
The Struggle for Web eQuality by Persons with Cognitive Disabilities

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This article is based on the book *eQuality: The Struggle for Web Accessibility by Persons with Cognitive Disabilities* (2014, Cambridge University Press). It contends that the rights of individuals with cognitive disabilities to equal access to web content are not only protected under law, but may also be implemented and supported by current user-based, semantic and cloud technologies. Consistent with the Americans with Disabilities Act and the U.N. Convention on the Rights of Persons with Disabilities, web content equality is defined through functional, rather than disability-specific, approaches and techniques to enable personalization and customized usage across online functions. Legal challenges brought forward by individuals with cognitive and other disabilities illustrate the barriers still faced by individuals with disabilities to web equality as well as some of the solutions to and outcomes of these challenges. In closing, a view for the full and equal enjoyment of web content, which considers technology, financial benefits, and the role of advocacy and regulations, is discussed. Copyright © 2014 John Wiley & Sons, Ltd.

BACKGROUND

The seed for this article and the book it is based upon, *eQuality: The Struggle for Web Accessibility by Persons with Cognitive Disabilities* (2014, Cambridge University Press), was planted several years ago by Dr. David Braddock, who asked me to examine “The right under the Americans with Disabilities Act to web access for people with cognitive disabilities.” Given the ubiquity of networks in the United States and most of the world – even the developing world – as well as the shifting of nearly all of our daily interactions and activities to networked spaces, the right to web equality, especially, from an ethical standpoint, may seem an obvious, “Yes, of course!”

However, setting the rights of individuals has seldom come without some kind of enshrinement under law and requisite shifts in attitudes and understanding, and practice. Web equality must be defined, detailed, and decided not only through legal actions but also, and perhaps more importantly, through cultural actions.

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This article examines assumptions underlying the full and equal enjoyment (access) by people with cognitive disabilities towards the common understanding of web content. It explores how web content equality is grounded in law and policy that may help people with cognitive disabilities to fully partake and flourish in the information age. To that end, this article traces the struggle for web equality for people with disabilities; it introduces definitions, techniques for inclusion, legal challenges and legal rights that are developed in full in *eQuality*. In closing, the article moves towards the particular struggle for web equality by persons with cognitive disabilities. As this campaign is examined more closely, it raises important questions that must be answered to ensure the more general shift to web content equality.

DEFINING WEB EQUALITY

In a recent article, Wicker and Santoso argue that access to the Internet is a human right; they connect this argument to the importance of the Internet's World Wide Web (web) in supporting freedom of speech and the ability to make political choices as well as in being what Illich would consider a "tool for society."² Wicker and Santos note that:

Access to the Internet is directly tied to a set of human capabilities that are considered fundamental to a life worth living. Access and these capabilities are so intertwined that one cannot deny rights status to Internet access without diminishing or denying the associated capabilities.³

Internet access is thus fundamental to exercising one's human rights; however, access to the tool of the Internet alone is not sufficient to guarantee web equality. Overly complex interfaces, lack of alternatives (e.g., symbols along with text, captions instead of audio), and the inability to transform content presentation all prevent effective use of the tool that is the Internet. *Access alone is not web content equality.*

By web equality, I mean the opportunity for *full and equal enjoyment* of web content across all its technologies and interfaces. I use the term "eQuality" to emphasize the ideals attached to equality: the first is equality and justice under law, in terms of a justiciable right to web content equality for persons with cognitive disabilities; the second is "electronic quality," which is to signify the meaningful and objective opportunity for the comparable use of web content by persons with cognitive disabilities. This right to enjoy knowledge and social interaction is encompassed by the freedom from discrimination solely as a consequence of disability, and is established by the Americans with Disabilities Act (ADA) and recognized in the U.N. Convention on the Rights of Persons with Disabilities (CRPD). These and other domestic and supranational policies view equality in functional terms, which is the consideration of behavior and need in a given circumstance, rather than as a predetermined "solution" based on specific categories of disability.

RIGHTS OF PERSONS WITH DISABILITIES

Although the ADA has been in effect for almost 25 years and there has been a concordant growth in the political strength of the disability rights movement worldwide, the notion of

²Ivan Illich, *Tools for Conviviality*; available at: <http://www.preservenet.com/theory/Illich/IllichTools.html> (accessed December 15, 2013).

³Steven B. Wicker & Stephanie M. Santoso, Access to the Internet is a human right, *Communications of the ACM*, 56 (6), 45–46 (June 2013).

web content equality for people with disabilities has generally received limited attention, and when examined has faced resistance and pushback. For the principle of web content equality to evolve in law and practice, concordant clarity is necessary from multiple disciplines and from organizational and technological perspectives domestically and transnationally.⁴

Under the ADA, the right to web equality, as for other rights assuring equal access to society, is considered on an individualized basis in circumstances involving the human and computer interaction. Those individuals with disabilities who choose to engage the web must have the prospect for reasonably equivalent and comparable use of its electronic content, and not simply mere access to it, as do others without disabilities in the same situation.

