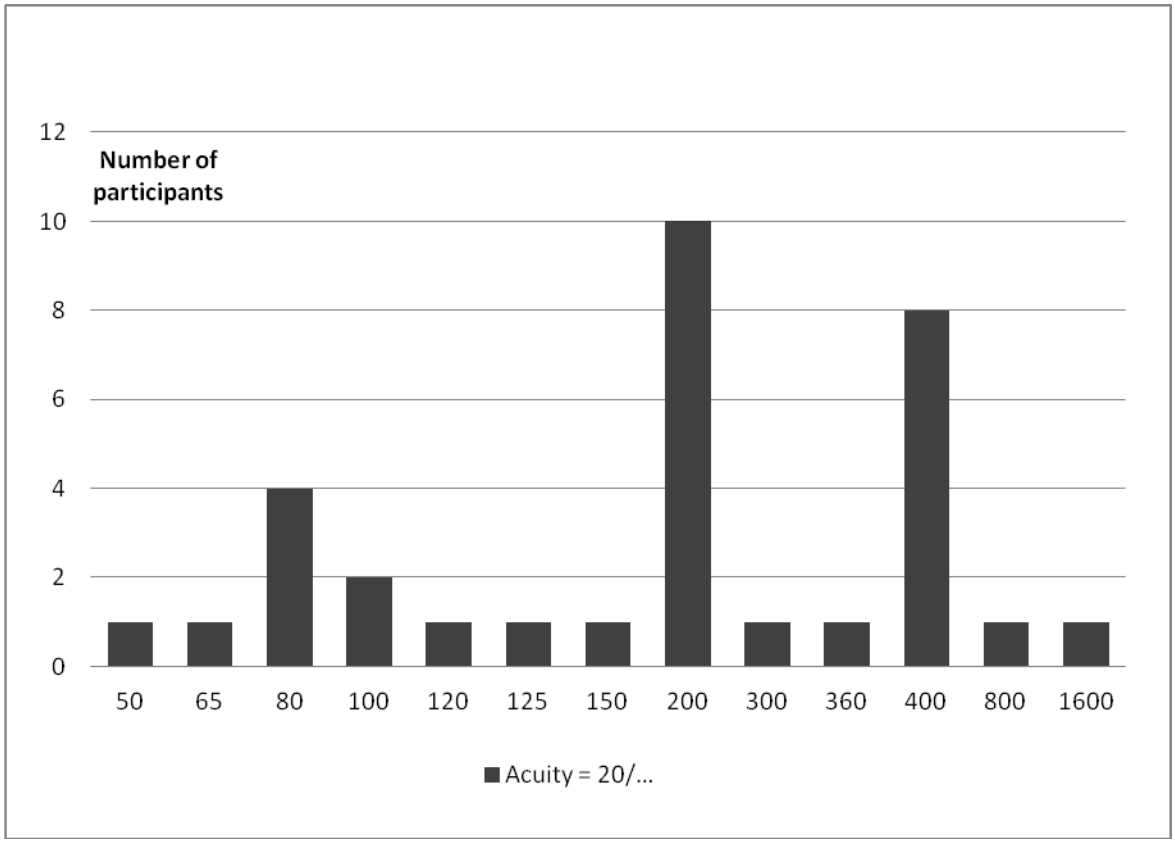
Personal characteristics. The participants who responded to the questionnaire were fairly balanced in gender with 21 men (56.8%) and 16 women (43.2%). These participants were primarily Caucasian (n = 32; 86.5%), followed by African-Americans (n = 3; 8.1%), American Indian (n = 1; 2.7%), and other (n = 1; 2.7%). The 37 participants' ages covered a span of 11 years, ranging from 18 to 28, with an average age of 21.84 years (*SD* = 2.94). Just over half of them (19) were 21 or younger; eight participants were within 22–24 years of age, and 10 were 25 years or older. Living arrangements varied for the group. Of the 37 respondents, 13 lived with a roommate, 13 lived at home with parents, six lived alone, and five lived with a spouse or partner.

Respondents answered a variety of questions on visual functioning, including items about their vision, and services offered for their optical care. The group listed 14 different visual conditions with albinism occurring most often (*n* = 9); congenital cataracts, nystagmus, and retinopathy of prematurity next most often (*n* = 4 each); and Stargardts in frequency after that (*n* = 3). Participants were asked to choose the label (functionally blind, legally blind with low vision, or low vision but not legally blind) that best described their vision. Twenty-four of 37 (64.9%) described themselves as legally blind with low vision, and 12 (32.4%) described themselves as low vision but not legally blind. One person chose the label *functionally blind*. When asked in a separate question if they were legally blind, 27 (73%) said *yes*, eight (21.6%) said *no*, and two (5.4%) said *not sure*. Seven participants (18.9%) listed a second medical issue or health condition (*n* = 1 for each, 2.7%.) These were hearing loss, vertigo, spina bifida, limited arm mobility, social anxiety, depression, and learning disability.

Participants also gave information on seven components of visual functioning (e.g., acuity, field, contrast), and responded *no*, *sometimes*, or *yes* if they noted a problem with a particular component. All participants stated *yes* to acuity as a problem. Twenty of 37 participants (54%) fell within the range of 20/200–20/400 acuity in their better eye, 11 (29.7%) participants gave an acuity of 20/60–20/150, and 2 (5.4%) participants had an acuity of 20/800 or worse. Four (10.8%) participants did not know their visual acuity. Figure 1 shows the range of visual acuity.

Vision consists of other aspects beyond perception of detail noted with an acuity measure. Sensitivity to light was the most problematic for participants, with 22 of 37 (59.5%) noting this was consistently a problem and 7 (18.9%) stating it was sometimes a problem. Slightly less than half of the participants (*n* = 16; 43%) noted peripheral field problems, with 15 participants noting this was a consistent problem and one participant indicating it was sometimes a problem.

Figure 1: Acuities in Better Eye

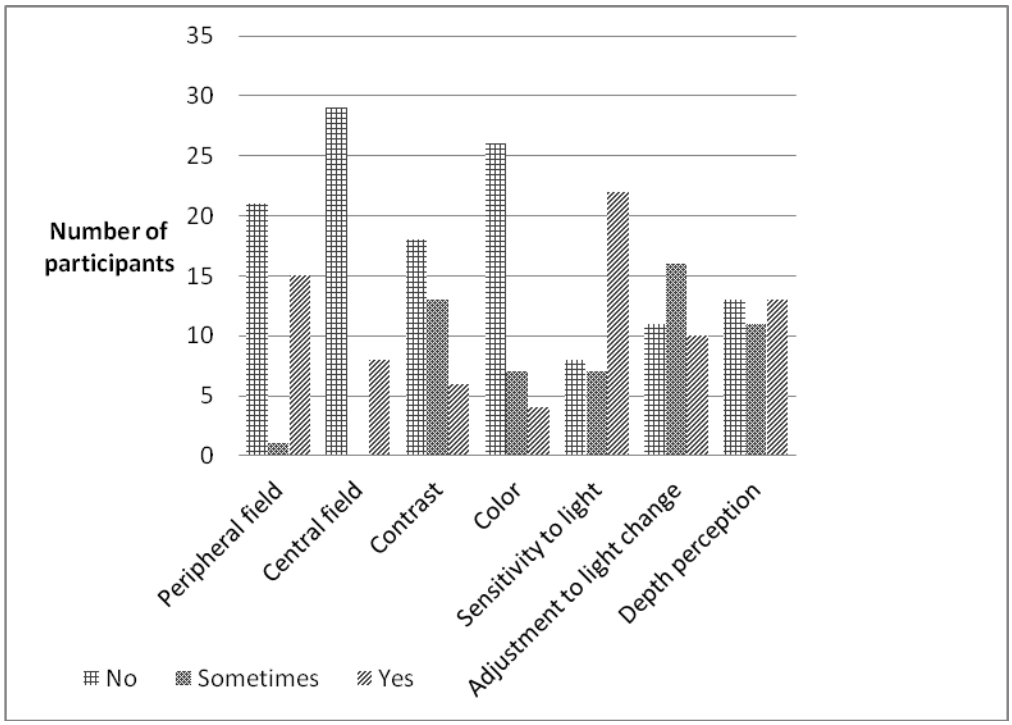


Participants reported the fewest problems with central visual field and color vision. See Figure 2 below for a summary of the remaining factors.

Participants also gave examples of other factors or problems with their vision. Three participants (**8.1%)** identified night blindness as an issue. Glare and visual fatigue were each listed by two respondents (**5.4%)**. Other examples of problems included scotomas, hazy vision, and eyes jerking (identified by one participant each.) Eleven of the 37 participants **(29.7%)** noted a change in their vision since participating in PAVE. Five (13.5%) described this as a loss of acuity, and one participant (2.7%) had experienced the onset of glaucoma. Two device users

(5.4%) and three non-users (60%) stated that their vision had improved. One explanation was, “I’m seeing better and I’m more aware.”

Figure 2: Factors of Visual Functioning



Three of the five participants (60%) who identified themselves as non-users described improved vision: “I notice more things that are farther away and I’m doing it faster,” and “My vision is much better with contact lenses.” One non-user stated, “No change” and another explained a loss of vision as, “I have increased blurriness and am more near-sighted.”

Twenty-six of the participants (70%), including all five of the non-users, had seen their eye doctor within the last year. Nine participants (28%) had seen an eye doctor within the last 1 to 3 years. Two noted that more than 5 years had passed since an eye-doctor visit. An optometrist provided care for 23 participants (62%) and an ophthalmologist did so for eight participants (22%). Six of the responders (16%) did not know what type of doctor they saw. Seeing a low vision specialist (an eye doctor trained in low vision care) as an adult was a rare

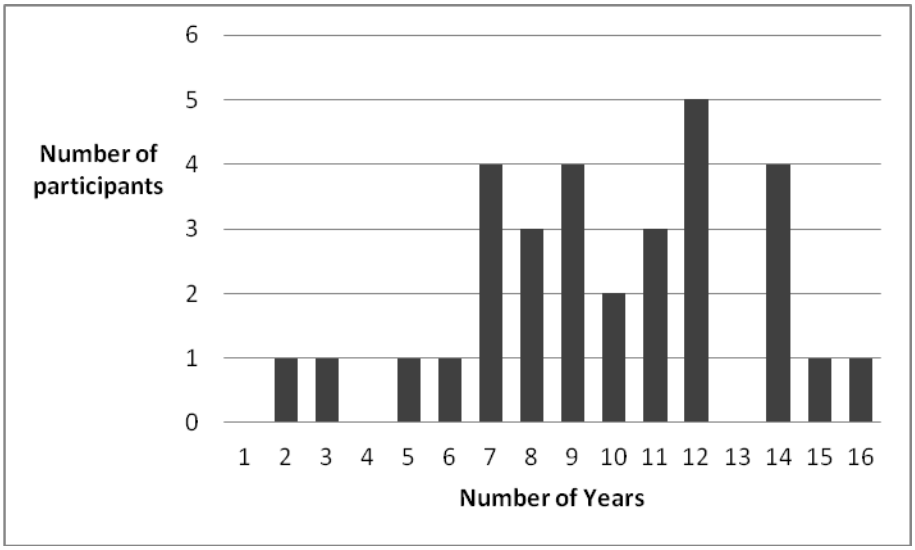
occurrence for these participants. Twenty-seven of the 37 participants (73%) stated that the PAVE clinician had been their only appointment with a low vision specialist. Eight participants (22%) had received a low vision exam within the last 3 years, and two (5.4%) had received such an exam more than 3 years ago.

The 32 participants who indicated they used optical devices responded to the question, "Because of your visual impairment are you having difficulty completing tasks?" Eighteen (56.3%) answered *no* and two (6.3%) of these participants then gave an example of a difficulty. Explanations given by the *no* respondents included comments on personal adaptability, such as, "I modify things," "I'm very functional," and "I just do things differently." One respondent commented, "I've adapted; I don't rely on devices." In contrast, another participant explained, "I'm pretty good with devices."

Fourteen of the 32 optical users **(**43.8%) answered *yes* to the question about difficulty completing tasks. Five of them (15.6%) indicated that reading tasks required more time to complete. Three participants (9.4%) identified difficulty with reading information from the board or on PowerPoint. One participant explained, "Using a magnifier at work when both hands are busy is tough." Five participants (15.6%) gave specific examples of difficulty (n = 1 for each): reading menus and cooking directions, reading food packages, seeing details in pictures, running errands, and seeing in the distance takes longer.

Project PAVE and services from a teacher of students with visual impairments. Seventy-six percent of the 37 participants (28) returned to the program for a reevaluation appointment and PAVE services following their initial enrollment year. Figure 3 shows participants' device use, with 25 of 32 participants (78.1%) noting that consistent use ranged from 7 to 14 years.

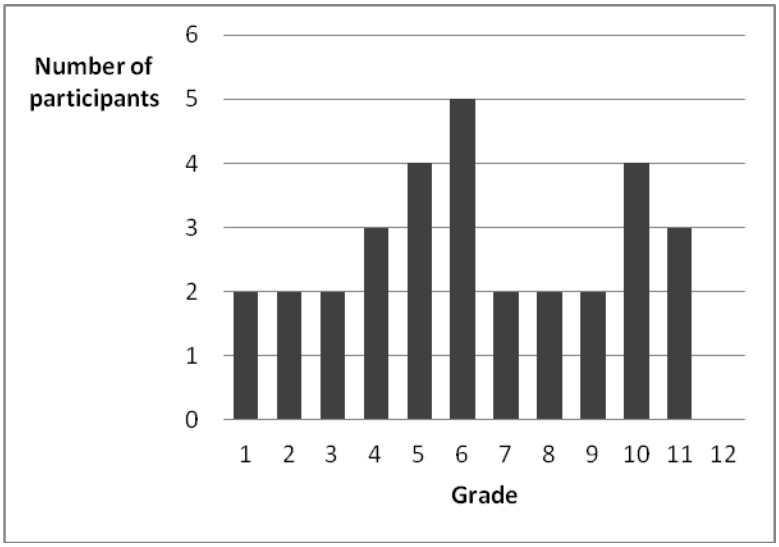
Figure 3: Number of Years of Device Use



Participants also identified the grade when they first received PAVE services. Nineteen of the responders were in elementary school (one non-user) and 16 were secondary students (three non-users). Two people stated that PAVE services began in preschool (one non-user). See Figure 4 below.

All participants (*N* = 37) responded to a Likert-type item about PAVE services asking how their involvement in Project PAVE helped them achieve their postsecondary goals. Response options ranged from: 1–very negatively influenced achievement, to 5–very positively influenced achievement, with a score of 3 representing no impact on the achievement. Ninety-two percent of participants responded either that Project PAVE somewhat positively influenced achievement of their postsecondary goals (*n* = 14) or very positively (*n* = 20) influenced the

Figure 4: Initial Enrollment in PAVE



goals. Three participants (one non-user) (8.1%) responded with a 3 indicating that PAVE had no impact on the achievement of postsecondary goals.

When asked to explain these responses, 35 of the 37 participants (94.6%) provided an explanation. Most of these responses fell into four themes: devices eased struggle/prevented failure (*n* = 12; 32.4%), personal traits gained (e.g., confidence, independence) (*n* = 10; 28.6%), skills learned (*n* = 6; 17.1%), and tools provided (*n* = 3; 8.6%). Two users of optical devices gave negative responses: “My experience with PAVE was frustrating. I was in a loop of no information (referring to bioptic driving),” and “I don’t want people to know I’m visually impaired. I didn’t want to use them (devices) in school.”

Participants who currently use devices also made references to tools: “I learned about different devices and tech by being in PAVE”; “Without PAVE I wouldn’t have had tools for college.” They further identified skills learned: “Using devices helped me get things done faster, especially with reading. It helped speed that up;” “PAVE helped me deal with seeing

things in class and preparing for college;" "They taught me how to use devices on tasks that I wouldn't have figured out for myself."

Some of the current device users were aware of personal traits gained, as indicated by responses such as: "Training with devices gave me confidence. It also helped me to question what else was out there for me. What I learned helped me to self-advocate later on;" "Using devices gives me more confidence and independence. Sometimes I still ask for help, but I am also able to do things for myself;" "It gave me a more independent mindset, seeing a different way to do things."

