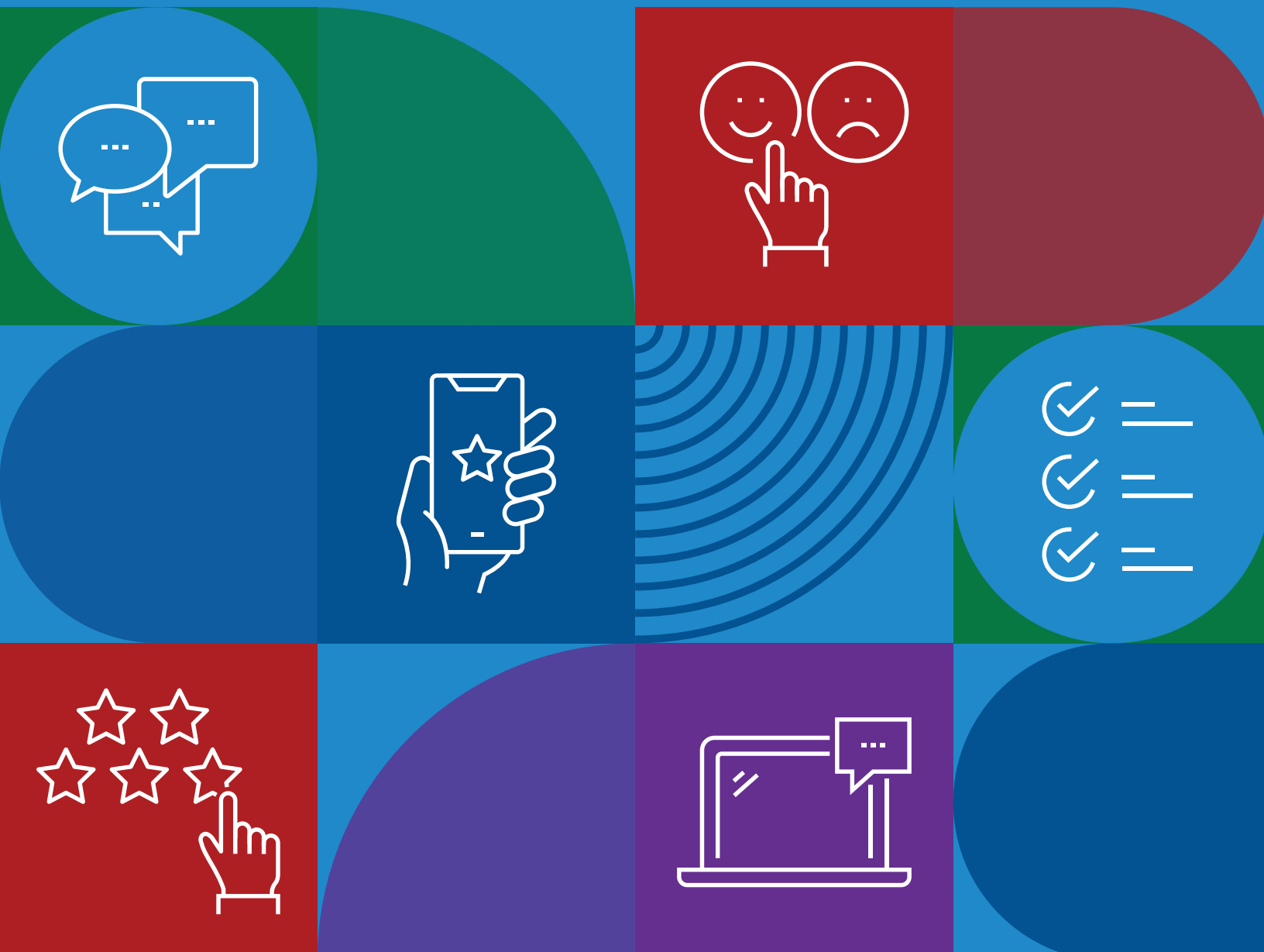
ATiA Assistive Technology Industry Association

Survey Report: The Critical Need for Practitioner Training in Assistive Technology (AT) to Better Serve Learners with Visual Impairments



Supporters:

Academy for Certification of Vision Rehabilitation and Education Professionals (ACVREP)

American Occupational Therapy Association (AOTA)

American Printing House for the Blind (APH)

Association for Education and Rehabilitation of the Blind and Visually Impaired (AER)

VisionServe Alliance (VSA)

Introduction

> *"As a teacher I want/need to know how to use the tools that my students need. I cannot teach what I do not know." Vision Professional*

The Assistive Technology Industry Association (ATIA) developed and conducted an online survey for practitioners who provide assistive technology (AT) support to people who are blind, have low vision, or are deafblind. After data were collected and analyzed, ATIA hired Vision for Independence, LLC to review the report and examine the data more closely. Dr. L. Penny Rosenblum, a researcher and teacher of students with visual impairments, reviewed the report, examined the data from the survey participants, and completed the report contained within these pages.

The survey instrument was developed with input from ATIA partner organizations including the:

- Academy for Certification of Vision Rehabilitation and Education Professionals (ACVREP)
- American Occupational Therapy Association (AOTA)
- American Printing House for the Blind (APH)
- Association for Education and Rehabilitation of the Blind and Visually Impaired (AER)
- VisionServe Alliance (VSA)

Two terms were defined for participants in the survey:

- **Assistive technology service** is defined as any service that directly assists someone with a disability in identification of AT needs, selection, acquisition, or use of an assistive technology device.
- **Assistive technology devices** includes either customized or off-the shelf equipment and technology which are used to support people with disabilities to live, work, and play in their communities.

The survey was available online from August 8 to September 1, 2021. Invitations for participation were posted on the websites and through electronic communications of the partner organizations.

The survey had 36 questions. The last survey question was "What additional comments would you like to share about the state of assistive technology for those who are blind, have low vision, or are deafblind?" Participants'

responses to this question have been incorporated into the sections of this report where the topics they comment on are discussed.

Abbreviations

The following abbreviations are used throughout this report:

- **AT**: assistive technology
- **CATIS**: Certified Assistive Technology for People with Visual Impairments
- **CLVT**: Certified Low Vision Therapist
- **O&M**: orientation and mobility
- **TVI**: teacher of students with visual impairments
- **VRT**: Vision Rehabilitation Therapist

Participant Demographic Information

A total of 1,227 individuals opened the survey though 192 individuals answered few questions, thus they were dropped from analysis. Not all individuals answered each question.

