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Leveling the Field: The Evolution from Assistive Technology to Universal Design and its Impact on Knowledge and Career Development within the Disability Community

Technical Whitepaper
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1. Overview

Assistive Technology (AT) is defined on its Wiki page as "an umbrella term that includes assistive, adaptive and rehabilitative devices for people with disabilities, and also includes the process of selecting, locating and using them." It has gone from a term that only those within the rehabilitation field —and people with disabilities and the need for AT—were familiar with to a term with its own Wiki page (for better or worse).

Addressing the breadth of disability and need, AT encompasses everything from wheelchairs to computer software. Its application to accessing electronic media/accessible information technology —with web site accessibility at its heart—has developed as one of the most frequently debated challenges in the business and disability advocacy communities.

While most often discussed in the context of addressing the challenges of vision loss associated with accessing electronic information, placing AT in the context of universal design principles enables a more holistic understanding of its potential benefit to a broader segment of the disability community, and its influence on productivity in the workplace. Universal design, whether applied to physical structures such as curb cuts, or the access to information and knowledge, strengthens communities and expands opportunity.

Through my experience in working with candidates and career professionals with disabilities in the technology field, I have come to recognize AT as an ally in supporting increased productivity. Frequently aligned with the requirement of Reasonable Accommodation under Title I of the Americans with Disabilities Act (ADA), implementing effective AT—both from a cost and outcome measure—can be the difference between a candidate's success and failure in the workplace.

Since the inception of the *n*Ablement channel within SPR Companies, we have explored and applied AT across a breadth of disabilities including hearing loss or deafness, low-vision to blindness, mobility loss associated with many diagnoses and conditions (exs; CVA, SCI, CP, amputation, congenital disabilities), and many non-evident disabilities.

2. Overcoming Workplace Perceptions

SPR Companies commissioned demand-side research – or analysis based on the client or customer perception and response - looking at perceptions of productivity associated with workers managing hearing, vision or mobility loss under the investigation of Professor Fong Chan, Director of Clinical Training in the Department of Rehabilitation Psychology and Special Education at the University of Wisconsin – Madison. Published in the *Journal of Occupational Rehabilitation* (July, 2010: Vol. 20; pgs. 412-419), this survey of Midwest employers suggested a strong impression by employers of lower productivity among employees with disabilities. This perception existed even among those respondents with no experience in hiring or working with employees with these types of evident disabilities. Whether accurate or not, faced with the reality of chronic unemployment and underemployment that continues to be dramatically higher than that of the general working-age population, we must do everything possible to overcome this detrimental perception of both candidates and professionals with disabilities.

One of the unanticipated challenges that we have identified in the research and implementation of Assistive Technology (AT) in the professional workplace is the resistance by candidates themselves. While anecdotal, my experience has taught us not to assume that candidates will willingly embrace the implementation of AT as a productivity tool. I

believe there are several factors that can influence its successful introduction and adoption.

- Candidate's internal perception of his productivity in the required skills – In exploring a candidate's opportunities based on background, skills, experience and other factors, using behavioral interview techniques to gain an appreciation for the candidate's own assessment of her ability to be productive may be key to the opportunity to explore AT as its own tool, or in conjunction with other productivity tools, approaches and processes.

- Complexity (or perceived complexity) of the AT and its integration into the environment – AT comes in many forms and levels of complexity and/or integration with the work environment and other systems. Through a thorough exploration of options within AT, you can help assure successful adoption of the optimal technology and not risk rejection of AT by the candidate or client based on the perceived complexity and anticipated challenges at integrating and/or adopting it successfully on the job.

- Previous exposure to/experience with AT – Based on the candidate's prior experience with AT, you may face resistance – sometimes warranted – to revisiting its adoption in his current effort or position. Being sensitive to past experience can support an honest and effective dialogue on the pros and cons of integrating

appropriately researched and adopted technology into the current environment.

- Age and career experience at time of implementation – While not universally true (never say never), younger candidates and professionals are generally more amenable to considering AT as a productivity tool in their career if only because they have fewer biases based on experience and the advantage of likely being more "digitally native" than more mature candidates and professionals. That noted, I have found that some more mature professionals are open to and embracing of AT that will support their future career goals. Those with the confidence, energy and patience to incorporate AT into their career learning may find its ROI to be well worth the effort.

- Culture and inclusiveness at company – The more embracing the organization is of experimenting with and allowing a learning curve associated with AT in the workplace, both for the person with the need and colleagues who may interface with that technology either directly or indirectly, the more likely that AT will become a staple productivity tool. Through cultural understanding of AT as one form of reasonable accommodation, and a recognition that by rejecting a mature and professional approach to researching, integrating and evaluating AT for appropriate candidates you may be limiting a colleague's productivity and opportunity for growth and success,

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you will help assure a role for AT in the productivity toolbox.

- Candidate's comfort with technology overall - While you might think this would be a non-issue in working with candidates in the IT field, there are still varying adoption and comfort curves for AT. I have known candidates who are always on the bleeding edge of software tools, but view AT as irrelevant to their success. Whether this reflects a knowledge processing challenge around hardware integration, a need to reject what they perceive as "special technology", or some other issue, there is still a lot of education to be imparted around AT and its successful integration. The steady migration toward and adoption of universal design principles should support the decline of this challenge.