In addition, easing the struggle of visual tasks and preventing failure were often voiced in the same comment: "Devices helped me to see what I couldn't. Without devices, I couldn't have gotten past the first semester of college;" "Without my devices it would be difficult for me to get my work accomplished. They showed me how to use these;" "Starting in 6th grade, I couldn't read regular print or see writing on the board. I would have seriously struggled. I feel like I would have failed."

Comments from the non-users echoed other participants. Four of the five provided positive responses on how devices helped them. "It helped me know I can get around. I wasn't so nervous about using it in public, and it made me even more confident." "In some situations, such as around friends, I felt comfortable enough using the devices from PAVE." "I thought there was never anything that could help me. I was so glad to get things that boosted my confidence." "It helped me deal with seeing things in class and preparing for college." These respondents also recognized specific benefits of participating in the program.

Responses from three of the 32 current users (9.4%) voiced dissatisfaction with the services received (*n* = 1 of each; 3.1%): "The visits were too infrequent, there was too much

time in-between lessons;" "Start younger and keep in contact through the school years. They didn't keep up with me;" and "I felt my questions were not answered well or fully such as driving or handling college. I had to search out information for myself." These three respondents still gave a positive Likert-type response to PAVE influence. Seven answered, "I don't remember" or "No ideas."

Users of devices (*n* = 32) gave feedback on ways they thought PAVE teachers could improve instruction or services received. Twenty-five of them (78.1%) responded with evaluative comments. Sixteen of the respondents (64%) were complimentary of the services, whereas six of them (24%) had ideas for improvement: "Give ordering information on companies or resources (*n* = 2);" "Show a bigger range of tools such as more telescopes to compare (*n* = 1 for each);" "Emphasize use of other technologies (e.g., audio) and nonvisual skills. What can someone do other than purchasing a device?;" "Sometimes I felt the teacher underestimated my abilities;" "One thing would be a chance to interact, to do activities with other visually impaired kids."

All participants indicated when they received services from a teacher of students with visual impairments during their years of schooling. Almost one-third of the group (*n* = 12) received services in preschool years, whereas 21 participants (56.8%) did not, and 4 (10.8%) did not know if such services were received. The elementary school years were the most common for initiation of services with a teacher of students with visual impairments. Eighty-four percent (*n* = 31) began receiving services in elementary school and continued through high school. Initiation of services began for two participants in middle school and for four in high school. Twenty-seven participants (73%) continued with services such as vocational rehabilitation (assistance for seeking employment or attending college) in their postsecondary years. Table 4 summarizes this information.

Table 4: School Years Participants Received Instruction from Teachers of Students with Visual Impairments

Participant school years	Yes	No	Don't Know
Preschool	12	21	4
Elementary School	31	6	0
Middle School	33	4	0
High School	37	0	0
Vocational Rehabilitation	27	10	0

All participants' education. All participants (*N* = 37) shared information on both school and college attendance. Public school enrollment was well represented with 27 participants (73%) receiving all twelve years of education in their local school. Only two respondents (5.4%) attended a state School for the Blind during both the elementary and secondary years, while 6 participants (16.2%) attended the School for the Blind for a shorter period of time (from 2 to 6 years.) All five of the non-users attended public school for their education.

Information on college attendance is first presented on the user group followed by non-users. College attendance was common for the participants who used devices. Twenty participants in the user group (63%) were current college students and seven (21.9%) had received a degree

(two associates, four bachelors, and one graduate). One person withdrew after enrolling in college and 4 had not attended college at all. Two of the non-users (40%) were current college students, one had graduated with a B.A. degree, one withdrew after 2.5 years, and one was not planning to attend college.

All Participant's employment. Participants (*N* = 37) also provided information on employment and their job history. Information on device users is presented first followed by non-users. Nine users (24.3%) were currently working and four (12.5%) of these were full-time employees. Fourteen participants (37.8%) were not currently employed but had held jobs previously. Four of these were full-time employees. Terms of employment were relatively short, from one-half of a year to 4 years, with an average of 1.82 years (*SD* = 1.47) for those currently working. This was slightly lower at 1.18 (*SD* = 1.33) for the previously employed group. Participants primarily held jobs in three categories: seven in food service, five in retail, and three in education. As most of the participants worked part time, income for 20 of them was below $20,000.

Two of the device non-users were currently employed and two were not employed, but had held jobs previously. One was working full-time in retail, with an income of $20,000 to $30,000, and one was working part time in education with an income below $20,000. One had briefly held a part-time position in retail, and one had worked full time in the past three summers in childcare. One of the non-users had no job history.

Receiving monthly government assistance (e.g., social security disability income) is a familiar option for this population, and 21 of the 37 participants (56.8%) received SSI or SSDI support. Only one (2.7%) of the non-users was receiving this type of assistance.

How participants read. Managing print-reading tasks efficiently is a critical skill for young adults with low vision. Participants identified their preferred reading format (e.g., regular print with device, auditory) from a list and then designated the percentage of use for each format. Information on device users is presented first. Fifteen of 32 participants (46.9%) used a near device most of the time when reading print and 11 participants (34.4%) did not. Five participants (15.6%) preferred auditory as their reading format and one (31.1%) relied on large print. Percentage of use by current device users for each format was: regular print with a near device = 45%, no use of device = 25%, auditory = 15%, and large print = 13%.

Use of regular print for the five non-users of devices was high. One participant (20%) used regular print 100% of the time, two (40%) for 90% of the time, and two (40%) for 75% of the time. Use of large print, such as enlarging the font size on the computer, was limited with two participants (40%) at 10%, and one at 25%. One participant (20%) used auditory 25% of the time.

Participants also responded about comfort, speed, and stamina when reading. Ability to read without tiring was the greatest concern, with 26 of 37 participants (70%) indicating this was a problem (two non-users). In addition, 19 of 37 respondents (51%) noted dissatisfaction with a slow reading speed (one non-user). Twenty-eight of 37 respondents (76%) indicated they were able to handle different sizes of print comfortably (see Table 5). Three of the device non-users (60%) noted no problem in these areas.

Table 5: Response to Print

Respondents (*N* = 32)	Read without tiring	Read as fast as I want	Read different sizes of print comfortably
Yes	29.7% (11)	48.7% (18)	75.7% (28)
No	70.3% (26)	51.3% (19)	24.3% (9)
Total	100% **(37)**	100% **(37)?**	100% **(37)?**

Summary of participant information. Meaningful comparisons between the user (*n* = 32) and non-user (*n* = 5) groups are difficult to draw because of the small number of non-users. Even so, analysis of the data revealed a number of similarities. Both groups gave positive ratings to PAVE services. Thirty (93.8%)device users and four (80%) non-users gave ratings of 4 or 5 indicating PAVE had somewhat positive or very positive influence on their achievement of postsecondary goals. The groups showed a similar balance in initial year of enrollment with PAVE. Eighteen (56.3%) device users and two (40%) non-users began in elementary school; 13 (40.6%) device users and two (40%) non-users began in secondary school. One participant from each group started with PAVE as preschoolers. A reevaluation with PAVE was common with 28 (87.5%) device users and four (80%) non-users returning. Most of the group (27 users, 84.4%; three, 60% non-users) described themselves as legally blind. Sensitivity to light was noted as the most common problem in visual functioning for both groups. Public school and college attendance was high for both groups.

Three dissimilarities (i.e., visual functioning, comfort with regular print, and employment) between the groups stood out in examining the data. First, all five of the non-users had relatively high acuities in their better eye of between 20/50–20/80. Field loss was very limited

for the non-user group, with two participants (40%) indicating a central field loss and no problems in peripheral field for the group. Sixteen (50%) optical device users indicated a problem with peripheral field. Second, rates of employment were higher for the non-user group, while rates of college attendance were higher for the user group. Two of five (40%) non-users were currently working and two had been employed previously. In comparison, only nine (28.1%) optical device users were currently working and 14 (43.8%) had been employed previously. Twenty of the 32 (62.5%) users, however, were enrolled in college as compared to two (40%) of the non-users. Finally, the non-user group also reported greater comfort in working with regular print. Regular print with no devices was the primary reading medium. One (20%) of the five non-users read regular print 100% of the time followed by 90% (*n* = 2) and 75% (*n* = 2). Two (40%) device non-users noted a problem with fatigue in comparison to 24 (75%) device users. One non-user (20%) noted a problem with reading speed in comparison to 18 (56.3%) device users.

Specific Uses of Optical Devices by Users

Participants who used optical devices (*n* = 32) responded to items on how frequently they applied specific optical devices for specific functions to address the second research question. Examples of near task use were using a device to read cooking directions on a food package or read a menu in a restaurant. Examples of distance task use were using a device to see travel signs or to spot activity far away. Response options were (1) never, (2) rarely, (3) some of the time, (4) most of the time, or (5) all of the time. The following sections summarize participants' response to functioning questions.

Near functioning tasks. Thirty participants (93.8%) used near optical devices. The total mean score for near task use was 2.97 (*SD* = .86) across five situations (e.g., read directions). The range of mean scores for the five situations for near was from 2.80–3.25.

Reading pages in a book received the highest individual mean of 3.57 (*SD* = 1.22); reading cooking directions was second at 3.47 (*SD* = 1.04); reading a menu received the lowest mean of 2.13 (*SD* = 1.25). The mean for reading the mail was 2.90 (*SD* = 1.09), and the mean for reading dial markings or buttons on appliances or equipment was 2.80 (*SD* = 1.4). Table 6 shows the mean scores and percentage (actual count) of participant responses.

Table 6 also presents a helpful overview of participant responses. Reading a book or magazine and reading appliance dials or buttons had the most even spread of responses to the 5 points on the Likert-scale. Overall, reading cooking directions had the greatest use with responses of 3 or above. Reading a menu was the least common activity with 22 participants

Table 6: Frequency of Near Optical Device Use on Specific Tasks

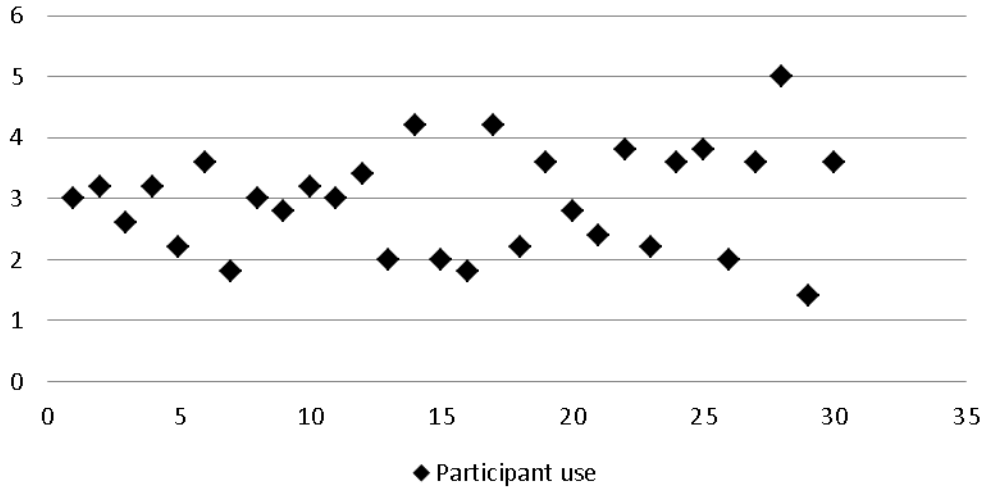
Task	*M*	*SD*	Never	Rarely	Some of the time	Most of the time	All of the time
Read pages in books or magazines	3.57	1.22	3% (1)	20% (6)	23% (7)	23% (7)	30% (9)
Read cooking directions	3.47	1.04	3% (1)	10% (3)	43% (13)	23% (7)	20% (6)
Read mail	2.90	1.09	6% (2)	30% (9)	43% (13)	6% (2)	13% (4)
Read dials on appliances	2.80	1.40	23% (7)	20% (6)	27% (8)	13% (4)	17% (5)
Read menus	2.13	1.25	37% (11)	37% (11)	13% (4)	3% (1)	10% (3)

Note: Total *M* = 2.97, *SD* = .86. Exact participant numbers shown in parentheses.

(73%) responding never or rarely. Reading mail was not a common activity with a near device, but 13 of the 30 respondents (43%) noted that they relied on a device some of the time for managing this task independently.

Participants gave comments during the phone interviews explaining their habits with using optical devices with near vision tasks. They indicated that another person often provided assistance if needed for tasks such as reading the mail or a menu. They usually knew the settings by touch on appliances or equipment and did not need to see the detail information about use. College textbooks were the most frequent example of reading material. Most of the near tasks happened inside the home, and this was noted as a comfortable place to use devices. The range of participant mean scores across the five situations was 1.4–5. The median score was 3.0 and the mode was 3.6. Figure 5 shows the distribution of participant mean scores on near functioning tasks.

Figure 5: Mean Level of Use for Near Tasks



Distance functioning tasks. Twenty-seven participants (84.4%) used distance optical devices, primarily telescopes. The total mean score for distance tasks was 3.0 (*SD* = .78)

across five situations. The range of mean scores for distance was from 2.48–3.33. Reading travel signs and following activity in the distance both received the highest individual item mean of 3.33 (*SD* = 1.18 and 1.21, respectively); looking for an object in an open space such as a parking lot was second at 3.30 (*SD* = .99); reading aisle signs received the lowest mean of 2.48 (*SD* = 1.12); watching a speaker was 2.56 (*SD* = 1.25). Table 7 shows the mean scores and percentage (actual count) of participant responses.

Table 7 also presents a helpful overview of participant responses. Reading travel signs and viewing activities in the distance were nearly equal across the five Likert-type responses. Finding an object in an open space was not a common activity with a telescope, but 17 of the 27 respondents (63%) noted that they relied on a device some of the time and another 8 respondents (30%) gave a higher response. Reading aisle signs was also limited, but 14 of the respondents (52%) said they relied on a device some of the time and another three (11%) gave a higher response. Seeing a speaker from the distance received the lowest overall score, with 13 participants (48%) reporting that they never or rarely used a device for this task.

The range of the participant mean scores across the five situations was 2.0–4.2 (excluding the user who responded never to all questions). The median score was 3.0 and the mode was 2.40. Figure 6 shows the distribution of participant mean scores on distance functioning tasks.

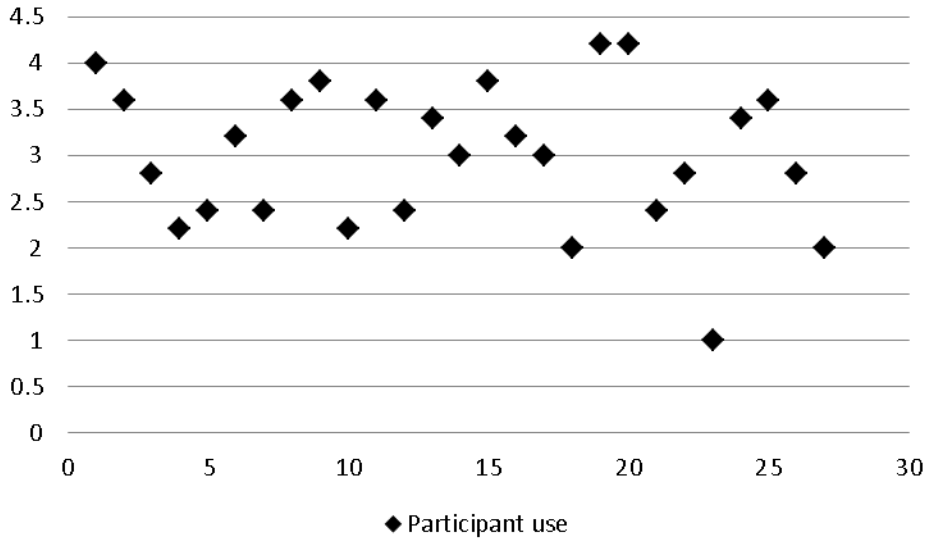
In summary, the measure of functioning with optical devices was based on participants' responses to a discrete set of 10 tasks. Reading pages in a book and seeing travel signs or activity in the distance were the most common tasks for this group. Reading a paper menu and watching a speaker in the distance were the least common tasks.