Of the 1,035 participants, 1,024 selected the country in which they worked. Almost 9 in 10 (n=907, 88.6%) worked in the United States. There were 41 participants who worked in Canada (4.0%), 27 (2.6%) in Australia, 16 (1.5%) in the United Arab Emirates, and 15 (1.4%) in Ireland. There were 13 other countries in which 1 to 4 participants worked.

There were 1,024 participants who responded to a question about the highest degree they had earned in which they learned skills to support users of AT. Responses included:

- Bachelor's degree (n=156, 15.2%)
- Master's degree (n=632, 61.7%)
- Doctoral/post-doctoral (n=45, 4.4%)
- Training not associated with a college (n=92, 9.0%)
- No formal training (n=99, 9.7%)

Participants who indicated their training was not associated with a college degree reported training occurred through vocational rehabilitation, on the job, or through self-study.

There were 783 participants who reported the year they earned their degree. Participants were grouped by decade. Participants received their degrees in:

- Late 1960s or 1970s (n=24, 3.1%)
- 1980s (n=60, 7.7%)
- 1990s (n=127, 16.2%)
- 2000s (n=206, 26.3%)
- 2010s (n=301, 38.4%)
- 2020-2022 (n=6, 8.3%)

Close to 3 out of 4 participants received their degree between 2000 and 2022. In open-ended responses, several participants noted that professionals who were more recently trained knew more about AT than those who received their training longer ago.

> *"I believe that technology has changed this field entirely but that many currently certified TVIs have had trouble keeping up with the changes. I, personally, find myself teaching almost everyone I talk to who was certified more than a few years ago. Newer TVIs, however, do have this training and incorporate many vital technologies into their teaching." Vision Professional*

Job Role

Participants were asked to report their job role, with multiple responses accepted. Each participant reported between 1 to 5 job roles. Participant responses were grouped into one of three job role categories:

- **Vision Professionals** included teachers of students with visual impairments, orientation and mobility specialists, certified low vision therapists, vision rehabilitation therapists, rehabilitation teachers, and rehabilitation counselors working with clients who were visually impaired. This category also included professionals who reported they worked as one or more of the above in addition to occupational therapy or different roles such as an administrator, physical therapist, or special education teacher.
- **Assistive technology professionals** included AT consultants, instructors, and specialists. This category also included participants who reported they were a vision professional, occupational therapist, and/or worked in different role(s).
- **Other professionals** include participants in different roles such as special education teacher, paraprofessional, physical therapist, speech

language pathologist, braillist, parent, vendor, early intervention provider, instructor/faculty at colleges/universities etc. This category also included participants who reported their only role was as an occupational therapist as this was a role listed on the survey.

Table 1 reports the job roles of participants by job role group.

Table 1: Job Roles of 1,028 Participants

Job Role	Number	Percent
Vision Professionals	**572**	**55.7**
Vision Professionals Only	507	49.3
Vision Professional + Different Role(s)	55	5.4
Vision Professional + Occupational Therapist	10	1.0
Assistive Technology Professionals	**289**	**28.1**
Assistive Technology Professional Only	171	16.7
Assistive Technology Professional & Vision Professional	61	5.9
Assistive Technology Professional & Different Role(s)	20	1.9
Assistive Technology Professional, Vision Professional, & Different Role(s)	18	1.8
Assistive Technology Professional & Occupational Therapist	19	1.8
Other Roles	**167**	**16.2**
Different Role(s)	140	13.6
Occupational Therapist	25	2.4
Occupational Therapist & Different Role(s)	2	.2

Three out of 4 participants (n=779, 75.3%) were staff employees. Eighty-nine participants (8.9%) were contractors employed by an agency while slightly less (n=80, 7.8%) were independent contractors. The remaining 81 (8.0%) participants reported they had other arrangements including volunteer, student, administrator, instructor at an institution of higher education, and related service provider (e.g., speech language pathologist, physical therapist).

Participants' Ratings of Their Own Skills

Thinking about their work with people who were blind, had low vision, or were deafblind, participants were asked to rate their own skills in three AT areas: assessment, supporting ongoing use, and maintenance and repair.

The ratings they could select were 1=low, 2=medium, and 3=high. The higher the mean, the higher participants rated their skills. Table 2 reports the means and standard deviation (SD) of participants' self-ratings by job role group.

Table 2: Participants' Self Ratings of Their Skills Reported by Job Role Group

Job Role	N	Mean	SD
Assessing the assistive technology support needs			
Vision Professionals	519	1.89	.656
Assistive Technology Professionals	250	2.29	.682
Other Roles	141	1.79	.702
Supporting the ongoing use of assistive technology			
Vision Professionals	520	2.03	.662
Assistive Technology Professionals	252	2.35	.700
Other Roles	141	1.85	.675
Maintaining and repairing assistive technology equipment			
Vision Professionals	515	1.35	.570
Assistive Technology Professionals	251	1.88	.765
Other Roles	141	1.35	.573

Not surprisingly, participants in the assistive technology professional group had a higher mean rating of their skills in all three areas compared to vision professionals. For all three job role groups, participants rated their skills higher in the area of supporting the ongoing use of AT than assessment or maintaining/repairing AT equipment. Regardless of their role(s) those providing AT support noted they had many responsibilities.

> *"The scope of expertise required for TVIs is extremely broad, and no TVI can be expected to be an expert in everything. However, with AT being omnipresent as the primary solution to classroom access concerns, I think that the effort to provide official certification in the field through the CATIS program is an excellent start." Vision Professional*

Participants were asked to rate their level of expertise serving different groups of people who use assistive technology from low to high. Table 3 reports the means and SD of participants' self-ratings by job role group.