3. The Evolution of AT and the Case for Universal Design

As the sophistication of the mathematical algorithms driving "speech engines" has improved, the adoption of commercially available speech recognition programs like Dragon Systems Naturally Speaking and IBM Via Voice has grown significantly. In fact, some level of speech recognition has been built into many PC and laptop operating systems as well as tablets and smart phones. The Windows operating system includes a robust speech recognition application that can be used to create documents, spreadsheets, email and other common requirements. This is a case of a technology initially applied to the disability community (as in Dragon's early technology "Dragon Dictate" —a discrete speech product almost exclusively directed at a segment of the disability population) that has migrated into the general population, thereby benefitting far more users and improving its adoption.

We are quickly approaching the mass application of "assistive technologies" that can benefit all computer users rather than strictly carve-out populations like users with disabilities. I sold Dragon's speech recognition products into the legal and medical markets as they were just transitioning from their discrete to natural speech technologies. At that point, the penetration into these markets was slow and the sales cycle could be long and challenging at the front end of the technology adoption curve.

Historically, assistive technologies were applied to a small percentage of the disability community. By virtue of this modest potential market, their cost was often prohibitive for the users they were intended to support. In fact, many developers of these technologies went out of business due to this challenge among others. Several factors have likely contributed to the growth in both development and user adoption of user-friendly, intuitive assistive technologies at the desktop.

First, the growth in universal design principles applied to software development has supported the creation and exposure of many simple, yet effective function keys, actions or default settings that address an array of challenges. Examples are the ease of setting font size, type and style, built-in predictive word processing capability, order history/archive on most merchant sites, speech-to-text creation and text-to-speech capability, audible cues, variable shading and contrast, screen resolution, sticky and hot keys, macro command structures and mouse responsiveness. The University of Wisconsin's Trace Center has an outstanding history of supporting more integration of universal design principles into technology, including, but not limited to, computer systems.

Next, the boomer generation is aging—and addressing the erosion of hearing, vision and fine motor control—and boomers have discretionary income to invest in evolving technologies that can enhance their lives. They were generally late to the technology adoption curve – which is

ironic since boomers were largely responsible for driving its early development - but have strongly influenced intuitive design and functionality of computers and their software/operating systems. The oldest boomers turn 65 this year. Having invested so much time and effort into understanding computers and digital technology, boomers aren't about to let the onset of their aging and deteriorating senses, arthritic hands with limited dexterity, or other challenges keep them from continuing to explore the functional—and increasingly immersive-experience afforded within our technological world. I expect that the Americans with Disabilities Act (ADA) signed into law in 1990 is gaining more and more favor with the boomer generation as its assurance of accessibility of goods, services and equal treatment in screening and hiring practices becomes a more tangible value in their own lives.

Another key influence on systems becoming more accessible "out of the box" has been the resilience of the ADA itself. Notwithstanding unfair, polarizing and often inaccurate, media coverage of disability in a broad range of forums, there is an ongoing battle by many in the advocacy community to educate the media on clear and objective language/terminology to apply when relevant to the coverage (http://ncdj.org/styleguide/). In addition, the narrowing of the law's application through conservative court decisions (recently expanded beyond the initial language and coverage with the passage of the ADA Amendments Act of 2008) and the periodic cries of abuse of the law by unscrupulous attorneys and their unwitting—or

themselves unscrupulous—clients with disabilities, the ADA continues to be enforced as a critical civil rights legislation for over 50 million of our fellow citizens.

The tenets of this far-reaching law continue to shape overall accessibility policy and operations in both the public and private sector, including those related to electronic information and communication. While companies in the private sector are not under the level of scrutiny of federal agencies, there is a growing recognition that approaching your overall communication standards with an eye to making them universally accessible benefits everyone. Also, while the ADA didn't strictly address web accessibility— being drafted and enacted before the evolution in electronic, internet-based communication—its language around "places of public accommodation" has been interpreted in several high-profile court cases (ex; NFB v. Target) as applicable to the exploding world of e-commerce and related publicly used services.

4. Recommendations and Future Paths

As the standard of universal design applied to information and electronic communication is more widely adopted, the merger between historic Assistive Technology (AT) as applied to hardware and software in the IT environment, and that developed for the general population will continue to accelerate. This will support improved productivity across all segments of the labor force and will be a leading factor in the integration and productivity of candidates with disabilities in particular.

User-centered design principles consider the many distinctions and nuances of users of both hardware and software when designing and testing those systems. Ability, or the challenge of a given disability or learning process challenge, is just one of those factors. Its consideration is woven with other factors like culture, generation, gender and language in an effort to provide the most universally positive experience possible for the broadest range of users of the technology or visitors to the site.

The wider adoption of this approach to design will continue to draw more users with disabilities into the ever-expanding world of e-knowledge, thereby enabling their growth and opportunity for career development.

As these principles become more mainstream with forward-thinking development, that segment of the population identifying as living with a disability—approximately 15-

20% and growing with global aging patterns—will be embraced in a more seamless fashion. AT, at least as it references computer hardware and software, will likely become an anachronistic reference to early efforts to provide access to e-knowledge that will then be assumed as one consideration in the principles and practice of universal design.

When that practice becomes acknowledged as *best practice* we will have taken a giant step forward in supporting greater opportunity for knowledge transfer and productivity within the disability population. As the population of people with disabilities gains access to e-knowledge more holistically, they will greatly enhance their opportunities to join the global workforce of tomorrow.

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