Table 7: Frequency of Distance Optical Device Use on Specific Tasks

Task	*M*	*SD*	Never	Rarely	Some of the time	Most of the time	All of the time
Identify location on signs when traveling	3.33	1.18	11% (3)	11% (3)	22% (6)	44% (12)	11% (3)
Watch activity happening in the distance	3.33	1.21	7% (2)	22% (6)	15% (4)	41% (11)	15% (4)
Look for object in an open space	3.30	.99	7% (2)	0	63% (17)	15% (4)	15% (4)
Watch a presenter	2.56	1.25	26% (7)	22% (6)	30% (8)	15% (4)	7% (2)
Read overhead signs in a store	2.48	1.12	30% (8)	7% (2)	52% (14)	7% (2)	4% (1)

Note: Total *M* = 3.0, *SD* = .78. Exact participant numbers shown in parentheses.

Figure 6: Mean Level of Use for Distance Tasks



Confidence, Social Acceptance, Personal Value, and Perceptions of Independence Among Optical Device Users

The information in this section addresses the third research question: How do optical device users describe their confidence, social acceptance, personal value, and independence in using these devices? Participants who used optical devices responded to 20 questions in the interview (i.e., the section on Psychosocial Aspects of Device Use). The questions covered four topics: confidence, independence, personal value, and social acceptance. Each psychosocial topic contained five questions and the questions were randomly ordered. The Likert-type response options ranged from 1, never true, to 5, always true, with a score of 3 representing sometimes true. These items were used to secure information about optical device users' personal feelings about device use and how they felt others responded to seeing them use a device. Table 8 gives a summary of mean responses for the four constructs.

Table 8: Summary of Mean Responses for Psychosocial Constructs

Constructs	*M*	*SD*	Never true	Rarely true	Sometimes true	Often true	Always true
Confidence	4.56	.51	0	3% (1)	13% (4)	53% (17)	31% (10)
Social acceptance	4.44	.58	0	3% (1)	16% (5)	59% (19)	22% (7)
Personal value	NA	NA	0	0	19% (6)	63% (20)	19% (6)
Independence	NA	NA	0	6% (2)	63% (20)	28% (9)	3% (1)

Note: Exact participant numbers shown in parentheses.

Confidence in optical device use. The five questions assessing confidence gave different ways to determine participants' perception of confidence. Response averages were high in this category (4.41–4.63). The five questions were: I am comfortable using my devices as an adult; Using my devices is a skill that I am proud to have developed; My devices help me feel more confident about taking on new responsibilities that require use of my vision; I am able to complete more tasks efficiently because I use devices; I do not worry during the day about managing tasks that require use of devices. Table 9 shows the mean scores and percentages (actual count) of participant responses. The "complete more tasks efficiently" question received the lowest scores, with 18 participants choosing a score of 5 (always true), and nine participants chose 4 (often true). The remaining four questions yielded a similar pattern of responses, with 22 to 25 participants choosing 5.

Figure 7 shows the individual mean scores for confidence. As noted in the opening summary, 10 participants had the highest possible average of 5 and 17 participants had scores of 4-4.9. The lowest average score was 2.8. Participants were consistent in reporting feelings of confidence with using devices.

Figure 7: Perception of Confidence by Users of Optical Devices

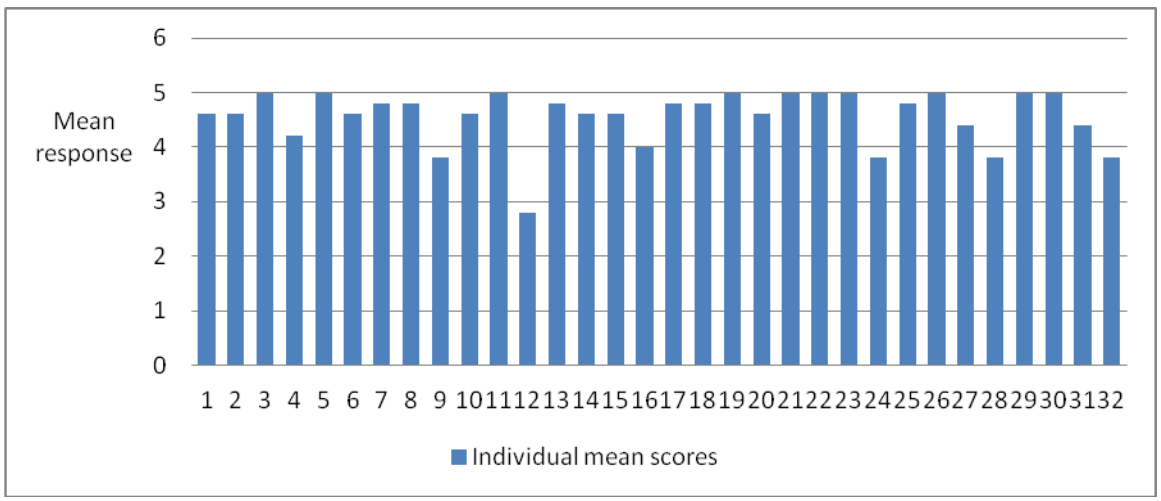


Table 9: Summary of Mean Responses for Confidence

Question	*M*	*SD*	Never true	Rarely true	Sometimes true	Often true	Always true
Proud of my skill	4.63	.79	0	3% (1)	9% (3)	9% (3)	78% (25)
Do not worry about using	4.63	.66	0	0	9% (3)	19% (6)	72% (23)
Comfortable as an adult	4.59	.79	0	3% (1)	9% (3)	13% (4)	75% (24)
Accept new responsibilities	4.56	.72	0	0	13% (4)	19% (6)	69% (22)
Efficient with tasks	4.41	.76	0	0	16% (5)	28% (9)	56% (18)

Note: *M* = 4.56, SD = .51. Exact participant numbers shown in parentheses.

Social acceptance of optical devices. The construct social acceptance also received high marks from participants. The average response for all questions was 4.44, with a relatively small range (4–4.59) across the five items. The five questions were: People around me trust me to handle a task correctly when they see me use devices; I am comfortable talking to others about why I use devices; I continue to use a device even when someone is watching me; I am as likely to use my device when I am alone as when I am with someone; I have an answer ready when someone asks why I am using a device. Table 10 shows the mean scores and percentages (actual count) of participant responses.

Participants gave the lowest response, an average of four, to the "people trust me" question. During the phone interviews, several made the comment, "I don't know what others think about me when I'm using a device." Optical devices are still unfamiliar to the public and often attract attention. Based on participants' answers, this did not seem to raise concern. Seven participants had the highest possible average of 5 and 19 participants held scores between 4-4.9. The lowest score was 2.2. The responses were consistently high with 21 or more giving a 5 (always true) to four questions. Figure 8 shows the individual mean scores.

Figure 8: Perception of Social Acceptance by Users of Optical Devices

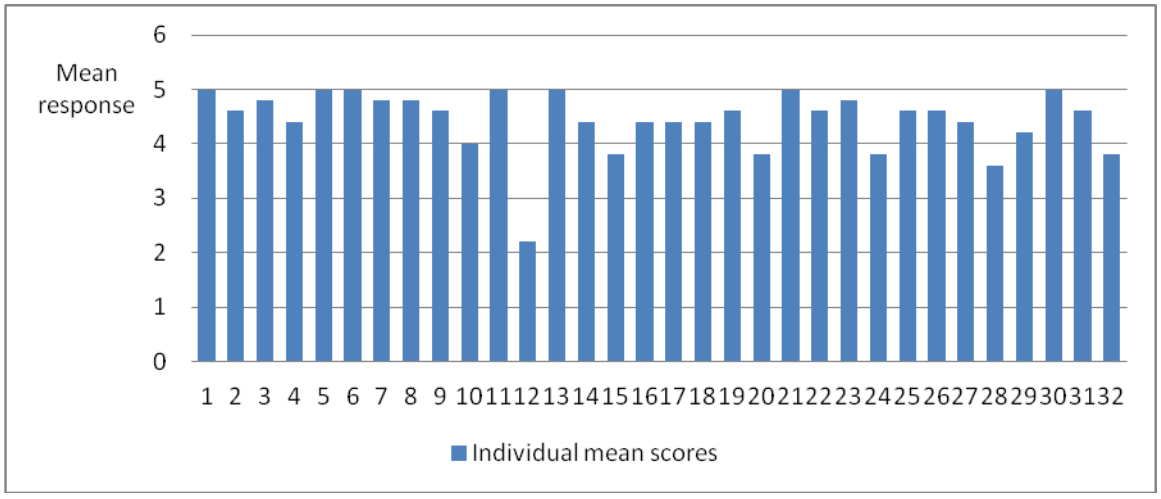


Table 10: Summary of Mean Responses for Social Acceptance

Question	*M*	*SD*	Never true	Rarely true	Sometimes true	Often true	Always true
Use when watched	4.59	.76	0	3% (1)	6% (2)	19% (6)	72% (23)
Have an answer ready	4.59	.88	0	6% (2)	6% (2)	9% (3)	78% (25)
Can talk to others	4.53	.80	0	3% (1)	9% (3)	19% (6)	69% (22)
Use when with someone	4.47	.84	0	3% (1)	13% (4)	19% (6)	66% (21)
People trust me	4.0	1.02	3% (1)	3% (1)	2% (7)	34% (11)	38% (12)

Note: Total *M* = 4.44, *SD* = .58, Exact participant numbers shown in parentheses.

This group of adults reported a comfort level with using devices in front of others.

Personal value of optical devices. Respondents reported valuing their optical devices, as shown in relatively high scores of between 4–4.56. Means are not reported here due to the low reliability score of .32. A cell phone is an example of a daily-use item that holds personal value for most individuals. The five questions were: I can do more things visually because I have devices; I have a specific spot for my devices at home or at work so if I need one I know where it is and can grab it quickly; I am as likely to use devices in my free time as when I am working; If my vision changed, I would want to get another low vision exam for a new set of devices; Having my devices with me is as important as grabbing my wallet or my house keys when I leave the house. Table 11 shows the percentages (actual count) of participant responses. Scores in this construct were very similar to Social Acceptance. Six participants scored the highest possible average of 5 with 20 participants responses were between 4-4.9. The lowest score was 3. Figure 9 shows individual mean scores.

Figure 9: Perception of Personal Value by Users of Optical Devices

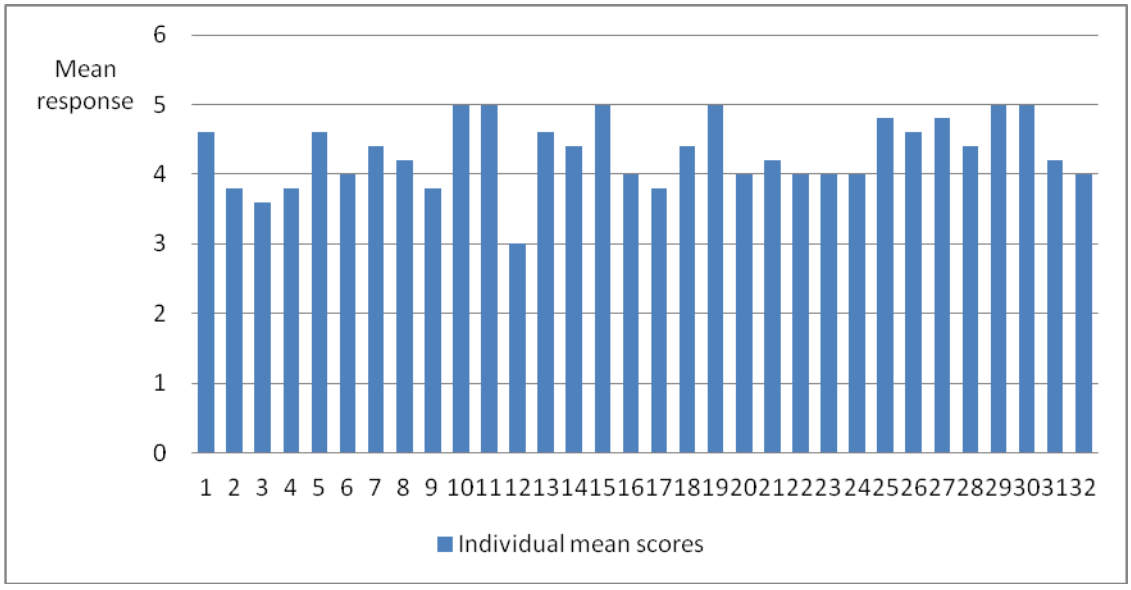


Table 11: Summary of Responses for Personal Value

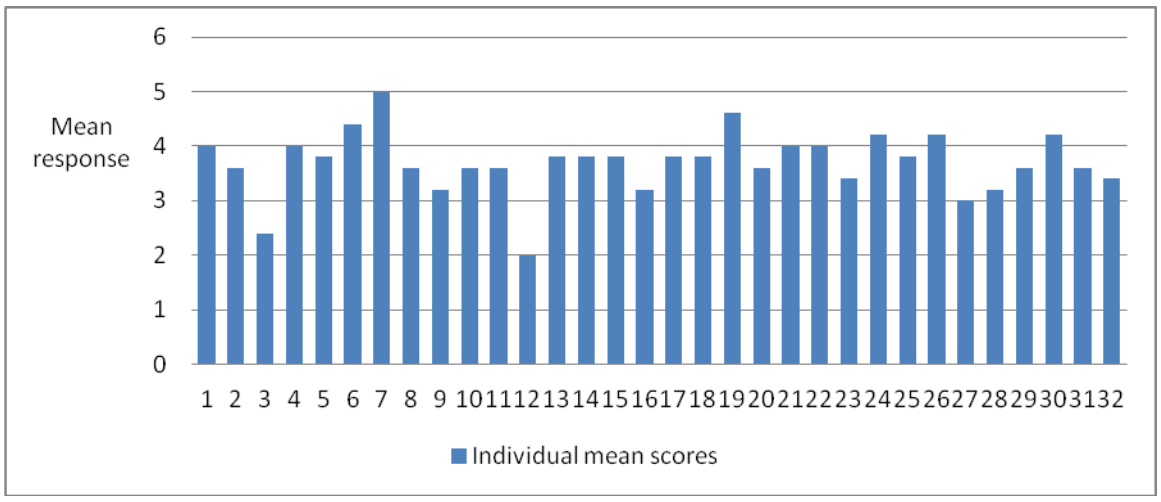
Question	Never true	Rarely true	Sometimes true	Often true	Always true
Want to replace if vision changed	3% (1)	0	13% (4)	6% (2)	78% (25)
Have a place to keep devices	0	3% (1)	13% (4)	28% (9)	56% (18)
Use in work and leisure	0	0	16% (5)	34% (11)	50% (16)
Can do more	0	0	25% (8)	22% (7)	53% (17)
Carry it with me	3% (1)	9% (3)	22% (7)	16% (5)	50% (16)

Note: Exact participant numbers shown in parentheses.

These questions asked about feeling value for an item that sometimes brought frustration to the user. Participants made comments during the phone interview that reflected an ambiguity toward devices with needing to use one and choosing not to depend on it or noting its limitations in some tasks.

Independence in optical device use. Means are not reported here due to the low reliability score of .30. Responses to these items ranged from a low score of 2.63 to a high score of 4.31. The questions were: Using my devices sometimes takes more time than if I ask for help, but I prefer using them and being able to do things for myself; If someone offers to finish a task for me when I am using my device, I assure the person that using my device is working well for me; I carry my device with me when I am away from home and know I will be in unfamiliar places; I am involved in similar activities as my peers because I use my devices to join in on what everyone else is doing; If I need to replace my devices, I would know what to order and what company I should contact. Table 12 shows the mean scores and percentages (actual count) of participant responses.

Figure 10: Perception of Independence by Users of Optical Devices



These responses showed the widest spread across the five response options.

Table 12: Summary of Responses for Independence

Question	Never true	Rarely true	Sometimes true	Often true	Always true
Do tasks for myself	0	3% (1)	13% (4)	34% (11)	50% (16)
Use in new places	0	9% (3)	22% (7)	22% (7)	47% (15)
Takes more time	3% (1)	9% (3)	28% (9)	16% (5)	44% (14)
Join in activities	6% (2)	9% (3)	34% (11)	19% (6)	31% (10)
Can reorder device	19% (6)	31% (10)	31% (10)	6% (2)	13% (4)

Note: Exact participant numbers shown in parentheses.