Table 3: Participants' Self Ratings of Their Expertise Serving Different Group of Assistive Technology Users Reported by Job Role Group

Group	N	Mean	SD
People who use screen readers			
Vision Professionals	519	1.74	.700
Assistive Technology Professionals	251	2.22	.776
Other Roles	141	1.61	.695
People who have low vision			
Vision Professionals	520	2.33	.640
Assistive Technology Professionals	251	2.41	.689
Other Roles	140	2.01	.715
People who are deafblind			
Vision Professionals	516	1.27	.530
Assistive Technology Professionals	248	1.50	.643
Other Roles	140	1.41	.688
People who have complex learning needs which includes a visual impairment and one or more additional disabilities			
Vision Professionals	521	1.82	.716
Assistive Technology Professionals	250	2.06	.758
Other Roles	143	1.89	.823

For all four groups, AT professionals rated their expertise higher than vision professionals or those in other roles. Those in other roles rated their level of expertise higher than vision professionals when supporting people who are deafblind or have complex needs. Vision professionals rated themselves as having a higher level of expertise supporting people who use screen readers and those with low vision compared to those in other roles. Participants in other roles included speech language pathologists, many of whom have training in augmentative and alternative communication.

Amount of Time Spent Assisting People with Disabilities

Almost 95% of participants (n=977, 94.8%) reported that in their professional role they supported people with disabilities to select, acquire, or use AT. Participants were asked four questions related to the relative amount of time they spent directly engaged in activities related to AT use by people with disabilities. The number of participants and percentages are reported in Tables 3 through 6 for all participants who directly supported people with disabilities and for the three job role groups.

Table 3: Amount of Time Participants Assisted with Needs-Assessments for Assistive Technology Devices Reported by Job Role Group

Amount of Time Spent	All	Vision Professionals	Assistive Technology Professionals	Other Roles
Nearly all	53 (5.5%)	12 (2.2%)	35 (12.7%)	6 (4.1%)
More than half	135 (14.0%)	48 (8.9%)	68 (24.5%)	19 (13.0%)
Some	509 (52.5%)	310 (57.1%)	137 (49.3%)	61 (41.8%)
Occasionally	232 (24.0%)	150 (27.6%)	35 (12.6%)	47 (32.2%)
Never	39 (4.0%)	23 (4.2%)	13 (8.9%)	13 (8.9%)
Total	87 (100%)	543 (100%)	278 (100%)	146 (100%)

Overall, AT professionals spent more of their time engaged in needs-assessments than either vision professionals or those in other roles. For 1 in 3 AT professionals, conducting needs assessments took nearly all or more than half of their time.

> *"I think there is a considerable gap between blind/visually impaired AT users, their knowledge, skills, and needs, and that of the 'experts' providing their evals and AT. Whatever we can do to narrow or eliminate this gap for the AT providers will be great." Assistive Technology Professional*

Table 4: Amount of Time Participants Assisted with the Selection of Assistive Technology Devices Reported by Job Role Group

Amount of Time Spent	All	Vision Professionals	Assistive Technology Professionals	Other Roles
Nearly all	44 (4.5%)	9 (1.8%)	31 (11.2%)	4 (2.8%)
More than half	105 (10.8%)	36 (6.5%)	56 (20.1%)	13 (9.0%)
Some	517 (53.5%)	297 (54.5%)	157 (56.5%)	63 (43.4%)
Occasionally	254 (26.3%)	173 (31.7%)	32 (11.5%)	50 (34.5%)
Never	47 (4.8%)	30 (5.5%)	2 (0.7%)	15 (10.3%)
Total	967 (100%)	544 (100%)	278 (100%)	145 (100%)

As expected, AT professionals spent more time supporting individuals with disabilities in selecting AT devices than did vision professionals or those in other roles. Seventy-five percent of AT professionals reported spending from some to nearly all of their time in supporting those with disabilities in selecting AT compared to 62% of vision professionals and 55% of those in other roles.

Table 5: Amount of Time Participants Assisted with the Acquisition (Including Writing Justifications for Funding) of Assistive Technology Devices Reported by Job Role Group

Amount of Time Spent	All	Vision Professionals	Assistive Technology Professionals	Other Roles
Nearly all	19 (2.0%)	2 (0.4%)	13 (4.6%)	4 (2.7%)
More than half	40 (4.1%)	15 (2.8%)	18 (6.4%)	7 (4.8%)
Some	381 (39.4%)	187 (34.5%)	145 (51.8%)	49 (33.6%)
Occasionally	358 (37.0%)	218 (40.2%)	80 (28.6%)	60 (41.1%)
Never	170 (17.5%)	120 (22.1%)	24 (8.6%)	26 (17.8%)
Total	988 (100%)	542 (100%)	280 (100%)	146 (100%)

AT professionals spent more time assisting individuals with the acquisition of AT than did vision professionals or those in other roles. Half of the AT professionals spent some of their time in this activity while 11% spent nearly all or more than half of their time. In comparison only 38% of vision professionals and those in other roles spent some to nearly all of their time in acquisition activities.

Table 6: Amount of Time Participants Directly Assisted People with Disabilities with the Use of Assistive Technology Devices Reported by Job Role Group

Amount of Time Spent	All	Vision Professionals	Assistive Technology Professionals	Other Roles
Nearly all	122 (12.5%)	37 (6.8%)	71 (25.4%)	14 (9.5%)
More than half	309 (31.9%)	176 (32.4%)	107 (38.2%)	26 (17.9%)
Some	407 (42.0%)	260 (47.8%)	83 (29.6%)	64 (43.8%)
Occasionally	114 (11.8%)	66 (12.1%)	19 (6.8%)	29 (18.9%)
Never	18 (1.8%)	5 (0.9%)	0 (0%)	13 (8.9%)
Total	970 (100%)	544 (100%)		146 (100%)

AT professionals spent more time directly assisting people to use AT devices than did vision professionals or those in other roles. One in four AT professionals spent nearly all of their time engaged in instruction compared to 7% of vision professionals and 10% of those in other roles.

Professional Memberships

Participants were asked about the professional memberships they had with multiple responses permitted. There were 192 participants who reported they did not have any professional memberships. Table 8 reports membership data by job role group. Participants were able to write in other organizations to which they belonged. There were 202 responses. Responses provided by 5 or more participants have been included in Table 7.

The author questions why “teacher of students with visual impairments” was listed in this question as this is not a membership. Rather in most US states, teachers of students with visual impairments are certified or licensed by the state department of education. In other countries teachers of students with visual impairments may or may not go through a certification or licensure process.