Participants noted a great difference in task completion versus independence. In the phone interviews, they explained their perception of independence in comparison to peers. For example, they did not feel that their participation in activities was on an equal level to peers, and they often traveled with someone who could help with tasks in new places.

Participants found it challenging to portray their feelings of device use within constraints of the 20 questions and the five response options. Their responses indicated that as a group they felt highly confident but less independent when using devices. Participants' scores also indicated a strong sense of social acceptance and a personal value for their devices. Overall, the respondents showed positive attitudes towards device use.

Predicting Confidence, Social Acceptance, Personal Value, and Independence

The final analysis focused on the fourth research question: What factors predict confidence, social acceptance, personal value, and independence in optical device users? A series of multiple regression analyses were run to determine if gender, central visual field, or years of optical device use (i.e., start of PAVE service) were predictors of the four psychosocial factors measured in this study. The central field item asking if the participant noted a problem (yes, no, sometimes) was used as four participants did not know their acuity. These three predictors were entered as a block into each analysis because of small sample size.

The three predictor variables together made a statistically significant contribution to predicting participants' confidence (p = .036), accounting for 26% of the variability. In addition, gender made a unique and statistically significant contribution to the prediction of confidence, with males being more confident (M = 4.73, SD = .30) than females (M = 4.34, SD=.65). Table 13 presents results on the model.

Table 13: Regression Model Predicting Confidence

Predictor	*b*	β	SE	T
Gender	-.37	-.38	.17	-2.23
Central field	-.24	-.16	.11	-1.49
Years of use	-.25	-.04	.03	.14

Note: Predictors entered as a block. $p < .05$

I ran a second analysis to determine if the same factors, also entered as a block, predicted social acceptance. In the second analysis, the three variables together accounted for just 3% of variance and did not predict social acceptance. Table 14 presents results on the second model.

Table 14: Regression Model Predicting Social Acceptance

Predictor	*b*	β	SE	T
Gender	-.08	-.1	.22	-.43
Central field	-.13	-.1	.14	-.67
Years of use	-.07	-.01	.04	-.37

Note: Predictors entered as a block. $p < .03$

Analyses were not done on the remaining two psychosocial factors (personal value, independence) because coefficient alpha indicated that these scales were not reliable.

Discussion

Characteristics of Device Users

Thirty-two of 37 (87%) participants in this study reported using optical devices for completing either near or distance visual tasks. These optical device users were primarily aged 18 to 21, Caucasian, and were either attending or had graduated from college. Twenty-one participants were men *(65.6%)*), and 78% of the 32 participants used both types of devices. As expected, there was considerable variation in eye conditions with 14 different eye conditions listed, with albinism being the most common (*n* = 9, 26%). The next most common conditions (congenital cataracts, nystagmus, retinopathy of prematurity) were named by four participants(12.5%). Sensitivity to light was the most common visual problem as noted by 29 participants (90.6%), with the same number of participants indicating they had a good central field of vision.

The visual acuity for nearly one-fourth of the group in this study was better than 20/160, and another 20 participants reported an acuity between 20/200 to 20/400. Thus, 63% of optical device users fell within the weakest acuity range. This percentage was higher than some previous studies where only 22% and 39% of device users fell within this range, respectively (Corn et al., 2002; Guerrette et al., 2011). In those studies, a high percentage of users, 68% and 53% respectively, had vision better than 20/200. These conflicting data support the need for closer examination of persons with better vision and establishing their habits of long-term device use.

Regular services with a TVI began for most of the device user group (*n* = 26) (81.3%) during the elementary years, with nearly one-third of these participants (*n* = 11) recalling some type of services during preschool. Receiving a low vision evaluation and participation in Project PAVE did not begin as early with 19 device users (59.4%) receiving these services in the

elementary years and 12 (37.5%) in the secondary school years. PAVE services for one participant began in preschool. Project PAVE had been available as a service in Tennessee since 1994, the start of schooling for most of this group. The device users had an overwhelmingly positive response to the Project, with 92% responding that their involvement positively or somewhat positively influenced achievement of their goals.

The employment figures for device users were not promising, as only 11 of the respondents (30%) were currently employed (five (15.6%) in full-time positions). Sixteen device users (43%) had previous work experience. Overall, the annual income for device users was below $20,000 except for one participant who was earning over $50,000. Over half of the user group, 20 of 32 participants(62.5%), was receiving monthly government, assistance such as social security disability income. Comments made during the interviews suggested that this monthly check was a disincentive to seeking full-time employment.

Functioning with Optical Devices

Participants used optical devices for a range of near and distance visual tasks, but overall their use was limited rather than widespread. In prior studies device use for reading pages in books or printed material and reading cooking directions on food packages were the most frequent uses for near devices. Device use for reading printed material in school received considerable attention in five studies focusing on new device users (Corn et al., 2002; Guerette et al., 2011; Leat & Karadsheh, 1990; Mason & Mason, 1998; Zammitt, et al., 1999). Interestingly, when new users were asked to identify what was easy to see, 43% named books at school (Guerette et al., 2011).

When asked about tasks beyond the five items listed in the questionnaire, participants in this study provided few examples. Computer screen (*n* = 6; 18.8%) and cell phone screen (*n* =

5;15.6%) were the most common near device uses after reading pages of print. In terms of distance device use, finding travel information on signs and watching activity happening in the distance were the two most common applications. Likewise, new device users in the Guerrette et al. (2011) study identified similar device use. Additional examples of distance device use included reading from a whiteboard in class (*n* = 11; 34.4%) and watching sports (*N* = 5; 15.6%). Participants (*n* = 14; 43.8%) explained that they sometimes found it difficult to use devices in a public setting because of people staring or making comments, but they emphasized it was important to use the device when needed. This discomfort with using a device in front of others was a considerable concern for new device users in two prior studies. Seven of the eight participants in Zammitt et al. (1999) indicated they felt it drew attention to their visual impairment. New device users in Mason (1999) explained that they felt different (42%) or felt embarrassed (35%). Developing instructional strategies to overcome this barrier is an important subject for further research.

Psychosocial Aspects of Device Use

Device users were both confident and proud of their ability to use devices to aid their visual functioning. For instance, 84% of device users indicated that device use was a skill they were proud to have developed and that they were able to complete a task efficiently using their devices. Participants (*n* = 12; 37.5%) used phrases like “a helpful tool” or “it helps you” when describing their reasons for using a device. In a similar tone, new device users in the Leat and Karadsheh (1990) study described these tools—66% with magnifiers and 67% with telescopes—as useful.

Device users were also positive about their comfort in using devices, with 81% giving positive responses to question measuring this construct. Yet device users acknowledged this comfort level had taken time to develop, and their use of devices was currently restricted.

Increasing this sense of comfort may be a factor of increasing functioning. Preserving a self-image as a capable person "like everyone else" is a universal goal, and participants were sensitive to this awareness. However, 75% of the new device users in the Zammitt et al. study (1999) chose not to use their device at school. While eyeglasses are an accepted vision aid in our society, a stigma of disability is attached to an additional tool such as an optical device. For example, long-term device users in this study (*n* = 5) explained that when at school, they often felt reluctant to use devices. This did lessen with age, however.

Most device users (78%) valued devices that could enhance their vision. However, only one of the personal value questions, "If my vision changed, I would want to get a new set of devices," received an overwhelmingly positive response. Twenty-five participants (78.1%) marked always true, suggesting that such devices were valuable enough to spend their own money to obtain. It should be noted, however, this group was still using devices they had received free-of-charge from Project PAVE, and they had not purchased any new devices. In addition, device users (*n* = 7; 21.9%) explained that using a device could be frustrating, especially because a task can take longer, and others become impatient with them. This concern of new device users with a task taking longer was also noted in Leat and Karadsheh (1990) and Mason (1999).

Device users' responses about the use of devices to support their independence were less positive in this study. The only item to receive a strong affirmative response was "I can do more things visually because I have devices." The individual item scores were high but qualitative data were negative. Overall, their comments suggested that use of a device let them complete tasks, but this was not the same as being independent. Doing the task differently or more slowly than those around them gave a limited sense of accomplishment.

Finally, confidence in using optical devices was related to a useable central field of vision, amount of time the device had been applied, and gender. In essence, device users were more confident about device use if they were male, had better central vision, and had used optical devices longer. No predictors were identified for social acceptance. Further research is needed to test possible factors such as acuity level, amount of direct service from a teacher of students with visual impairments, or employment status.

Unexpected Findings

This study produced a number of unexpected findings. First, this group of young adults was continuing to use the dome, a stand magnifier, as their primary device for near tasks. The dome is an ideal introductory tool, and clinicians frequently prescribe one for their young patients or new users. These participants had matured, but their use of devices had not. Handheld magnifiers, designed to come off the page instead of sitting on the page such as the dome, are a more sophisticated tool. Such tools allow device users to increase their speed of functioning as well as range of tasks. This was an unexpected finding, as each appointment with a low vision specialist should include forecasting the next step of device use. Both clinicians and consumers have a responsibility to upgrade their tools as well as their expectations in completing tasks.

Second, the range of acuities showed a wide spread, but included little diversity, as many participants had the same acuity (see below). It is difficult to determine if this is simply a factor of those who agreed to be in the study or indicative of those who use devices. Thirty-three of 37 participants (89.1%) knew their visual acuity. Nearly two-thirds (63.6%) of the group had an acuity of 20/200 or better with acuity for 11 (34.4%) of the participants ranging from 20/50–20/150. All of the non-users fell within this best acuity group. In comparison, 22 participants (68.8%) had an acuity of 20/200 or weaker, the criteria for legal blindness. The bar graph

depicting visual acuity showed two spikes at 20/200 and 20/400 with 18 participants (56%) reporting one of these numbers. This representation of acuity was surprising considering the possible range for low vision in this many participants with visual impairments.

Third, improving employment statistics is a familiar, longtime goal in the field of visual impairments. This group showed minimal improvement. Young workers, ages 16–24, face employment barriers, especially in today's struggling U.S. economy. The Bureau of Labor Statistics reported that 50.2% of this age group was employed in 2012 compared to 28% of the participants who used devices. In a positive light, 44% of the group reported previous employment. More than half of all participants (57%) received government assistance and their comments suggested little motivation to change this status. Based on the data from this study, disappointing employment figures for young people with low vision continues to be a problem in the 21st century.

Fourth, participants reported a short list of tasks that were completed with optical devices when asked to describe their functioning. A day holds hundreds of reasons for using detail and distance vision. Optical devices are a versatile tool that can make tasks beyond visual reach possible. They had gotten older, but their uses for devices had not increased much beyond those activities they engaged in at school. Few examples were offered beyond the 10 tasks listed in the functioning section of this questionnaire. Lack of proficiency with device skills, reluctance to use them in front of others, and limited awareness with range of tasks may all be factors. These issues point to possible improvements in a Project PAVE –type model of school-based services. For example, extending the follow-through time with students beyond the initial year of instruction or at intervals in the student's schooling may establish a lifetime reliance on use of optical devices; teaching problem-solving skills to increase student awareness of generalizing optical device use to a greater number of tasks may build self-confidence in

personal ability; formalizing a protocol of basic instruction on device use to family members and general education teachers may provide the support needed to integrate these tools throughout the student's day.

In addition, these longtime users reported a low sense of independence. Cultural attitudes and psychosocial perceptions that devalue the person with a disability are a part of the complex decision by people with visual impairments to use a device. Successful training with devices could be defined as having the ability and the desire to complete a similar range of tasks as peers. To improve service delivery, professionals need a better understanding of the path to fully embracing use of optical devices.

Information on Non-users

The low number of non-users who participated in the study may have to do with the fact that having low vision is a minor part of their self-identity. Two distinguishing characteristics were that the visual acuity of these participants was better than 20/200 after correction and overall they had a slightly higher rate of employment. They responded with a positive rating for their participation in Project PAVE and had used optical devices through high school years, but had chosen to discontinue their use. Their reasons for not using devices were varied, and they felt they had developed other strategies for the times when visual access was difficult. In effect, their vision and coping skills appeared to be strong enough that they did not feel the need to use optical devices.

Directions for Future Research

One important direction for future research is to better determine if optical devices are worth the trouble. This question continues to generate debate at professional development seminars and teacher meetings. Currently, success with young people using devices is seen

more as the exception than the rule. Our limited history of research on use of optical devices has presented guidelines, but we have not found the tipping point to make training and expectation of device use widespread across the field. The majority of the population with visual impairments has low vision, so we have no shortage of potential users. Results of this study showed that special education services from teachers of students with visual impairments were typically initiated in elementary school years, but referral for low vision evaluations and prescribed optical devices with Project PAVE was delayed for some participants until the secondary school years. Future research needs to more fully explore how and if optical device use makes a difference in the life of those with low vision.

Second, optical devices have been available for more than 50 years, but widespread use by young people with low vision has not occurred. This study is one example of research aimed at identifying the personal characteristics that may be used to create a profile of a long-term device user. Additional research is needed to replicate and extend these findings. These characteristics may include personality type, reading performance, academic goals, or friendship network. Knowing this information can help to individualize instruction and potentially decrease prevalence of limited functioning and non-use of devices.

Third, an educational goal of optical devices is to promote their use as a universal tool for completing visual tasks. Why was the use of such devices by participants in this study not generalized across a range of settings? Although they were a young group continuing the student life, living at home, or just beginning to accept routine adult responsibilities, it was rare to hear a participant describe using optical devices in a store, at entertainment events, or anywhere at home besides when reading books at a desk or food labels in the kitchen. Was restricted use a deliberate choice or were participants unaware of or not skilled enough to expand their use? Research is needed to better understand these use patterns.

The goal of this study was to increase understanding of the psychosocial issues related to optical device use, with limited effectiveness. Personal motivation or reluctance to use devices, however, has received very limited attention, especially in the younger age group with congenital eye conditions. Individuals with low vision are beginning to use mainstream technology such as smart phones and tablets with built-in magnification features for near and distance tasks and may be more effective and acceptable than relatively low tech magnifiers and telescopes. These devices are highly appealing to the public unlike the far more affordable, non-electronic optical devices. Is it simply the novelty of this technology that makes it so appealing for gaining access to visual information in a range of environments? I encourage other researchers to collaborate to develop an improved instrument and to administer it to a larger number of participants to better understand the factors that promote or limit device use.

Implications

First, interviews with the participants revealed some continuing issues with training and response to optical devices. Participants demonstrated limited generalization of device use across environments and reluctance to increase use. This may be related to lack of proficiency with using devices for more complex tasks. Professionals who design personnel preparation programs, continuing education courses, and professional development opportunities for teachers of students with visual impairments should include hands-on training with devices, stress the responsibility to implement a curriculum of device training, and provide access to current resources. A proper knowledge base is essential to understand a progression of skills and development of lessons with high expectations for device use. Teachers of students with visual impairments as well as general education teachers frequently comment that they have had little exposure to optical devices and the needs of students with low vision. The outcome of this training crisis mean referrals are delayed, and students apply a dome magnifier, an

introductory tool, into adult years; have little experience with using devices throughout their typical day; and feel psychosocially unprepared to use optical devices with ease. As a field we have a professional and ethical responsibility to provide appropriate and comprehensive services to students with low vision, which is the high majority of the population with visual impairments.

Second, 92% of the participants gave a positive response to Project PAVE, even those who discontinued device use. Closer examination of outcome data is necessary to more fully understand the specific benefits of participation in such a program. This single result is encouraging enough to support exploration of implementing school-based, statewide models. Project PAVE is about to begin its third decade of providing services. Outcome studies are essential to increase our knowledge base on effective training, user profiles, and psychosocial aspects of optical device use. For example, does the instructional model vary based on acuity? What age is most effective for initiating device use leading to a lifetime habit? My personal experience with use of optical devices did not begin until adulthood. The relatively good acuity I have of better than 20/100 did not dissuade my personal choice to rely on optical devices.

Third, awareness of psychosocial needs is as critical to successful use of device as is the skill of scanning a page of print with a magnifier or tracking action on the athletic field with a telescope. These participants had plenty to say about their experience. The first participant interviewed in the pilot study asked, “What took you so long to ask about this?” Overall, participants responded quickly and confidently to questions. Gathering their feedback is a valuable element in our comprehensive understanding of individuals who use optical devices. We have a responsibility to hear their opinions and ideas. Developing instruments to record these data, designing studies that analyze personal responses effectively, and dedicating attention to this topic across research facilities is imperative.

Limitations

The study had a number of limitations. First, the small number of participants and the homogenous nature of the group (e.g., age, race, ethnic background) restricted the generalizability of the findings. Second, all of the participants received services from Project PAVE teachers. Thus, the findings must be interpreted in the light of these services, as persons with visual impairments who did not receive similar services may have responded differently to the questionnaire. The results can only be generalized to Project PAVE participants. Third, the multiple regression model testing for predictors for confidence showed insufficient power and no predictors were found for social acceptance. Overall, the measurement of psychosocial aspects was ineffective. Qualitative research is needed to define the critical constructs and their relationship to use of optical device. Fourth, the use of phone interviews as a format for collecting data has a number of weaknesses, including reliance on self-reporting with no on-site documentation of functioning. Fifth, the guided interview was developed for use in a dissertation and did not undergo extensive examination and testing.

REFERENCES

Americans Wth Disabilities Act (1990), Pub. L. No. 101-336, 104 Stat. 328 (1990).

Bell, J., Andersen, E., & Bachofer, C. (2001, November). Project Providing Access to the Visual Environment. Presentation session presented at the biennial Getting in Touch with Literacy Conference, Philadelphia, PA.

Brody, B., Roch-Levecq, A., Ganst, A. C., MacLean, K,. Kaplan, R. M., & Brown, S. I. (2002). Self-management of age related macular degeneration and quality of life. *Archives of Ophthalmology, 120,* 1477–1483.

Capella-McDonnall, M., & Crudden, A. (2009). Factors affecting the successful employment of transition-age youths with visual impairments. *Journal of Visual Impairment & Blindness, 103,* 329–341.

Chase, J. (2000). Technology and use of tools. In B. Silverstone, M. A. Lang, B. P. Rosenthal, & E. E. Faye (Eds.), *The Lighthouse handbook on visual impairment and vision rehabilitation* (Vol. I, pp. 983–1002.) New York, NY: Oxford University Press.

Copolillo, A. & Teitelman, J. (2005). Acquisition and integration of low vision assistive devices: Understanding the decision-making process of older adults with low vision. *The American Journal of Occupational Therapy, 59*, 305–313.

Corn, A. L., Bell, J. K., Andersen, E., Bachofer, C., Jose, R. T., & Perez, A. M. (2003). Providing access to the visual environment: A model of low vision services for children. *Journal of Visual Impairment & Blindness, 97,* 261–272.

Corn, A. L., & Lusk K. (2010). Perspectives on low vision. In A. Corn & J. Erin (Eds.). *Foundations of low vision: Clinical and functional perspectives.* (2nd ed., pp. 3–34). New York, NY: AFB Press.

Corn, A.L., Wall, R.S., & Bell, J. K. (2000). Impact of optical devices on reading rates and expectations for visual functioning of school-age children and youth with low vision. *Visual Impairment Research, 2,* 33–41.

Corn A. L., Wall R. S., Jose, R. T., Bell, J. K., Wilcox, K., & Perez, A. (2002). An initial study of reading and comprehension rates for students who received optical devices. *Journal of Visual Impairment and Blindness, 95*, 322–334.

Corn, A. L., & Webne, S. L. (2001). Expectations for visual function: An initial evaluation of a new clinical instrument. *Journal of Visual Impairment & Blindness, 95*, 110–116.

Day, H., & Campbell, K. A. (2003). Is telephone assessment a valid tool in rehabilitation research and practice? *Disability and Rehabilitation, 25*, 1126–1131.

Day, H., & Jutai, J. (1996). Measuring the psychosocial impact of assistive devices: The PIADS. *Canadian Journal of Rehabilitation, 9*, 159–168.

Day, H, Jutai, J., & Campbell, A. (2002). Development of a scale to measure the psychosocial impact of assistive devices: Lessons learned and the road ahead. *Disability and Rehabilitation, 24,* 31–37.

Dickerson, L. R., Smith, P. B., & Moore, J. E. (1997). An overview of blindness and visual impairments. In J. E. Moore, W. H. Graves, & J. B. Patterson (Eds.), *Foundations of Rehabilitation Counseling with Persons Who Are Blind or Visually Impaired* (19–22). New York, NY: AFB Press.

Farmer, J., & Morse, S. E. (2007). Project MAGNIFY: Increasing reading skills in students with low vision. *Journal of Visual Impairment and Blindness, 101*, 763–769.

George, A., & Duquette, C. (2005). The Psychosocial experiences of a student with low vision. *Journal of Visual Impairment & Blindness, 99,* 152–163.

Goodrich, G. L., & Arditi, A. (2004). A Trend analysis of the low vision literature. *The British Journal of Visual Impairment, 22*, 105–106.

Guerette, A., Lewis, S., & Mattingly, C. (2011). Students with low vision describe their visual impairments and visual functioning. *Journal of Visual Impairment & Blindness, 105*, 287–298.

Hall-Lueck, A. (2004). Comprehensive low vision care. In A. Hall Lueck (Ed.), *Functional Vision: A practitioner's guide to evaluation and intervention* (pp. 3–24). New York, NY: AFB Press.

Hatlen, P. (2000). Historical perspectives. In A. Koenig & M. Holbrook (Eds.), *Foundations of education: History and theory of teaching children and youths with visual impairments* (2nd ed., Vol. 1, pp. 19–54.) New York, NY: AFB Press.

Hellinger, G. O. (1977). A multidisciplinary approach in low vision rehabilitation. *Journal of the American Optometric Association, 48*(8), 999–1003.

Hocking, C. (1999). Function or feelings: Factors in abandonment of assistive devices. *Technology and Disability, 11*, 3–11.

Huebner, K. (2000). Visual impairment. In A. Koenig & M. Holbrook (Eds.), *Foundations of education: History and theory of teaching children and youths with visual impairments* (2nd ed., Vol. 1, pp. 55–76.) New York, NY: AFB Press.

Hyvarinen, L. (2000). Understanding pediatric low vision. In C. Stuen, A. Arditia, A. Horowitz, M. A. Lang, B. Rosenthal, & K. R. Seidman (Eds.), *Vision rehabilitation: Assessment intervention and outcomes* (pp. 400–403). Lisse, The Netherlands: Swets & Zeitlinger.

Individuals with Disabilities Education Act 2004. United States Department of Education. Retrieved March 2, 2013 from http://idea.ed.gov/explore/home.

Jutai, J., & Day, H. (2002). Psychosocial impact of assistive devices scale (PIADS). *Technology and Disability*, *14*, 107–111.

Leat, S., & Karadsheh, S. (1991). Use and non-use of low vision aids by visually impaired children. *Ophthalmic and Physiological Optics, 11*, 10–15.

Lifshitz, H., Hen, I., & Weisse, I. (2007). Self-concept, adjustment to blindness, and quality of friendship among adolescents with visual impairments. *Journal of Visual Impairments & Blindness, 101*, 96–107.

Lund, M. L., & Nygard, L. (2003). Incorporating or resisting assistive devices: Different approaches to achieving a desired occupational self-image. *Occupational Therapy Journal of Research, 23*, 67–75.

Mangione, C. M., Lee, P. P., Gutierrez, P. R., Spritzer, K., Berry, S., & Hays, R. D. (2001). Development of the 25-item National Eye Institute Visual Function Questionnaire (VFQ-25). *Archives of Ophthalmology*, *119*, 1050–1058.

Mason, C., Davidson, R., & McNerney, C. (2000). *National plan for training personnel to serve children with blindness and low vision*. Reston, VA: Council for Exceptional Children.

Mason, H. (1999). Blurred vision: A Study of the use of low vision aids by visually impaired secondary school Pupils. *British Journal of Visual Impairment, 17*, 94–97.

Mason, H. L., & Mason, B. F. (1998). The use of low vision aids in mainstream schools by pupils with a visual impairment. *Report to the Viscount Nuffield Auxiliary Fund.* Birmingham, England: The University of Birmingham.

McCabe, P., Nason, F., Demers, P., Friedman, D., & Seddon, J. M. (2000). Evaluating the effectiveness of a vision rehabilitation intervention using an objective and subjective measure of functional performance. *Ophthalmic Epidemiology, 7*, 259–270.

Mehr, H. M., & Mehr, E. B. (1970). Psychosocial aspects of low vision rehabilitation. *American Journal of Optometry and Archives of American Academy of Optometry, 47*, 605–612.

Mogk, L., & Goodrich, G. (2004). The history and future of low vision services in the United States. *Journal of Visual Impairment & Blindness, 98*, 585–600.

Myrberg, M., Bachman, O., & Lemerstrand, G. (1996). Reading proficiency of elderly visually impaired persons after rehabilitation. *Journal of Visual Impairment & Blindness*, *90*, 341–335.

Nelson, K. A., & Dimitrova, E. (1993). Severe visual impairment in the United States and in each state, 1990. *Journal of Visual Impairment and Blindness, 87*, 80–85.

Renwick, R., Brown, I., & Raphael, D. (1994). Quality of life: Linking a conceptual approach to service provision. *Journal of Developmental Disabilities, 3,* 32–44.

Riemer-Reiss, M., & Wacker, R. (2000). Factors associated with assistive technology discontinuance among individuals with disabilities. *Journal of Rehabilitation, 66*, 44–50.

Ringering, L., & Amaral, P. (2000). The role of psychosocial factors in adaptation to vision impairment and rehabilitation outcomes for adults and older adults. In B. Silverstone, M.

A. Lang, B. P. Rosenthal, & E. E. Faye (Eds.), *The Lighthouse handbook on visual impairment and vision rehabilitation* (Vol. II, pp. 1029–1048.) New York, NY: Oxford University Press.

Robbins, H. G., & McMurray, N. E. (1988). Psychological and visual factors in low vision rehabilitation of patients with age related maculopathy. *Journal of Visual Rehabilitation, 2I*, 11–21.

Sacks, S. Z. (2010). Psychological and social implications of low vision. In A. L. Corn & J. Erin (Eds.), *Foundations of low vision: Clinical and functional perspectives* (2nd ed., pp. 67–96). New York, NY: AFB Press.

Schmier, J. K., Halpern, M. T., & Covert, D. (2006). Validation of the daily living tasks dependent on vision (DLTV) questionnaire in a U.S. population with age related macular degeneration. *Ophthalmic Epidemiology, 13*, 137–143.

Schwartz, C. E., & Spranger, M. (2000). *Adaptation to changing health: Response shift in quality of life research*. Washington, DC: American Psychological Association.

Spafford, M., Rudman, D. R., Leipert, B., Klinger, L., & Huot, S. (2010). When self-presentation trumps access: Why older adults with low vision go without low vision services. *Journal of Applied Gerontology, 29*, 579–602.

Stelmack, J. A., Rosenbloom, A. A., Brenneman, C. S., & Stelmack, T. R. (2003). Patients' perceptions of the need for low vision devices. *Journal of Visual Impairment & Blindness, 97*, 521–535.

U.S. Department of Education National Center for Education Statistics (2006). *Digest of Education Statistics, 2005* (NCES 2006-030).

Vision 2020, World Health Organization. Retrieved March 17, 2013, from http://www.who.int/blindness/partnerships/vision2020/en/index.html

Wagner, M., Newman, L., Cameto, R., Garza, N., & Levine, P. (2005). *After high school: A first look at the post-school experiences of youth with disabilities: A report from the National Longitudinal Transition Study-2 (NLTS2).* Menlo Park, CA: SRI International.

Watson, G., De l'Aune, W., Long, S. Maino, J., & Stelmack, J. (1997). Veterans' use of low vision devices for reading. *Optometry & Vision Science, 74,* 260–265.

Wilkinson, M. E., & Trantham, C. S. (2004). Characteristics of children evaluated at a pediatric low vision clinic: 1981-2003. *Journal of Visual Impairment & Blindness, 98*(9), 693–702.

Williams, R. A., Brody, B. L., Thomas, R. G., Kaplan, R. M., & Brown, S. I. (1998). The psychosocial impact of macular degeneration. *Archives of Ophthalmology, 116*, 514–120.

Wolffe, K. (1998). *Skills for Success: A career education handbook for children and adolescents with visual impairments.* New York, NY: AFB Press.

Wolfssohn, J. S., & Cochrane, A. L. (2000). Design of the low vision quality-of-life questionnaire (LVQOL) and measuring the outcome of low vision rehabilitation. *American Journal of Ophthalmology, 130(*6), 793–802.

Zammitt, N., O'Hare, A., Mason, J., & Elliott, G. (1999). Use of low vision aids by children attending a centralized multidisciplinary visual impairment service. *Journal of Visual Impairment & Blindness, 93*, 351–359.

Appendix A

Project PAVE follow-up study: Optical Device Survey

Research goal: to rate user perception of importance of devices after receiving instruction; to compare activity levels of persons who continue to use devices following instruction and those who do not use devices.

Purpose of study:

1. To determine impact of PAVE optical device instruction on current daily activities six years following participation in project.

2. To record factors that influenced students' use or non-use of devices.

3. To document student's level of comfort in using devices in environments named above.

Please provide the following information.

Section 1: A. Personal information:

1. Student name_____ 2. Subject ID # _____

3. Grade in school _____ 4. Expected graduation _____

5. Age _____ 6. Date __ _____

7. Has your vision changed since you participated in Project PAVE?

Y ___ N ___ Explain_____

8. Did you use device before receiving a Project PAVE evaluation? Y ___ N ___

9. Are you currently using optical devices? Y _____ No _____ Please name these.

_____

10. Did you use large print before participating in Project PAVE? Y ___ N ___

11. Did you use a combination of large print and regular print before receiving devices?

Y ___ N ___

12. At completion of instruction with your PAVE teacher, were you able to read regular

print? Y ___ N ___

13. What plans, goals do you have after finishing school?

_____

B. Project PAVE history

1. When (what grade in school) do you remember starting to use devices? _____

2. What devices do you remember using following your PAVE evaluation? _____

Devices prescribed: Magnifier (stand, handheld: power) _____

Microscope reading glasses (power)_____

Telescope (power) _____

Bioptic (power) _____

3. Do you remember receiving instruction in using devices? Y ____ No _____

4. Did you find the instruction helpful? Y ____ No _____ Please explain

---

5. Did you have positive feelings or negative feelings about using devices? Explain.

_____

6. What reaction did those around you exhibit when you initially used optical devices?

Positive, very supportive Curious, briefly interested Neutral, no reaction
Uncomfortable, awkward feeling Discouraged by others to use

a. School: Adults
b. School: Peers
c. Home: Adults family members
d. Home: Siblings, peers
e. Community
f. Work place

C. Factors related to device use

1. Visual condition _____ 2. Visual acuity _____ 3. Field _____

4. Family support: Y ___ N ___ 5. Peer support: Y ___ N ___ 6. TVI: Y ___ N __

7. Age of earliest device use: ___

D. Tasks with Devices

1. a. I have been a regular device user since receiving instruction with Project PAVE:

Y ___ N ___

b. I did not use devices in the year following PAVE instruction but I now use devices:

Y___ N ___

2. I use devices ___ at home____ at school ____ work ___ in the community

3. Access to information: Please note how you access the following type of information

a. Map _____
b. Thermometer _____
c. Phone book _____
d. Other _____

4. Did you become involved with additional activities because of use of devices?

Y ___ N ___ List these _____

5. Did your work habits at home or at school change because of use of devices?

Y ___ N ___ Explain the changes _____

6. Did new responsibilities occur because of your use of devices?

Y ___ N ___ Explain these _____

7. If you are working, could you complete current job tasks without use of devices?

Y ___ N ___ Explain your response _____

8. Do you occasionally choose to not use your devices when you could more easily complete a task with the device:

Y ___ N ___ Explain the situation _____

E. Psychosocial issues

Please answer the questions using the following Likert-type scale:

1 strongly agree 2 somewhat agree 3. neither agree or disagree

4. somewhat disagree 5. Strongly disagree

1. I use devices throughout the day to help me complete routine tasks. _____

Please give examples: _____

2. When I do not have my devices, I am not able to complete these same tasks independently. ____

3. Even with use of devices I am not able to complete some tasks. _____

Please give examples: _____

4. I use my devices much more at home than outside of home (work, school.) ____

5. I use my devices much more outside of home (work, school) than at home. _____

6. I use my devices both at home and outside of home (work, school.) _____

7. People who use devices to complete personal tasks are visually independent (they do not rely on others to complete tasks using vision for them.) _____

8. I consider myself to be visually independent in completing tasks at home. ___

9. I consider myself to be visually independent in completing tasks at work or school. __

10. I consider myself to be visually independent both at home and at work, school. ____

11. I read as fast as my peers or my co-workers. _____

12. I am able to complete independent living tasks such as reading cooking instructions, checking my bills and finding telephone numbers. _____

F. Additional questions:

1. When using your device did strangers stop you to ask what you were doing or how the device worked?

Y ___ N ___ Describe the situation _____

2. Do you think the public awareness of devices has changed over your time of use?

Y ___ N ___ Explain your answer _____

3. Does the public have an accurate or inaccurate view of why devices are used? Explain.

---

4. What advice would you give to a student (same age as when you started using devices) who is considering the use of optical devices?