Table 7: Membership Organizations to Which Participants Belonged Reported by Job Role Group

Professional Organization	All	Vision Professionals	Assistive Technology Professionals	Other Roles
List Provided in Survey				
Association for Education and Rehabilitation of the Blind and Visually Impaired (AER)	353	277	57	19
Teacher of Students with Visual Impairment (TVI)	191	160	27	4
The Council for Exceptional Children (CEC)	81	52	19	10
American Occupational Therapy Association (AOTA)	54	16	27	11
Rehabilitation Engineering Society of North America (RESNA)	48	2	40	6
National Association of Special Education Teachers	18	9	5	4
Other Organizations Provided by Participants				
Academy for the Certification of Vision and Rehabilitation Education Professionals (ACVRP)	43	26	14	3
American Speech-Language Hearing Association (ASHA)	40	1	21	18
Orientation and Mobility Organizations	29	25	4	0
Association on Higher Education and Disability (AHEAD)	8	0	7	1

Professional Organization	All	Vision Professionals	Assistive Technology Professionals	Other Roles
South Pacific Educators in Vision Impairment (SPEVI)	5	5	0	0

AER and CEC were the two membership organizations to which more participants belonged than any others. Fifty-four (85.7%) of 63 US occupational therapists in the study sample belonged to AOTA.

Current and Desired Certifications

There were 153 participants who indicated they had a specialty certificate in AT. The 153 participants were provided a list of certificates and asked to check all those that they had. They also could write in other certificates. Some participants wrote in specific programs they were certified in such as JAWS, NVDA, or Microsoft products. Other participants wrote in that they took courses in AT as part of their university program while some participants noted attending training through CSUN. Certifications that the 153 participants held included:

- Assistive Technology Practitioner/Professional (ATP) (n=57)
- Certified Assistive Technology for People with Visual Impairments (CATIS Instructional Specialist) (n=39)
- Certified Teacher of Students with Visual Impairments (n=31)
- Certified Low Vision Therapist (administered by ACVREP) (n=7)
- Certified Vision Rehabilitation Therapist (administered by ACVREP) (n=5)
- Specialty Certification in Low Vision (SCLV) (administered by AOTA) (n=1)
- Certified Orientation and Mobility Specialist (n=2)

> *"I have completed 100 hours in AT from CSUN [California State University Northridge] but it did not include certification, as such. I would like to obtain an official certification to add credibility to the work I do as an AT Specialist, such as through RESNA or AOTA. I would like more accessibility of options to do so." Assistive Technology Professional*

There were 432 participants who reported they wanted to attain specialty certification. Certifications the participants were interested in were:

- Certified Assistive Technology for People with Visual Impairments (CATIS Instructional Specialist) (n=328)
- Certified Low Vision Therapist (administered by ACVREP) (n=113)
- Specialty Certification in Low Vision (SCLV) (administered by AOTA) (n=88)

There were 64 participants who selected that they were interested in obtaining other certifications. When asked to explain, they wrote a variety of responses. Some participants indicated they were interested in all the options provided in the survey, others wanted to obtain certification in augmentative and alternative communication (AAC), and others in specific programs such as JAWS or Microsoft products. There were some participants who were unsure what certifications they would like to obtain, either because they were not familiar with the options listed in the survey or did not know what options were available for them specifically.

Number of Years Providing Assistive Technology Support and the Populations Who Participants Support

Participants were asked to report the number of years they had been involved in providing AT support to people who are blind, have low vision, or are deafblind. Table 8 reports these data for participants by job role group.

Table 8: Number of Years Participants Provided Assistive Technology Support Reported by Job Role Group

Years	All	Vision Professionals	Assistive Technology Professionals	Other Roles
Less than 2 years	91	35 (6.7%)	23 (9.1%)	33 (33.2%)
2 to 4 years	140	90 (17.1%)	29 (11.5%)	21 (14.8%)
5 to 10 years	236	123 (23.4%)	75 (29.8%)	38 (26.8%)
11 to 20 years	238	146 (27.8%)	66 (26.2%)	26 (18.3%)
More than 20 years	214	131(25.0%)	59 (23.4%)	24 (16.9%)
Total	919	525 (100%)	252 (100%)	142 (100%)

Of 919 participants, approximately 25% had worked for less than 4 years providing assistive technology support, another 25% for 5 to 10 years, 26% for 11 to 20 years, and 24% for more than 20 years.

Participants were asked to select all the age groups they worked with in the provision of assistive technology support. Table 9 reports these data by job role group.

Table 9: Age Groups Participants Provided Assistive Technology Support to Reported by Job Role Group

Age Groups	All	Vision Professionals	Assistive Technology Professionals	Other Roles
Early intervention (birth-3 years of age)	223	138	55	30
Preschool (3 to 6 years of age)	463	305	104	54
School age (6 to 13 years of age)	619	390	146	83
Transition (14 to 22 years of age)	681	414	171	96
Adults (18 to 64 years of age, no longer in high school)	404	178	168	58
Older adults (65 ears and older)	322	148	136	38

Participants in all three job role groups provide support with AT from birth through adulthood. Each age group presents unique challenges.

"I primarily work with adults who lost their vision later in life who seem to languish as consumers of the department of rehabilitation. So few rehabilitation counselors have the skills to even contract out services for their consumers to AT specialists. Counselors also seem to have unreasonable expectations about what a person is capable of doing with a computer and AT when they haven't learned to touch type and haven't worked in many years. More multidisciplinary long-term intensive programs are needed to provide all of the scaffolding consumers who are low vision, blind or deafblind

need to support them as they are learning to use technology." Assistive Technology Professional

Challenges of Providing Assistive Technology Support

Participants were provided a list of seven statements and asked, based on their experience, to rate their level of difficulty providing assistive technology to people who are blind, have low vision, or are deafblind. Only responses were included in which participants selected one of the four choices: 1=very difficult, 2=relatively difficult, 3=relatively easy, or 4=very easy. The higher the mean, the higher the level of ease the participant reported. Means between 2 and 3 represent ease that fell between relatively difficult and relatively easy. Table 10 reports the means and standard deviations for level of difficulty participants experienced providing assistive technology support to people who are blind, have low vision, or are deafblind.

Table 10: Level of Difficulty Participants Experienced Providing Assistive Technology Support

Statement	N	M	SD
Assessment - selecting the appropriate assistive technology solution*	853	2.41	.778
Obtaining funding for assistive technology devices and services	742	2.34	.907
Ensuring that the person is having their needs met on an ongoing basis, in multiple settings*	888	2.19	.858
Maintaining and repairing assistive technology devices*	758	2.15	.878
Having sufficient time to provide assistive technology instruction	858	2.12	.913
Finding experienced assistive technology providers	802	2.12	.933
Having back-up device(s) available when a device is broken or lost*	813	1.92	1.00

One-way ANOVAs were conducted to determine if there were significant differences in participants' ratings based on job role group. Statements for which ANOVA results were significant are indicated with an *. See Appendix A for ANOVA results.

Participants' Beliefs

Participants were provided statements and asked to select their level of agreement with each statement. Only responses were included in which participants selected one of the five choices: 1=strongly disagree, 2= disagree somewhat, 3=unsure, 4=agree somewhat, or 5=strongly agree. Table 11 reports the means and standard deviations for participants' beliefs for the provided statements.

Table 11: Participants' Beliefs

Statement	N	M	SD
Generally, I have **sufficient knowledge and skills** I need for my work with people who are blind, have low vision, or are deafblind.*	906	3.54	1.32
Generally, other professionals and practitioners who are providing assistive technology services to the people I work with have **sufficient knowledge and skills** they need for their work with people who are blind, have low-vision, or are deafblind.	889	3.00	1.40
Generally, I am able to **meet the assistive technology support needs** of the people who are blind, have low-vision, or are deafblind that I serve.	894	3.36	1.27
Generally, other professionals and practitioners who are providing assistive technology services to the people I work with are able to **meet the assistive technology support needs** of the people who are blind, have low-vision or are deafblind.	883	2.97	1.37
Generally, I am able to **get the professional training and technical assistance** I need to stay informed with developments in my field.	901	3.15	1.34

Statement	N	M	SD
Generally, other professionals and practitioners who are providing assistive technology services to the people I work with are able to **get the professional training and technical assistance** they need to stay informed with developments in their field.	877	3.40	1.35
Generally, I am able to **get the support I need to maintain and repair the assistive technology device**s I work with.*	819	2.82	1.35
Generally, other professionals and practitioners who are providing assistive technology services to the people I work with are able to **get the support they need to maintain and repair the assistive technology devices** they work with.	864	2.91	1.35
I had **adequate preparation** in assistive technology in my undergraduate and/or graduate program.*	750	2.43	1.39
I rely on **continuing education** to develop my assistive technology skills.*	810	3.90	1.49
I have an **adequate amount of time** for continuing education to build my assistive technology skills.*	811	2.92	1.33
My **employer gives me sufficient support** to meet my professional development needs related to assistive technology.	777	3.16	1.42
I **learn from my peers** on a multidisciplinary team to support individuals' assistive technology use.	794	3.46	1.41

*See Appendix A for ANOVA results.

More participants believed that they had more knowledge and skills and were able to meet the AT support needs of those with disabilities than other professionals and practitioners. Conversely, more participants believed that other professionals and practitioners were more successful in getting professional development and the support they needed to maintain and repair AT devices.

"Graduate students need more opportunities to observe/implement AT in their pre-practicum and practicum experiences to become TVIs. AT assessment and instruction

should be integrated into more courses for TVI prep programs." Vision Professional

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More participants believed they did not receive adequate preparation in AT as part of an undergraduate or graduate program than believed they had received adequate preparation. Positively, more participants agreed that they did receive continuing education compared to those who disagreed with this statement.

"While there are conferences, CE opportunities, online programs (certificate & university) there are not really any GOOD hands-on opportunities with follow through demonstration of acquired knowledge. Reading a book, article, or listening to a lecture with presentation slides or videos is not enough to say, 'I have learned and can teach AT'." Assistive Technology Professional

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Participants were neutral on the support received by employers. More participants agreed they learned from their peers compared to those who did not believe they learned from their peers.

Factors Impacting Early Career, Pre-Professional Training, and Professional Development Opportunities

Participants were provided seven factors and asked to rate the importance of each factor in helping early career professionals to effectively provide AT services to people who are blind, have low vision, or are deafblind. Only responses were included in which participants selected one of the four choices: 1=not at all important, 2=slightly important, 3=moderately important, or 4=very important. Table 12 reports the means and standard deviations for participants' ratings of the factors.

Table 12: The Importance of Factors in Helping Early Career Professionals to Provide Assistive Technology Services

Factor	N	M	SD
More opportunities for continuing education in assistive technology*	824	3.30	1.10
Opportunities for interdisciplinary assistive technology skills development (across professional disciplines)*	815	3.19	1.07
Easier access to information about available assistive technology products*	823	3.11	1.10
More assistive technology pre-professional requirements (as part of pre-licensure or pre-certification training)*	824	3.09	1.00
More research to establish evidence-based intervention practices in assistive technology*	819	3.08	1.04
Enhanced reimbursement for assistive technology assessments and ongoing support of AT as part of service delivery	818	3.00	1.08
Requirements for professionals to demonstrate assistive technology skill through a certification requirement	824	2.74	.99

*See Appendix A for ANOVA results.

With the exception of the factor "Requirements for professionals to demonstrate assistive technology skill through a certification requirement," participants' ratings fell between moderately important and very important, though in all instances ratings were closer to moderately important than very important. The factor of "More opportunities for continuing education in assistive technology," was rated as the most important.

> *"Offer more funding and grants to blindness rehab specialists who have been in the field for 5+ years to become CATIS certified or at least receive additional training in AT products for this population." Vision Professional*

Participants were provided six pre-professional training factors and asked to rate the importance of each factor in preparing practitioners to meet the AT support needs of people who are blind, have low vision, or are deafblind. Only responses were included in which participants selected one of the four

choices from not at all important to very important. Table 13 reports the means and standard deviations for participants' ratings of the factors.

Table 13: The Importance of Pre-Professional Training in the Preparation of Individuals to Support Assistive Technology Users

Factor	N	M	SD
Mentoring by experienced assistive technology professionals*	817	3.17	1.10
Required courses/credits in assistive technology*	831	3.15	1.02
Scholarships in assistive technology specialty	8.19	3.09	1.06
More elective courses/credits in assistive technology	816	3.08	1.01
Internship electives in assistive technology	811	2.89	.94
Internship requirements in assistive technology*	817	2.80	.98

*See Appendix A for ANOVA results.

Required courses/credits in AT and mentoring by experienced AT professionals were factors rated as more important by participants than other factors. Surprisingly, internships were rated between slightly and moderately important, yet internships provide an opportunity for mentorship, so the lower rating was surprising.