_____

Section I1: To be completed by those who do not use devices.

1. Did you use devices following PAVE instruction? Y ____ N _____

Estimated number of months or years of use? _____

2. What reasons caused you to not use devices? Check those that apply and explain.

___Frustrating to use ____Ineffective in accessing information ___ Too much trouble

___Lost ____Broken ____Stolen and not replaced

____Brought unwanted attention ____Others were uncomfortable when I used device

____Family did not want me to use ____Friends did not want me to use

____Easier methods available to get information I want

_____

3. Name the factors that influenced you to not use devices: _____

4. Please complete this statement: I would use devices if _____

Appendix B

Project PAVE Follow-up Questionnaire

I. Reading ad Device Use:

1. a. I am pleased with my reading speed: ___Yes ___ No

   b. I am able to see the size of print I want to: ___ Yes ___ No

   c. I can read for the length of time I want to: ___ Yes ___ No

   d. I am able to see what I wan to at a distance: ___ Yes ___ No

2. Please mark the statement that applies to you:
   a. I received the right amount of training with devices.
   b. I needed more instruction with devices. (Please explain)
   c. I needed less instruction with devices. (Please explain)

_____

Likert-type scale: 1-this describes me very well

2-this describes me somewhat well.

3-this does not apply to me

4-this does not describe me very well

5-this does not describe me at all.

II. Completion of task

1. My devices let me do things on my own that I want to do like reading prices in a store or reading a menu in a restaurant. _____

2. When I use my devices at home, I don't have to ask others for help with things like reading cooking directions or setting dials on appliances. _____

3. At work I am able to do the same jobs as co-workers such as change settings on the copier and read different sizes of print on office forms. _____

4. My devices don't help me to see the things I want to see.
   Magnifier _____ Telescope _____

5. I can use my device for short tasks but it is too hard to use for longer reading.
   Magnifier _____ Telescope _____

6. Devices were okay for school assignments but they don't help me in the real world. _____
7. I rarely use my telescope because somebody else can tell me information that is too far away. _____
8. When I leave my devices at home, I am frustrated and know that I will not be able to see some of the things I want to. ____
9. I would rather ask someone for help than to use devices when I am trying to see something. _____
10. I feel comfortable reading for a half hour or more. _____
11. My telescope is more of a toy that's fun to use but it doesn't work well for finding information efficiently when I am traveling. _____

III. Effect on behavior, activity in life

1. If I did not have devices, I would not be able to do many of the things I now do every day. _____
2. My life would not change that much if I did not have devices. _____
3. I am comfortable picking up a newspaper or magazine to read in a coffee shop or doctor's office. _____
4. I am able to read several pages or a section of a book at one sitting with my devices. _____
5. I read to complete necessary tasks but not for pleasure. _____
6. I tend to avoid leisure activities where I use my devices. _____
7. If I need to read street signs or building names, I will travel with someone instead of going by myself. _____
8. My devices help me feel confident about taking on new responsibilities _____
9. I am confident about traveling on my own and finding information when I need it because I have devices. ____
10. My devices are as important as grabbing my wallet, my house keys or my cell phone when I leave the house. _____
11. When I leave my house, I carry my devices with me. _____

IV. Personal concerns

1. If my vision changed, I would want to get another low vision exam for a new set of devices. _____
2. I feel like people make fun of me when I use devices. ____
3. I feel independent and successful when I use devices. _____
4. I often worry during the day about managing tasks that require devices. _____
5. If I could talk with a young student who was about to receive devices I would warn him or her about the problems of using them. _____
6. Using my devices is a skill that I am proud to have developed. _____
7. I am more comfortable using devices now outside of school than when I was a student. _____
8. I keep a second set of devices at another work spot for convenience or as replacements in case one gets broken. ____

V. Social issues

1. People around me don't trust me to handle a task correctly when they see me use devices. ____
2. I would rather not have to use my devices in front of other people. ____
3. My device is a tool like a flashlight or a timer that helps me finish a job. ____
4. I am not comfortable talking to others about why I use devices. ____
5. I am uncomfortable if people feel sorry for me when I use my devices. ____
6. I feel good when people tell me they are supportive of my use of devices. ___
7. I am uncomfortable reading information in front of others. ____
8. I am reluctant to use) devices because it reminds everyone that I am visually impaired. _____
9. I am much more aware as an adult that people are staring at me and making comments when I use devices._____
10. Sometimes I choose to not use devices because of where I am or who I am with. ____
11. I use my devices even when someone I am with is uncomfortable with it. ____

VI. Open-ended Questions

1. What would you like to be able to see that you cannot? _____
2. Besides reading and writing, in what other ways have your devices helped you?_____
3. In what ways might the PAVE teachers have improved the services or the instruction you received?
   _____
4. What information would you most like the public to know about having low vision or using devices?
   _____
5. What advice would you give to a 2nd grade student who might be prescribed devices?
   _____
6. How can family or friends be helpful in supporting use of devices?
   _____
7. How did your family respond to your involvement in PAVE?
   _____
8. How did your involvement in PAVE affect you and how you saw yourself?
   _____
9. Do you have special memories about changes in your life through your involvement with PAVE?
   _____
10. Do you remember uncomfortable instances from your involvement with PAVE?
    _____

Appendix C

Project PAVE Follow-up Study Questionnaire

Part 1. Demographic data

1. What is your name? _____
2. What is your gender? _____
3. What is your race? _____
4. What is your date of birth? _____ Current age: _____
5. Are you still in school or have you graduated?
    a. If in school, what grade? _____ Years until graduation? ____
    b. If graduated, when did you graduate? _____
6. Did you attend a post-secondary institution? _____ If so, how many years did you attend? _____ Please list any certifications or degrees received

    _____
7. Are you employed?
    a. If employed, how many years have you been employed? _____
    b. What is your job title? _____
    c. If not employed, have you held a previous job? _____
    d. What was your previous job title? _____
8. What is your visual diagnosis or etiology? _____
9. What is your current visual acuity? _____
10. Do you have restricted visual fields? _____
11. Do you have problems in the following areas? (Yes/No)
    a. Contrast sensitivity _____
    b. Color discrimination _____
    c. Light sensitivity _____
    d. Adaptation to dark _____
12. What label do you use to describe your level of visual impairment?
    a. Blind
    b. Legally blind
    c. Low vision
    d. Visually impaired
    e. Other description _____

13. What is your primary reading medium?
    a. Standard print without optical devices
    b. Standard print with optical devices
    c. Large print
    d. Braille
    e. Auditory format
    f. Other
14. What other types of reading media do you use?
    a. Standard print without optical devices
    b. Standard print with optical devices
    c. Large print
    d. Braille
    e. Auditory format
    f. Other
15. Do you/did you have a TVI (teacher of students with visual impairments)? _____
    a. How often do you/did you meet with your TVI?
        i. Weekly
        ii. Monthly
        iii. Less frequently (consult)
        iv. Other
16. Did you attend a local school or a special school?_____
17. Has your visual status changed since your initial participation in PAVE? _____
    If so, how? _____
18. Did you return to PAVE for reevaluations? _____ If so, how many times? _____
19. Do you currently use optical devices?
    If yes, fill out Questionnaire #1. If no, fill out Questionnaire #2.

(Optical Device Users)

Part 2. Past use of devices

1. Did you use devices before your participation in Project PAVE? Yes No

If yes, please specify _____

2. Before your participation in PAVE, what was your primary reading medium?

a. Standard print without optical devices
b. Standard print with optical devices
c. Large print
d. Braille
e. Auditory format
f. Other

3. Before your participation in PAVE, how did you complete the following tasks? (Answer with one of the following: Independently, With assistance, or Not completed)

a. Looking up words in a standard dictionary I W N

b. Copying material at a distance (i.e., whiteboard) I W N

c. Reading maps, graphs, and/or tables I W N

4. Before your participation in PAVE, were you visually independent?

a. Yes

b. Somewhat

c. No

Part 3. Current use of devices

1. What devices do you currently use? _____

Please use one of these choices to respond to the following statements: 1-Strongly disagree, 2-Disagree, 3-Neither agree or disagree, 4-Agree, 5-Strongly Agree

2. I use devices throughout the day to help me complete routine tasks. _____

3. When I do not have devices, I am not able to complete these same tasks independently. _____
4. Even with use of devices, I am not able to complete some tasks. _____
   Give examples. _____
5. I use my devices:
   a. at home _____
   b. at work/school. _____
   c. in the community (shopping, restaurants, transportation). _____
6. I am visually independent:
   a. at home _____
   b. at work/school. _____
   c. in the community (shopping, restaurants, transportation). _____
7. At home, I am able to complete independent living tasks such as:
   a. Reading cooking instructions _____
   b. Checking bills/bank statements _____
   c. Finding telephone numbers _____
8. At work or school, I am able to complete independent tasks such as:
   a. Using the computer _____
   b. Identify information on forms _____
   c. Using copier or similar equipment (at work) _____
9. In the community, I am able to complete independent tasks such as:
   a. Reading receipts _____
   b. Reading menus and ordering food _____
   c. Identifying street names or bus numbers _____
10. I read as fast as my peers or coworkers. _____
11. Did you become involved with additional activities because of use of devices? __
    If yes, describe those activities_____
12. Did your habits (home/work/school) change because of your use of devices? ____ If yes, describe those changes _____
13. Did new responsibilities occur because of your use of devices? ____ If yes, what were they? _____

14. If you are working, could you complete your current job tasks without the use of devices? _____ If no, how do you think you would complete these tasks?

    _____

15. Do you occasionally choose to not use your devices when you could more easily complete a task with the device? _____ If yes, please give examples of situations.

    _____

Part 4. Psychosocial aspects of using devices

1. How did others around you react to your use of devices?
    a. Asked questions (wanted information)
    b. Wanted to try device for themselves
    c. Stared
    d. Made fun of me
    e. Made rude or inappropriate comments
    f. Asked me to discontinue use
2. Did you have positive or negative feelings about using your devices?
    a. Extremely positive
    b. Somewhat positive
    c. Neither positive or negative
    d. Somewhat negative
    e. Extremely negative

Explain: _____

3. The following people responded to my use of devices in different ways.
   (Use the scale – 1-Unsupportive, 2-Somewhat supportive, 3-Supportive):

    a. Parents ____
    b. Siblings ____
    c. Other family members _____
    d. Peers/Coworkers ____
    e. Teachers/Supervisors _____
    f. Other adults _____

4. Do you think the public's awareness of devices has changed since you began using them? (Yes/No)_____ Please explain _____

5. In your opinion, do you think the public has an accurate or inaccurate view of why devices are used? (Yes/No) _____ Please explain _____
   _____

6. What advice would you give to a student (same age as you when you started using devices) who is considering the use of optical devices? _____
   _____

(Optical Device Non-users)

Part 2. Past use of devices

1. Did you use devices before your participation in Project PAVE? Yes No

If yes, please specify _____

2. Before your participation in PAVE, what was your primary reading medium?

g. Standard print without optical devices
h. Standard print with optical devices
i. Large print
j. Braille
k. Auditory format
l. Other

3. Before your participation in Project PAVE, how did you complete the following tasks? (Answer with one of the following: Independently, With assistance, or Not completed)

a. Looking up words in a standard dictionary I W N

b. Copying material at a distance (i.e., whiteboard) I W N

c. Reading maps, graphs, and/or tables I W N

4. Before your participation in Project PAVE, were you visually independent?

a. Yes

b. Somewhat

c. No

Part 3. Reasons for not using devices

1. I stopped using devices for the following reasons.
   a. Awkward
   b. Difficult to use
   c. Ineffective in accessing information
   d. Uncomfortable using in front of others

e. Discouraged by adults/peers
f. Lost/stolen or broke device
g. Preferred other methods of accessing information

2. I am visually independent:

    a. at home _____
    b. at work/school. _____
    c. in the community (shopping, restaurants, transportation). _____

3. At home, I am able to complete independent living tasks such as:
    a. Reading cooking instructions _____
    b. Checking bills/bank statements _____
    c. Finding telephone numbers _____
4. At work or school, I am able to complete independent tasks such as:
    a. Using the computer _____
    b. Identify information on forms _____
    c. Using copier or similar equipment (at work) _____
5. In the community, I am able to complete independent tasks such as:
    a. Reading receipts _____
    b. Reading menus and ordering food _____
    c. Identifying street names or bus numbers _____
6. I read as fast as my peers or coworkers. _____
7. Under what circumstances would you reconsider using devices? _____
   _____

Part 4. Psychosocial aspects of using devices

1. How did others around you react to your use of devices?
    a. Asked questions (wanted information)
    b. Wanted to try device for themselves
    c. Stared
    d. Made fun of me
    e. Made rude or inappropriate comments
    f. Asked me to discontinue use
2. Did you have positive or negative feelings about using your devices?
    a. Extremely positive

b. Somewhat positive
c. Neither positive or negative
d. Somewhat negative
e. Extremely negative

3. The following people responded to my use of devices in the following way (Use the scale – 1-Unsupportive, 2-Somewhat supportive, 3-Supportive):

    a. Parents ____
    b. Siblings ____
    c. Other family members _____
    d. Peers/Coworkers ____
    e. Teachers/Supervisors _____
    f. Other adults _____

4. Do you think the public's awareness of devices has changed since you began using them? (Yes/No)_____ Please explain _____

5. In your opinion, do you think the public has an accurate or inaccurate view of why devices are used? (Yes/No) _____ Please explain _____
   _____

6. What advice would you give to a student (same age as you when you started using devices) who is considering the use of optical devices? _____
   _____

Appendix D

Long Term Use of Optical Devices Questionnaire: PAVE follow-up study

Subject Number _____ Date _____

Interviewer _____

Part 1. A. Demographic data

Information provided in student PAVE file (*Verify with subject):

1. Name _____ 2. Gender: M _____ F ____
3. Race: White _____ Black/African-American _____ Asian _____

   Hispanic/Latino _____American Indian _____ Alaska native_____

   Pacific Islander/Hawaiian _____ Bi or Multi-racial _____ Other_____

4. Current age: _____
5. Visual diagnosis or etiology _____ (Problems with these?)
   a. Visual acuity _____ b. Visual fields _____
   c. Contrast _____ d. Color vision _____

   e. Sensitivity to light _____ f. Adjustment to darkness or light _____

   g. Other information about your vision _____
6. Grades you attended: Local school _____ Special school _____
7. Did you come to PAVE more than one year? Yes _____ No _____ # ____

Information provided by subject:

8. What year did you graduate from high school? _____
9. Did you receive services from a Teacher of Students with Visual Impairments?
   Infant/Pre-school ___Elementary ____Middle ____High School ___Other ____