Based on their personal experience, participants were asked to rate the significance of eight barriers specific to the assessment, delivery, and use of AT by people who are blind, have low vision, or are deafblind. Only responses were included in which participants selected one of the four choices: 1=not at all significant, 2=slightly significant, 3=moderately significant, or 4= very significant. Table 14 reports the means and standard deviations for participants' ratings of the barriers.

Table 14: Significance of Barriers Impacting Participants' Support of Assistive Technology Use by Individuals with Disabilities

Barrier	N	M	SD
Lack of assistive technology available for hands on learning (e.g., a library of assistive technology tools)*	804	3.11	1.04
Lack of assistive technology mentorship opportunities	799	3.06	1.01

Barrier	N	M	SD
No time in the program for a required, dedicated course(s) in assistive technology*	801	3.04	1.00
Lack of faculty who are well-versed in AT used by those who are blind, have low vision or are deafblind.	799	3.04	1.09
Lack of assistive technology clinical / practicum opportunities	793	3.03	1.00
Cost of training	737	3.01	1.08
Lack of assistive technology content integrated into other courses	800	2.99	.98
Lack of assistive technology content integrated into other courses	800	2.99	.98
Student's lack of interest in assistive technology needs of those who are blind, have low-vision or are deafblind	793	2.59	1.01

*See Appendix A for ANOVA results.

The barrier that was rated by participants as least significant were pre-professional students' lack of interest in assistive technology needs, indicating that for those pursuing training in AT, interest is high. The other seven barriers were rated on average as moderately important. None of the barriers listed had a lot of participants rate them as very important.

Participants were asked to rate the significance of three barriers to the pursuit of professional development for practitioners in their field. Only responses were included in which participants selected one of the four choices from not at all significant to very significant. Table 15 reports the means and standard deviations for participants' ratings of the barriers.

Table 15: Significance of Barriers Impacting the Pursuit of Professional Development for Practitioners in Participants' Fields

Barrier	N	M	SD
Lack of time to pursue continuing education opportunities*	808	3.13	1.06
Cost of continuing education*	807	3.09	1.06
Lack of continuing education opportunities that practitioners need the most*	805	3.03	1.08

*See Appendix A for ANOVA results.

Participants' ratings of all three barriers fell between moderately important and very important, though all ratings were closer to moderately important

than very important. The factor of "Lack of time to pursue continuing education opportunities," was rated as the most significant barrier.

Helpfulness of Resources

> *"Ironically, it took the coronavirus pandemic for more AT learning opportunities for blindness/low vision tech to become more widely available. I hope that the trend for offering more online learning options continues after the pandemic ends." Assistive Technology Professional*

Participants were provided a list of six resources and asked how helpful the resources were for improving the knowledge and skills of those in their field who providing assistance with AT to people who are blind, have low vision, or are deafblind. Table 16 reports the number and percentage of participants in each of the job role groups who selected the rating of very helpful.

Table 16: Helpfulness of Resources to Individuals in Participants' Fields

Resource	Total Number of Participants	Vision Professionals	Assistive Technology Professionals	Other Roles
Mentoring by experienced assistive technology practitioners (in-person or online)	814	69.5%	61.6%	55.3%
Continuing education on the job site	815	63.8%	55.5%	48.0%
In-person online education with opportunities to engage with the speaker(s)	816	61.7%	55.7%	48.0%
Continuing education at state and regional conferences / conventions	816	58.8%	55.9%	42.5%

Resource	Total Number of Participants	Vision Professionals	Assistive Technology Professionals	Other Roles
Continuing education at national conferences / conventions	808	58.4%	26.2%	15.3%
Recorded online education	816	45.1%	39.3%	38.0%

Across the three job role groups, resources that provided opportunities to engage with others (in-person online education, continuing education on the job site, and mentoring) were resources that were rated as very helpful compared to recorded online education and conferences. One reason conferences may have been not rated very helpful by more participants may be the cost of traveling to and attending in-person conferences.

In open-ended responses some participants spoke about the need for resources that address different populations such as those who have had traumatic brain injuries or strokes; older individuals; and those who are deafblind.

> *"I would also like to see more resources that are specific to working with DeafBlind AT users. In fact, I just finished having a 45-minute conversation with my DeafBlind coworker today discussing a long list of devices on the market that are speech-output accessible but not braille-output accessible, or even braille technology that is geared for the hearing blind user and not the DeafBlind user. He, I, and others have provided very specific feedback to companies who make products like Aira on how they could become more DeafBlind accessible, and our feedback is never taken seriously by companies. It's time to listen more to the needs of the DeafBlind community." Assistive Technology Professional*

Participants' Wishes for Future Continuing Education

Participants were asked to rate their level of agreement, on a 5-point scale from strongly disagree to strongly agree, with the statement "I would be interested in pursuing continuing education to increase my knowledge and

skill to provide AT services to people who are blind, have low-vision, or are deafblind." The mean for 815 participants was 3.55 (SD=1.14). This mean indicates that most participants' level of agreement fell between neutral and agree. It is encouraging that there is a high level of agreement that continuing education is valuable to participants.

Participants were provided a list of topics and asked to select the topics they had an interest in receiving more information and/or training about. They could select as many topics as they wished. Table 17 reports the number of participants who selected each topic.

Table 17: Topics Participants Would Like to Receive Information and/or Training About

Topic	N
Strategies for keeping up with new technology	594
Assistive technology relevant to learning	527
Best practices in person-centered assistive technology needs-assessment to select the right tools for each client	523
Assistive technology AT for people who are blind, have low-vision, or are deafblind with fine motor issues	495
Assistive technology AT for people who are blind, have low-vision, or are deafblind with autism	480
Assistive technology AT for people who are blind, have low-vision, or are deafblind with mobility issues	465
Assistive technology for decreasing isolation for people who are blind, have low-vision, or are deafblind	442
Assistive technology for people who are blind, have low-vision, or are deafblind who are not very technologically literate (e.g., older adults)	418
Alternative access strategies including switches, scanning devices	399
Assistive technology trainings for non-professionals who are supporting people who are blind, have low-vision, or are deafblind	376
Assistive technology relevant to employment	374
Assistive technology relevant to transportation, orientation, and wayfinding in the physical environment	357
Best practice for configuring, maintaining, and repairing assistive technology devices and software	354
Resources and strategies for public and private funding (including grants and philanthropies)	300
Effective documentation of assistive technology needs for insurance requirements	195

Over 500 participants selected three topics they wanted more information or training on. These topics focused on keeping current and ensuring that the AT they selected to support people with disabilites is appropriate.

More than 400 participants selected five topics, each topic having to do with meeting the AT needs of a specific group who had characteristics in addition to their visual impairment: fine motor, autism, mobility issues, social isolation, and not technology literate.

Topics that a third or fewer of the participants wanted information or training on covered a range of topics, the least of interest to participants focused on documenting AT needs for insurance purposes.

In an open-ended questions participants were asked, "Are there other areas where you feel more assistive technology training is needed for serving people who are blind, have low-vision, or are deafblind?" There were 138 participants who wrote a response, though not all were specific to AT training. For example, there were comments about the need for information about visual conditions, increasing funding streams, and the concern that in some locals the only individuals providing training were vendors who did not provide information about products other than their company's products. Some participants' comments focused on frustrations of websites, apps, documents, and products not being designed to allow AT users to access them.

Responses were wide ranging regarding area in which participants would like to see training. It was also clear that those providing AT support had differing needs as well and desired training in different ways. Some participants wanted in-person, hands-on individualized training while others wanted recorded trainings that could be accessed when time allowed.

"…One size does not fit all. [Students have] different tech abilities." Vision Professional

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Training to Teach Access to Assistive Technology Users

Many participants listed examples of technology related accessibility challenges that need to be addressed through training for themselves so they in turn could provide training to their students or clients. Examples included accessing PDFs, accessibility of websites, supporting students in

post-secondary education to access materials, making math materials accessible, and developing and teaching how to make graphs accessible.

> *"With virtual learning, students are increasingly asked to access websites and interactive programs (Kahoot, FlipGrid, PearDeck, etc.). Typically, these are not accessible for students with visual impairments (especially those with screen readers or those who require significant magnification). I would like a class/training on adapted educational technology for visually impaired [students] and appropriate alternatives to common programs/websites." Vision Professional*

A few participants shared comments related to the role of AT and employment.

> *"[I need training on] worksite accessibility including how to work with employers on ADA computer accessibility for employees who are blind. [I need to learn] how to speak the 'business' and IT languages and understand how AT works with networking systems. [I need to] understand website accessibility standards and how to discuss with employers/educators." Vision Professional*

Training Related to Office Products and Assistive Technology and Certification

Other participants asked for training on specific combinations of mainstream and vision specific technology, for example Microsoft products and JAWS or VoiceOver. Several participants commented about certifications.

> *"[We need] integration of mainstream technology certifications (such as CompTIA, Microsoft Certified Professional, Apple Expert, etc.) with disability specific certifications. Do you have any idea how hard it is to find someone with BOTH a JAWS/NVDA certification and a Microsoft Certified Trainer with Microsoft Office Certification? But how the hell else am I supposed to teach a blind individual*

to use Excel? And what about adding not just braille certification but Nemeth braille so I can teach a deaf-blind individual how to do formulas in Excel? These combinations are more and more critical to success in the workplace, and no one, not you, not Microsoft, no one, is even trying to set them up or make them exist." Vision Professional

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Training to Better Teach Use of Web Conferencing Platforms

There was a need expressed for standardization of web conferencing tools (e.g., having buttons consistently labeled and located in the same position regardless of platform). Instructional materials that could be used to teach efficient use of web conferencing tools was requested by several participants.

Training Focused on Supporting Individuals with Complex Learning Needs

Several participants requested training specific to those who have cortical visual impairment or other brain-based disabilities. Participants specifically wanted training on communication tools that would benefit this population.

"[I want training on] how to modify picture symbols and communication devices besides larger symbols and high-contrast pictures." Assistive Technology Professional

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There were also requests for how to make decisions for individuals with complex needs e.g., those who have high receptive language and are non-verbal or how to integrate sign and augmentative and alternative communication (AAC).

Training to Promote Collaboration and Build Understanding

Several participants provided comments that spoke to the need for collaboration between professionals, professionals and vendors, and professionals and the AT users and/or their families and support networks. There were requests to design AT training for paraprofessionals and family members that would be available on demand in short increments to allow those with limited time to access training flexibly. A participant recommended short video clips family members could watch to assist AT users in solving problems that arose with AT in the home.

> "As a teacher I can't possibly know all the AT that is available. I want an experienced VI AT evaluator to come in and help. I don't think I can learn any more things. I help students ages 3-21, with all kinds of disabilities." *Vision Professional*

There was a need expressed by participants for training that would promote role release and cross-training among different professional groups.

> *"AT Specialists need more training in the roles of the TVI and O&M [specialist] and in how to team with those practitioners. There is too much territoriality in the field, and practitioners tend to discourage the crossing of the perceived boundaries." Vision Professional*

There were a few participants who expressed a need to collaborate more closely with vendors and manufacturers as a way of providing AT training and access to equipment.

> *"Hands on demonstration is a MUST for AT advocates. Providing sessions for Train the Trainer opportunities is crucial. AT funds need to be expanded to include updates to demonstration equipment available at the Centers. This includes partnering with vendors and manufacturers to donate or provide ongoing support to increase users." Assistive Technology Professional*

Several participants talked about the need for additional resources in the education of children. \

> *"I feel like there should be combined learning opportunities with assistive technology and alternate educational materials (AEM) in various formats. Districts are severely lacking in awareness of AT and AEM. These two areas work together for the student to be successful, but no one has this role in districts. So, these low incidence teachers are the ones trying*

to teach their students and provide trainings to staff. It is a difficult venture. It would be great to have a resource that we could go to for support like an AT/AEM specialist, who has overall knowledge in many areas, or even if they were available regionally. The more support we have the more buy in and ease we will have for districts to get on board providing equitable education for ALL STUDENTS." Vision Professional

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Needs of Those Teaching Assistive Technology Including Mentorship

In addition to training to allow individuals to have the knowledge and skills to support AT users, several participants explained why it is important for those providing training to be AT users themselves. They spoke to the role of mentorship and role models.

Needs in College and University Programs

There were participants whose comments focused on the need for pre-service preparation programs to have updated AT to use in their courses.

"[There needs to be] created AT training/professional curriculum as a career choice at both community college and undergrad level." Assistive Technology Professional

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Several participants also noted that college and university programs need to better integrate AT into their curriculum.