10. Did you attend school after high school? Yes _____ No _____
    a. Where did you go? _____
    b. How long did you go there? _____

c. Did you receive a certification or degree? _____

11. Job Experience: a. Do you have a job?

1. Business. ___ 2. Child care ___ 3. Community service ___ 4. Creative arts ___

5. Food service ___ 6. Math/Science ___ 7. Medical ___ 8. Mechanical/Repair __

9. Nature/Outdoors ___ 10. Protective services ___ 11. Sales/Retail ___

b. If yes, number of years in this job _____

i. Your current job title _____

c. If no, number of years in previous job _____

i. Your previous job title? _____

d. No present or past job experience _____

B. Vision Care

12. When was your last eye exam?

Less than 6 mo.___ 6 mo-1 yr.___ 1-2 yrs.___ 2-3 yrs.___ 4-5 yrs. ___ 5+yrs.___

13. Was your doctor an ophthalmologist ____Optometrist ___?

14. When was your last low vision evaluation?

Less than 6 mo.___ 6 mo-1 yr.___ 1-2 yrs.___ 2-3 yrs.___ 4-5 yrs. ___ 5+yrs.___

15. Has your vision changed since you first attended a PAVE clinic? Yes ____No___

If so, please describe ? _____

_____

16. How do you describe your level of visual impairment?

a. Totally or functionally blind
b. Legally blind
c. Low vision
d. Visually impaired
e. Other description _____
f. Do you know if you are legally blind? Yes ___ No ___

C. Reading

17. How do you read most often (choose one)?

a. Standard print without optical devices ____%
b. Standard print with optical devices ____%
c. Large print ____%
d. Braille ____%
e. Auditory format (Talking Books) ____%
f. Other ____%

18. How do you read at other times?

a. Standard print without optical devices _____%

b. Standard print with optical devices _____%

c. Large print _____%

d. Braille _____%

e. Auditory format _____%

f. Other _____%

19. The following questions relate to your reading performance: with or without devices.

a. I am able to see different sizes of print comfortably. Yes___ No ____
b. I am able to read as fast I want to. Yes ____ No ____
c. I am able to read as long as I want to without tiring. Yes ____ No ___

D. Functioning

20. Do you currently use any optical devices? Yes ____ No _____

A. near device(s) and B. distance device(s) used:

---

21. Use the following scale to respond to the tasks named below:

a. All of the time 2. Most of the time 3. Some of the time 4. Rarely 5. Never

b. To read cooking directions from a package or a cookbook:

1 2 3 4 5

c. To see prices when I'm shopping or in a paper menu:

1 2 3 4 5

d. To see information in catalogs or manuals such as diagrams:

1 2 3 4 5

e. To see information on a sign across a parking lot or the road:

1 2 3 4 5

f. To find a friend in a crowded place, large area like the mall:

1 2 3 4 5

g. To watch activity happening in the distance such as a game or concert:

1 2 3 4 5

22. a. Provide examples of tasks completed with distance device(s)

Device (Note power, type-spec, handheld)	Task

b. Provide examples of tasks completed with distance device(s)

Device (Note power, type-spec, handheld)	Task

Part II: Psychosocial Aspects of Device Use

Please use the following scale for Part II questions

Likert-type scale: 5-this describes me very well

4-this describes me somewhat well.

3-this does not apply to me

2-this does not describe me very well

1-this does not describe me at all.

Section A: Functional aspects of device use

1. Using my devices sometimes takes more time than if I ask for help, but I prefer being able to do things for myself.
2. I carry my devices when I am away from home and know I will be in unfamiliar places.
3. I only use my devices when no one is around to help me see information.
4. My devices help me to see most things I want to see.
5. I am involved in similar activities as my peers because I use my devices to join in on what everybody's doing.
6. If I need to replace my devices I would know what to order and what company I can get it from.

Section B: Aspects of personal value that relate to use of devices.

1. My life would not change that much if I did not have devices.
2. My devices are as important as grabbing my wallet or my house keys when I leave the house.
3. If my vision changed, I would want to get another low vision exam for a new set of devices.
4. I keep a second set of devices at another work spot for convenience or as replacements in case one gets broken.
5. I tend to avoid activities in my free time that need me to use my devices.

Section C: Aspects of confidence in use of devices.

1. I feel good when someone compliments me on completing a task with devices.

2.I often worry during the day about managing tasks that require use of devices.

3.Using my devices is a skill that I am proud to have developed.

4.I am comfortable using my devices as an adult.

5.My devices help me feel more confident about taking on new responsibilities that require use of my vision.

Section D: Social acceptance aspects of device use (Assume you are in a safe place.)

1. People around me don't trust me to handle a task correctly when they see me use devices.
2. I am not comfortable talking to others about why I use devices
3. I only use my devices when no one is around to see me using them.
4. I have an answer ready when someone asks why I am using my device.
5. I do not use my devices around someone I don't know very well because I don't know how the person will react.

Part III: Open-ended questions

1. Because of your visual impairment, are you having difficulties completing tasks? If yes, please provide examples.

_____

2. Besides reading and writing, in what other ways have your devices helped you?

_____

3. In what ways might the PAVE teachers have improved the services or the instruction you received?

_____

4. How have family or friends been helpful in supporting your use of devices?

_____

5. What advice would you give to a 2nd grade student who might be prescribed devices?

_____

Additional comments: _____

Appendix E

Guided Interview for Long Term Use of optical devices

Research Questions:

1. What demographic factors indicate a relationship to use of optical devices?
2. What differences exist among high, moderate, and low users of optical devices on four dimensions (independence, personal value of devices, social acceptance and confidence) of a psychosocial adjustment continuum and a functioning continuum? (Likert-type questions)
3. What factors do subjects identify as encouraging or discouraging in their regular use of optical devices? (open ended questions)

Note to interviewer: Review these instructions before interviewing participants.

1. *The interviewer can repeat the questions or the response choices for the participant as many times as needed.*
2. *If the participant seems uncertain about what the question means, the interviewer can paraphrase the question but should not prompt a specific response.*
3. *Remember to allow wait time for the participant as he or she considers the question.*
4. *Information in italics gives reminders to the interviewer. All parts of the form in regular print are to be read to the participant.*
5. *Look over the interview form before talking with a participant to remind yourself of the purpose of this study.*

Explanation to be read to participant: The purpose of this questionnaire is to learn about people who use optical devices and their long term use of devices. We also want to learn about people who choose not to use optical devices. Use of other tools or equipment to assist with visual tasks is important, but this questionnaire is only asking about devices such as magnifiers, telescopes, reading glasses, special contact lenses and so forth. The following points may help in completing the interview: (*Do not read the numbers.)*

1. Please provide as much information as you are comfortable sharing. This interview has no right or wrong answers. Please answer the questions as honestly as you can.
2. Let the interviewer know if you are not sure about a question or a response and answer as honestly as you can.
3. Let the interviewer know if you would like to take a break or stop the interview.
4. You can choose to not answer a question you don't like or makes you uncomfortable.
5. The interview is divided into several parts. Part I has two sections. It includes questions about your eye condition, your school background and your job history. Part II asks what you think about using devices and how you feel about using devices in front of other people. Part III asks open-ended questions that don't have a specific answer but asks for your general thoughts about using devices.
6. The expected time needed to complete the interview is about 40 minutes.
7. Do you have any questions for me? Are you ready to get started?

Subject Number _____ Date _____Start time _____ End time:_____

Subject's name _____ Interviewer _____

Long-term Use of Optical Devices: PAVE Follow-up Study Questionnaire

Part 1. Demographic Information: Section A

First, I have some general questions about you and your history of using devices.

1. What is your gender: M _____ F _____
2. What is your race/ethnic group: White _____Black/African-American _____Asian _____

   Hispanic/Latino _____ American Indian _____ Alaska native_____

   Pacific Islander/Hawaiian _____ Bi or Multi-racial _____ Other_____

3. What is your current age: _____

4. What year did you first participate in Project PAVE _____ (*If not sure, ask age or grade.)*
5. Did you come to PAVE more than one year? Yes _____ No _____ # of times ___ *(Use estimated number if person is not sure.)*
6. Are you currently using optical devices? Yes__(Near__ Distance__ Other__) No ___

(If response is yes" to Question #6, do not complete #9 with participant .)

7. Have you used your devices consistently since working with PAVE? Yes ___ No __
8. How many years have you used optical devices? _____
9. If you are not using your devices, I would like to find out some more information. I'm going to read to you a list of possible reasons. Tell me all that apply to you.
   a. ___ My vision improved and I no longer needed them.
   b. ___ My vision became worse and the devices no longer worked for me.
   c. ___ I broke or lost my devices and have not been able to replace them.
   d. ___ I don't like other people seeing me use them.
   e. ___ My friends or family were not comfortable with me using them.
   f. ____ My teachers were not supportive of my using devices.

g. ____ Other students teased me about using them.

h. ___ The devices are awkward or difficult for me to use.

i.___ The devices just don't help me that much and aren't worth carrying around.

j. ___ I don't want to show that I am visually impaired by using them.

k. ___ Other_____

Information provided by participant

The next section has questions about your eye condition.

10. What is your eye condition (visual diagnosis)? _____

11. Do you have additional disabilities or health conditions? If yes, please describe.

_____

12. Are you legally blind? Yes ___ No ___ Don't know ___

13. Please let me know if the following aspects of vision are affected by your eye condition.

You can say yes (Y), no (N) or sometimes (S).

a. Visual acuity _____ Right eye ____ Left eye ___

b. Visual fields _____ Central ___ Peripheral ___

c. Contrast _____

d. Color vision

e. Sensitivity to light _____

f. Adjustment to darkness or light _____

g. Depth perception _____

Other information about your vision _____

14. a. When did you last see your eye doctor? _____ (*Estimate if uncertain on a and c.*)

Less than 6 mo.___ 6 mo-1 yr.___ 1-2 yrs.___ 2-3 yrs.___ 4-5 yrs. ___ 5+yrs.___

b. Was your doctor an ophthalmologist ____ or an optometrist ___? or I don't know ____

c. When was your last evaluation by a low vision specialist like your PAVE doctor?

_____

Less than 6 mo.___ 6 mo-1 yr.___ 1-2 yrs.___ 2-3 yrs.___ 4-5 yrs. ___ 5+yrs.__

15. Has your vision changed significantly since you first attended a PAVE clinic?

Yes ___No__

If yes, please describe ? _____

---

16. I'd like to find out about services you received from a teacher of students with visual impairments (TVI) while you were in school. Did you receive services from a TVI?

Infancy/Pre-school ____ Yes ___ No ___ Don't know ___

Elementary _____ Yes ___ No ___ Don't know ___

Middle _____ Yes ___ No ___ Don't know ___

High School _____ Yes ___ No ___ Don't know ___

Other _____ Yes ___ No ___ Don't know ___

17. I'm going to read several possible answers for the next question.

"How do you describe your current level of visual impairment?" Please choose one option.

a. Totally or functionally blind
b. Legally blind with low vision
c. Low vision but not legally blind
d. Other terms used _____

(Complete the remainder of the form if participant is a device user. Thank the participant for sharing responses if this is the end of the interview.)

This next section asks about functioning and times that it may be helpful to use your devices.

18. a. Please specify near device(s) used: _____

_____

b. Please specify distance device(s) used: _____

---

19. Respond to the tasks named below which include both near and distance items such as “I use my near device to read song lyrics on the inside of a CD case.” Remember, I can repeat any of the questions or the choice of answers as often as you need. The response options are:

(*Read only the word choices to the participant, not the numbers.)*

1. Never
2. Rarely
3. Some of the time
4. Most of the time
5. All of the time

a. To read cooking directions from a food package or a cookbook: 1 2 3 4 5

b. To read information in the mail: 1 2 3 4 5

c. To read articles from magazines or paragraphs in a book: 1 2 3 4 5

d. To see information on a sign across a parking lot or the road: 1 2 3 4 5

e. To find a friend in a crowded place or large area like the mall: 1 2 3 4 5

f. To watch activity happening in the distance such as a ball game, a concert or a theater: 1 2 3 4 5

20 a. Please provide examples of other tasks where you use your near device(s).

---

b. Please provide examples of tasks where you use your distance device(s).

Part II: Psychosocial Aspects of Device Use

Explanation to be read to the participant: In this next set of questions, I want to know how you feel about using devices. You can choose one answer from several possible responses. I can repeat any of the questions or the choice of answers as often as you need.

Use the scale below for Part II. Read only the word choices, not numbers. Circle the numbers.

Likert-type scale: 1-never true

2-rarely true

3-sometimes true

4-often true

5-always true

1. I can do more things visually because I have devices. 1 2 3 4 5

2. As my budget allows, I keep a second set of devices at another work spot for convenience or as replacements in case one gets broken. 1 2 3 4 5

3. Using my devices sometimes takes more time than if I ask for help, but I prefer using them and being able to do things for myself. 1 2 3 4 5

4. I am as likely to use devices in my free time as when I am working.

1 2 3 4 5

5. People around me trust me to handle a task correctly when they see me use devices.

1 2 3 4 5

6. I am comfortable using my devices as an adult.

1 2 3 4 5

7. Using my devices is a skill that I am proud to have developed.

1 2 3 4 5

8. I am comfortable talking to others about why I use devices

1 2 3 4 5

9. I continue to use a device even when someone is watching me.

1 2 3 4 5

Likert-type scale: 1-never true

2-rarely true

3-sometimes true

4-often true

5-always true

10. I am as likely to use my device when I am alone as when I am with someone.

1 2 3 4 5

11. If my vision changed, I would want to get another low vision exam for a new set of devices.

1 2 3 4 5

12. Having my devices with me is as important as grabbing my wallet or my house keys when I leave the house. 1 2 3 4 5

13. If someone offers to finish a task for me when I am using my device, I assure the person that using my device is working well for me. 1 2 3 4 5

14. I carry my devices with me when I am away from home and know I will be in unfamiliar places. 1 2 3 4 5

15. My devices help me feel more confident about taking on new responsibilities that require use of my vision. 1 2 3 4 5

16. I am able to complete a task efficiently because I use devices.

1 2 3 4 5

17. I have an answer ready when someone asks why I am using my device.

1 2 3 4 5

18. I am involved in similar activities as my peers because I use my devices to join in on what everybody else is doing. 1 2 3 4 5

19. I do not worry during the day about managing tasks that require use of devices.

1 2 3 4 5

20. If I need to replace my devices I would know what to order and what company I should contact. 1 2 3 4 5

Part III: Open-ended questions

In this next section, you may have more than one answer to the question. Please share as much information as comes to mind.

1. Because of your visual impairment, are you having difficulty completing tasks? If yes, please provide examples.

2. Besides reading and writing tasks, in what other ways have your devices helped you?

3. In what ways might the PAVE teachers have improved the services or the instruction you received. The PAVE teacher worked with you on optical devices mostly and is not your TVI who you probably saw more often during the school year.

4. a. In what ways have friends or family been helpful and encouraging in your use of devices?

b. In what ways have they not been supportive in your use of devices?

5. a. What advice would you give to a 2nd grade student who might be prescribed devices?

b. What advice would you give to a 10th grade student?

Demographics: Section B

This final portion of the interview has 3 short sections. These questions ask about other areas of your life such as school and work history.

Education

1. How many years did you attend a local school ____ a special school ____
2. What year did you graduate from high school _____ How old were you? _____
3. Did you attend school or a training program after high school? Yes _____ No _____
    a. Where did you go? _____
    b. How many years did you go there? _____
    c. Did you receive a certification or a degree? _____
4. Tell me about your current living arrangement. For example, I live with a spouse or roommate: _____

Employment

5. These next questions ask about your job experience.
    a. Are you currently working? Yes ___ No ___ (*Go to Question #6 if "No".)*
    b. Is your job part time ___ or full time ___?
    c. How long have you held this job? _____
    d. What is your job title? _____

(Mark the category most appropriate to this job.)

a. Business. ___ b. Child care ___ c. Community service ___ d. Creative arts ___

e. Education ____ f. Food service ___ g. Math/Science ___ h. Medical ___

i. Mechanical/Repair ___ j. Nature/Outdoors ___ k. Protective services ___

l. Sales/Retail ___ m. Rehabilitation worker ____ n. Other _____

6. a. If you are not working now, have you held a job previously? Yes ___ No ____

b. Was your job part time ___ or full time ___?

c. What was your previous job title? _____

7. What is the primary reason you are not working? _____

_____

8. a. If you are willing to provide this information, please tell me your income bracket from your most recent job:

Below $20,000 ___ $20,000-$30,000 ___ $31 000-$40,000 ___

$41,000-$50,000 ___ $51,000-$60,000___ Above $60,000 ___

b. Do you receive an hourly wage _____or are you salaried _____?