Other Training Topics

There were a variety of additional training topics listed by individual participants that are worth mentioning. These include:

- When new apps become available there should be a training on how to teach people to use them.
- Individuals in rural areas present unique challenges as they may not have Internet or connectivity may be low. Training is needed on how to support AT users in rural areas.
- Strategies for how to start preschool age students with AT and how to build their AT skills through transition and into adulthood.
- Strategies for how to teach AT skills to adults who are resistant and/or not technology literate.

- CATIS programs that accommodate those who are working and are not tied to a master's degree program.
- Training for school administrators on the school's responsibilities regarding obtaining and supporting AT for students.

Recommendations

The data collected from 1,035 participants provides a rich source of information as consideration is given to the future of AT use by individuals who are blind, have low vision, or are deafblind. These data also shed light on the skills and supports needed by those conducting AT needs assessments, assisting with the selection of AT, and providing instruction in the use of AT.

> **Central to the recommendations below is the need to provide individuals supporting AT users with the knowledge and skills necessary to meet the diverse needs of those who are blind, have low vision, or are deafblind. To do so successfully necessitates high-quality pre-service and continuing education on a wide range of topics that is current, flexible in its delivery, on a wide range of topics that is current, flexible in its delivery, affordable, and supported by employers.**

ATIA and partner organizations can:

- Provide continuing education opportunities that cover AT needed by those from early childhood through older adults. Continuing education must encompass not only individuals who are blind or have low vision, but individuals who are deafblind and individuals with varying combinations of disabilities in addition to their visual impairment.

- Recognize the uniqueness of individuals with visual impairments and brain based additional disabilities including cortical/cerebral visual impairment, traumatic brain injury, and stroke. Continuing education that targets this population and includes augmentative and alternative communication (AAC) options and strategies for infusing AAC into the users lives are necessary.

- Design continuing education in recognition that adult learners have varying learning styles. Some individuals do best with 1:1 hands-on or small group instruction while others prefer on-demand instruction.

Those designing continuing education need to provide content in multiple formats.

- Provide training so that individuals completing needs assessments have up-to-date knowledge about the ever-changing AT and mainstream technology options available on the market. This necessitates that employers plan for continuing education for their employees and also ensure their employees have access to a broad range of technology to use in the needs assessment process.

- Recognize that AT users must be well versed not only in AT but in mainstream technology. Therefore, those supporting AT users should obtain certifications in both assistive and mainstream technologies and learn about new methods of instruction (e.g., augmented reality in training).

- Address the needs of individuals in rural communities where access to the internet may not be available or connectivity may be poor. Working with community leaders, internet providers, and AT users to address access issues ultimately will not only benefit AT users but the larger community.

- Support those providing pre-service and continuing education to work to design curricula that will allow those providing AT instruction to support individuals in accessing apps, websites, documents, and other learning materials used in education beginning in preschool and going through post-secondary education.

- Work with manufacturers and vendors to design loan programs that allow for those providing AT services to get hands-on opportunities and also allow those they are supporting to have hands-on opportunities before AT is purchased.

- Partner with community colleges, colleges, and universities to design curricula that integrates AT into coursework, practicum, and internship experiences. Focus should not be on specific devices, but rather on understanding the application of AT, features of AT that meet users' needs, operational skills, and strategies for approaching new devices.

- Increase the number of individuals who can access CATIS training through employer support, both financially and with time allocated into

employees' schedules. Encourage employers to provide a pay increase to those employees who earn their CATIS certificate.

- Work with mainstream manufacturers (e.g., Apple, Google, Microsoft) to design continuing education opportunities and potentially certificates that integrate knowledge of AT and mainstream products (e.g., using JAWS with Excel, NVDA with Google Docs).

- Provide resources for family members, paraprofessionals, and other support staff that will allow them to develop a deeper understanding of how individuals use AT, ways they can assist individuals use of AT in their lives, and troubleshooting strategies.

- Ensure that when pre-service and continuing education materials are developed that they are fully accessible to individuals who themselves use AT.

- Coordinate training opportunities across disciplines and providers so that individuals can have a "one-stop-shop" to find continuing education options that meet their individual needs.

- Promote cross-training and role release among professional team members to increase a deeper understanding of the needs of those who use AT and the options that are available to them to maximize their potential.

Closing

> *"Technology is progressing at a breakneck speed in the mainstream space and companies like Apple and Microsoft are bringing accessibility to the mainstream. Today is the best time to be blind or visually impaired in human history." Vision Professional*

This report provides a snapshot of challenges and wishes of 1,035 individuals providing support to AT users who are blind, have low vision, or are deafblind, many of whom have additional disabilities. It is clear from both the quantitative and qualitative data that continuing education

opportunities that are flexible in their delivery on a wide range of topics and depth is needed in the field as is high-quality comprehensive preservice instruction. AT is an important consideration to ensuring inclusion of individuals who are blind, have low vision, or are deafblind in their communities. Professionals with current and broad knowledge of AT are essential to the success of the individuals they support.

Appendix A

One-way ANOVAs and Tukey post hoc tests were conducted for job role groups. Significant ANOVA results are reported in the table below.

Statement	F	DF	P value
Table 10			
Assessment - selecting the appropriate assistive technology solution	11.550	2	> .001
Ensuring that the person is having their needs met on an ongoing basis in multiple settings	5.964	2	= .003
Maintaining and repairing assistive technology devices	10.098	2	> .001
Having sufficient time to provide assistive technology instruction	4.214	2	= .015
Having back-up device(s) available when a device is broken or lost	13.18	2	> .001
Table 11			
Generally, I have sufficient knowledge and skills I need for my work with people who are blind, have low vision, or are deafblind.	6.064	2	= .002
Generally, I am able to get the support I need to maintain and repair the assistive technology devices I work with.	4.716	2	= .009
I had adequate preparation in assistive technology in my undergraduate and/or graduate program.	4.441	2	= .012
I rely on continuing education to develop my assistive technology skills.	3.909	2	= .020
I have an adequate amount of time for continuing education to build my assistive technology skills.	8.297	2	> .001
Table 13			
Required courses/credits in assistive technology	7.213	2	> .001
Internship requirements in assistive technology	3.134	2	= .004
Mentoring by experienced assistive technology professionals	4.673	2	= .009
Table 14			
No time in the program for a required, dedicated course(s) in assistive technology	4.281	2	= .014
Lack of assistive technology available for hands on learning (e.g., a library of assistive technology tools)	7.058	2	> .001