9. What is the primary reason you are not working?

_____

10. Are you receiving government assistance such as SSDI or welfare? Yes ___ No __

Reading Performance

11. I am going to list some different ways that people read. Of the following options, choose the one response that answers the question “How do you read most often?”

a. Standard print without optical devices ____
b. Standard print with optical devices ____
c. Large print ____
d. Braille ____

e. Auditory format (Talking Books) ____

f. Other ____

12. For this question, give me an estimate of the amount of time you spend reading with each of these options.

a. Standard print without optical devices _____%

b. Standard print with optical devices _____%

c. Large print _____%

d. Braille _____%

e. Auditory format _____%

f. Other _____%

13. The following questions relate to your reading.

a. For most of my reading, I do use _____ or do not use _____ devices.
b. I am able to see different sizes of print comfortably. Yes ____ No ____
c. I am able to read as fast I want to. Yes ____ No ____
d. I am able to read as long as I want to without tiring. Yes ____ No ____

Additional comments:

_____

_____

I would like to call you again in about 2 weeks for a very short follow-up section to the interview. This would only take 5 minutes. May I call you? Yes __ No ___

Thank you for your time and effort in answering these questions!

Subject # _____ Date: _____ Interviewer:_____

Questionnaire II: Guided Interview for Long term Optical Device Use

Hello _____

This second interview will only take a few minutes. Would you like me to review the purpose of the study or the research questions? (*If "yes", read the Instructions, page 1, of this interview form.*)

The questions in this interview ask about your completion of tasks with optical devices and the questions may sound familiar to you. A practice in research work is to verify a section of responses given to questions. Please respond honestly to the following questions:

Respond to the tasks named below which include both near and distance items such as "I use my near device to read song lyrics on the inside of a CD case." Remember, I can repeat any of the questions or the choice of answers as often as you need. The response options are:

(*Read only the word choices to the participant, not the numbers.)*

1. Never
2. Rarely
3. Some of the time
4. Most of the time
5. All of the time

a. To read cooking directions from a food package or a cookbook: 1 2 3 4 5

b. To read information in the mail: 1 2 3 4 5

c. To read articles from magazines or paragraphs in a book: 1 2 3 4 5

d. To see information on a sign across a parking lot or the road: 1 2 3 4 5

e. To find a friend in a crowded place or large area like the mall: 1 2 3 4 5

f. To watch activity happening in the distance such as a ball game, a concert or a theater: 1 2 3 4 5

2 a. Please provide examples of other tasks where you use your near device(s).

b. Please provide examples of tasks where you use your distance device(s).

This completes the interview. Do you have any questions for me?

Thank you again for participating in this research study!

Appendix F

Project PAVE Follow-Up Study: Long-Term Use of Optical Devices

Research Questions

1. To what extent do individuals with low vision who participated in Project PAVE currently use optical devices? What demographic and personal characteristics are associated with optical device use?
2. How do Project PAVE participants rate their quality of life on a psychosocial scale and what variables (use of optical device, visual condition, employment, education) predict quality of life?
3. To what extent do participants attribute the attainment of post-secondary goals (e.g., attending college, being employed) to involvement in Project PAVE?

Note to interviewer: Review these instructions before interviewing participants.

- *The interviewer can repeat the questions or the response choices for the participant as many times as needed.*
- *If the participant seems uncertain about what the question means, the interviewer can paraphrase the question but should not prompt a specific response.*
- *Remember to allow wait time for the participant as he or she considers the question.*
- *Information in italics gives reminders to the interviewer. All parts of the form in regular print are to be read to the participant.*
- *Look over the interview form before talking with a participant to remind yourself of the purpose of this study.*

Explanation to be read to participant: The purpose of this interview is to learn about people who use optical devices and their long term use of devices. We also want to learn about people who choose not to use optical devices. Use of other tools or equipment to assist with visual tasks is important, but this questionnaire is only asking about devices such as magnifiers, telescopes, reading glasses, special contact lenses, and so forth. The following points may help in completing the interview: (*Do not read the numbers.)*

- Please provide as much information as you are comfortable sharing. This interview has no right or wrong answers. Please answer the questions as honestly as you can.
- Let the interviewer know if you are not sure about a question or a response and answer as honestly as you can.
- Let the interviewer know if you would like to take a break or stop the interview.
- You can choose to not answer a question you don't like or that makes you uncomfortable.
- The interview is divided into several parts. Part I has two sections. It includes questions about your eye condition, your school background, and your job history. Part II asks what you think about using devices and how you feel about using devices in front of other people. Part III asks open-ended questions that don't have a specific answer but asks for your general thoughts about using devices.
- The expected time needed to complete the interview is about 40 minutes.
- Do you have any questions for me? Are you ready to get started?

Subject Number _____ Date _____ Start time _____ End time: _____

Subject's first name _____ Interviewer _____

PAVE Follow-up Study Questionnaire Long-term Use of Optical Devices

Part I: Functioning with Devices

1. Are you currently using optical devices?
   Yes___(Near___ Distance___ Other___) No ___

   (If response is yes" to Question #1, do not complete #4 with participant .)

2. Have you used your devices consistently since working with PAVE? Yes ___ No ___
3. How many years have you used optical devices? _____
4. If you are not using your devices, I would like to find out some more information. I'm going to read to you a list of possible reasons. Tell me all that apply to you.
   a. ___ My vision improved and I no longer needed them.
   b. ___ My vision became worse and the devices no longer worked for me.
   c. ___ I broke or lost my devices and have not been able to replace them.
   d. ___ I don't like other people seeing me use them.
   e. ___ My friends or family were not comfortable with me using them.
   f. ___ My teachers were not supportive of my using devices.
   g. ___ Other students teased me about using them.
   i. ___ The devices are awkward or difficult for me to use.
   i. ___ The devices just don't help me that much and aren't worth carrying around.
   j. ___ I don't want to show that I am visually impaired by using them.
   k. ___ Other_____

(Complete the remainder of the form if participant is a device user. Thank the participant for sharing responses if this is the end of the interview.)

This next section asks about functioning and times that it may be helpful to use your devices.

5. a. Please tell me which near device(s) you use:

_____

b. Please tell me which distance device(s) you use:

_____

6. Respond to the tasks that follow, which include both near and distance items such as "I use my near device to read song lyrics on the inside of a CD case." Remember, I can repeat any of the questions or the choice of answers as often as you need. The response options are:

(*Read only the word choices to the participant, not the numbers.)*

1. Never
2. Rarely
3. Some of the time
4. Most of the time
5. All of the time

Near:

a. To read cooking directions from a food package or a cookbook: 1 2 3 4 5

b. To read paper menus in a restaurant: 1 2 3 4 5

c. To read information in the mail: 1 2 3 4 5

d. To read articles from magazines or paragraphs in a book: 1 2 3 4 5

e. To read markings or words on appliances or equipment: 1 2 3 4 5

Distance:

f. To see information that interests me along the street, in a store window, or in an open space such as a field: 1 2 3 4 5

g. To watch a presenter who is speaking to a large group: 1 2 3 4 5

h. To find the aisle or section I need from overhead signs in a store: 1 2 3 4 5

i. To identify my location on signs or buildings when traveling: 1 2 3 4 5

j. To watch activity happening in the distance such as a ball game, a concert, or performers on stage: 1 2 3 4 5

7 a. Please provide examples of other tasks where you use your near device(s).

b. Please provide examples of tasks where you use your distance device(s).

8a. To what extent did involvement in Project PAVE help you achieve your postsecondary goals (e.g., attending college, employment)?

1. Involvement with Project PAVE very negatively influenced the achievement of my post-secondary goals.
2. Involvement with Project PAVE somewhat negatively influenced the achievement of my post-secondary goals.
3. Involvement with Project PAVE had no impact on the achievement of my post-secondary goals.
4. Involvement with Project PAVE somewhat positively influenced the achievement of my post-secondary goals.
5. Involvement with Project PAVE very positively influenced the achievement of my post-secondary goals.

8b. Please briefly explain the reason for your answer.

Part II: Psychosocial Aspects of Device Use

Explanation to be read to the participant: In this next set of questions, I want to know how you feel about using optical devices. You can choose one answer from several possible responses. I can repeat any of the questions or the choice of answers as often as you need.

Use the responses below for Part II questions. Read only the word choices, not number. Circle the numbers.

Likert scale:
1. Never true
2. Rarely true
3. Sometimes true
4. Often true
5. Always true

	Item					
1.	I can do more things visually because I have devices.	1	2	3	4	5
2.	I have a specific spot for my devices at home or at work so if I need one I know where it is and can grab it quickly.	1	2	3	4	5
3.	Using my devices sometimes takes more time than if I ask for help, but I prefer using them and being able to do things for myself.	1	2	3	4	5
4.	I am as likely to use devices in my free time as when I am working.	1	2	3	4	5
5.	People around me trust me to handle a task correctly when they see me use devices.	1	2	3	4	5
6.	I am comfortable using my devices as an adult.	1	2	3	4	5
7.	Using my devices is a skill that I am proud to have developed.	1	2	3	4	5
8.	I am comfortable talking to others about why I use devices.	1	2	3	4	5
9.	I continue to use a device even when someone is watching me.	1	2	3	4	5
10.	I am as likely to use my device when I am alone as when I am with someone.	1	2	3	4	5

11.	If my vision changed, I would want to get another low vision exam for a new set of devices.	1	2	3	4	5
12.	Having my devices with me is as important as grabbing my wallet or my house keys when I leave the house.	1	2	3	4	5
13.	If someone offers to finish a task for me when I am using my device, I assure the person that using my device is working well for me.	1	2	3	4	5
14.	I carry my devices with me when I am away from home and know I will be in unfamiliar places.	1	2	3	4	5
15.	My devices help me feel more confident about taking on new responsibilities that require use of my vision.	1	2	3	4	5
16.	I am able to complete a task efficiently because I use devices.	1	2	3	4	5
17.	I have an answer ready when someone asks why I am using my device.	1	2	3	4	5
18.	I am involved in similar activities as my peers because I use my devices to join in on what everybody else is doing.	1	2	3	4	5
19.	I do not worry during the day about managing tasks that require use of devices.	1	2	3	4	5
20.	If I need to replace my devices, I would know what to order and what company I should contact.	1	2	3	4	5

Part III: Open-ended Questions

In this next section, you may have more than one answer to the question. Please share as much information as comes to mind.

1. Because of your visual impairment, are you having difficulty completing tasks? If yes, please provide examples.

2. Besides reading and writing tasks, in what other ways have your devices helped you?

3. In what ways might the PAVE teachers have improved the services or the instruction you received. The PAVE teacher worked with you on optical devices mostly and is not your TVI who you probably saw more often during the school year.

4. a. In what ways have friends or family been helpful and encouraging in your use of devices?

b. In what ways have they not been supportive in your use of devices?

5. a. What advice would you give to a 2nd grade student who might be prescribed devices?

b. What advice would you give to a 10th grade student?

Part IV: Personal Information: Section A

(*Non-users complete this section only*)

First, I have some general questions about you and your history of using devices.

1. What is your gender: M _____ F _____
2. What is your race/ethnic group: White _____ African-American _____Asian _____

   Hispanic/Latino _____ American Indian _____ Alaska native_____

   Pacific Islander/Hawaiian _____ Bi or Multi-racial _____ Other_____
3. What is your current age: _____
4. What year did you first participate in Project PAVE _____ (*If not sure, ask age or grade.)*
5. Did you come to PAVE more than one year? Yes _____ No _____ # of times ___
   (Use estimated number if person is not sure.)

The next section has questions about your eye condition.

6. What is your eye condition (visual diagnosis)? _____
7. Do you have additional disabilities or health conditions? If yes, please describe.
   _____
8. Are you legally blind? Yes ___ No ___ Don't know ___
9. Please let me know if the following aspects of vision are affected by your eye condition.
   You can say yes (Y), no (N) or sometimes (S).

   a. Visual acuity _____ Right eye ____ Left eye ___
   b. Visual fields _____ Central ___ Peripheral ___
   c. Contrast _____
   d. Color vision _____
   e. Sensitivity to light _____
   f. Adjustment to darkness or light _____

g. Depth perception _____

Other information about your vision _____

10 a. When did you last see your eye doctor? _____ (*Estimate if uncertain on "a" and "c".*)

Less than 6 mo.___ 6 mo-1 yr.___ 1-2 yrs.___ 2-3 yrs.___ 4-5 yrs. ___ 5+yrs.___

b. Was your doctor an ophthalmologist ____ or an optometrist ___? or I don't know ____

c. When was your last evaluation by a low vision specialist like your PAVE doctor?

Less than 6 mo.___ 6 mo-1 yr.___ 1-2 yrs.___ 2-3 yrs.___ 4-5 yrs. ___ 5+yrs.__

11. Has your vision changed significantly since you first attended a PAVE clinic?

Yes ___No__

If yes, please describe.

---

12. I'd like to find out about services you received from a teacher of students with visual impairments (TVI) while you were in school. Did you receive services from a TVI?

a. Infancy/Pre-school ____ Yes ___ No ___ Don't know ___

b. Elementary _____ Yes ___ No ___ Don't know ___

c. Middle _____ Yes ___ No ___ Don't know ___

d. High School _____ Yes ___ No ___ Don't know ___

e. Other _____ Yes ___ No ___ Don't know ___

13. I'm going to read several possible answers for the next question.

"How do you describe your current level of visual impairment?" Please choose one option.

a. Totally or functionally blind

b. Legally blind with low vision

c. Low vision but not legally blind

Other terms used _____

End of interview for non-users

Personal Information: Section B

This final portion of the interview has 3 short sections. These questions ask about other areas of your life such as school and work history.

Education

1. How many years did you attend a local school ____ a special school ____
2. What year did you graduate from high school _____ How old were you? _____

3. Did you attend school or a training program after high school? Yes _____ No _____

a. Where did you go? _____

b. How many years did you go there? _____

c. Did you receive a certification or a degree? _____

4. Tell me about your current living arrangement. For example, I live with a spouse or roommate: _____

Employment

5. These next questions ask about your job experience.

a. Are you currently working? Yes ___ No ___ (*Go to Question #6 if "No".)*

b. Is your job part time ___ or full time ___?

c. How long have you held this job? _____

d. What is your job title? _____

(Mark the category most appropriate to this job.)

a. Business. ___ b. Child care ___ c. Community service ___ d. Creative arts _____

e. Education ____ f. Food service ___ g. Math/Science ___ h. Medical ___

i. Mechanical/Repair ___ j. Nature/Outdoors ___ k. Protective services ___

l. Sales/Retail ___ m. Rehabilitation worker ____ n. Other _____

6. a. If you are not working now, have you held a job previously? Yes ___ No ____

b. Was your job part time ___ or full time ___?

c. What was your previous job title? _____

d. What is the primary reason you are not working? _____

7. What is the longest amount of time you have held a single job? _____

8. a. If you are willing to provide this information, please tell me your income bracket from your most recent job:

Below $20,000 ___ $20,000-$30,000 ___ $31 000-$40,000 ___

$41,000-$50,000 ___ $51,000-$60,000 ___ Above $60,000 ___

b. Do you receive an hourly wage _____or are you salaried _____?

9. Are you receiving government assistance such as SSDI or welfare? Yes ___ No ___

Reading Performance

10. I am going to list some different ways that people read. Of the following options, choose the one response that answers the question "How do you read most often?"

    a. Standard print without optical devices ____
    b. Standard print with optical devices ____
    c. Large print ____
    d. Braille ____
    e. Auditory format (Talking Books) ____
    f. Other ____

11. For this question, give me an estimate of the amount of time you spend reading with each of these options.

    a. Standard print without optical devices _____%
    b. Standard print with optical devices _____%
    c. Large print _____%
    d. Braille _____%
    e. Auditory format _____%
    f. Other _____%

12. The following questions relate to your reading.

    a. For most of my reading, I do use _____ or do not use _____ devices.

    b. I am able to see different sizes of print comfortably. Yes ____ No ____

    c. I am able to read as fast I want to. Yes ____ No ____

    d. I am able to read as long as I want to without tiring. Yes ____ No ____

Additional comments:

Thank you for your time and effort in answering these questions!