Non-discrimination in the full and equal enjoyment of web content offered by commercial entities is addressed by the ADA's third chapter (title III), which covers services offered by "public accommodations," including those of online service providers. Whilst my focus here primarily is on ADA title III, similar non-discrimination principles for governmental programs and services are set out in the second chapter of the ADA (title II). Freedom from discrimination because of disability in the use of the online activities of public accommodations and governmental actors, and the corresponding obligation to make modifications within reason to ensure that their services are equally enjoyable are among the central means by which people with cognitive and other disabilities meaningfully participate in the digital information society.

The ADA's preamble establishes its mandate as to ensure equal opportunity, inclusion, choice in independent living, and opportunity for economic self-sufficiency.⁵ The web is a major driver of these principles.⁶ For this reason, the lack of equal opportunity to participate on the web, whereby separate access to web content becomes the default means for interaction, is *inherently not equal* for people with cognitive disabilities and others who choose to enjoy such services.⁷ The full and equal enjoyment of web content requires at least the fair opportunity for substantive equality in online participation.

The World Wide Web Consortium (W3C) defines equivalent web content as that which is an "acceptable substitute," adaptation, and alternative that "fulfills essentially the same function or purpose as the original content upon presentation."⁸ The idea of the opportunity for alternative content is that it removes the reliance upon any one mode or cognitive mechanism for comprehension: text can be heard instead of seen, audio can be read instead of heard, images are described instead of seen, symbols replace words, and so on. As will be discussed, this seemingly complex suspension of modal reliance is actually and often simply achieved in web content as well as in other digital content. Perhaps an illustration of a common achieved adaptation is transformations in presentation, such as text enlargements and higher contrasts. Provision of equivalent content, or the capacity for web content to be transformed, is an important aspect of meeting my definition of web equality: opportunity for full and equal enjoyment of web content.

⁴ See Eli Pariser, *The Filter Bubble: What the Internet is Hiding from You*, at 5 (2011).

⁵ See generally Peter Blanck, Michael Waterstone, William Myhill, & Charles Siegal, *Disability Civil Rights Law and Policy: Cases and Materials* (2014).

⁶ See Rob Imrie, Universalism, universal design and equitable access to the built environment, *Disability & Rehabilitation*, 34 (10); 873–882 at 880 (2012); Fatima A. Boujarwah, Hwajung Hong, Gregory D. Abowd, & Rosa I. Arriaga, Towards a framework to situate assistive technology design in the context of culture, In *ACM, Proceedings of the 13th international ACM SIGACCESS Conference on Computers and Accessibility*, 19–26 (2011) (culture mediates understanding of disability and use of AT).

⁷ G. Anthony Giannoumis, Regulating web content: The nexus of legislation and performance standards in the United Kingdom and Norway, *Behavioral Sciences & the Law* (this issue, 2014).

⁸ See W3c, [DRAFT] Basic Glossary for WAI Documents (August 9, 2005); available at: <http://www.w3.org/WAI/lexicon/#equiv> (accessed January 13, 2013).

Practically speaking, the enjoyment of web content must be considered in context. This is why laws like the ADA approach such heavily fact-based determinations on a case-by-case basis, and typically not in terms of prescriptive compliance with web content technical standards and performance criteria. This is also the reason why courts have tended to view web equality in accord with general notions of the fair and equivalent *opportunity* to participate regardless of disability.⁹ The concept of web equality, then, is the comparable choice to participate online, with or without appropriate supports and adjustments, and without discrimination on the basis of disability.

Given historical and present attitudinal discrimination, the right to web equality is a means to ensure that disability is respected as an element of human diversity, when individuals and communities otherwise would exclude disabled individuals. The law accords individuals with disabilities individual and collective rights to web equality, regardless of obvious or hidden individual characteristics that may subject them to artificial, invidious, and paternalistic forms of prejudice and discrimination.

Other countries' domestic laws, and the CRPD, conceive of the equal enjoyment of the web as the opportunity to have equivalent access to and use of web content, and for individuals not to be excluded unreasonably from that prospect because of cognitive and other disabilities. This right is recognized as the objective and comparable opportunity to use web content in ways reasonable under the circumstances.¹⁰

Global Context

In 2008, the human rights of disabled people were recognized in the CRPD, and today more than 100 nations have ratified the treaty.¹¹ The CRPD reflects a commitment by member states to value active participation and citizenship by persons with disabilities in the global community. Article 1 of the CRPD states as its purpose "to promote, protect and ensure the *full and equal enjoyment* of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity."¹² Persons with disabilities are those with long-term physical and cognitive impairments who face societal barriers that "hinder their *full and effective participation in society* on an equal basis with others" without such conditions.¹³ The CRPD's human rights lens is similar to, but different than, that of the ADA's civil rights approach. Its enumerated fundamental liberties are expressed as universal and interrelated conditions arising from the human experience. These liberties are not granted by governments or laws. Rather, they are fundamental to personal dignity and fulfillment, autonomy and capacity, and individual development, well-being, and flourishing regardless of disability.

⁹ See, e.g., *K.M. v. Tustin Unified School District*, and *K.H. v. Poway Unified School District*, --- F.3d ----, 2013 WL 3988677 (9th Cir. 2013), (Compare T.H. Marshall, *Citizenship and Social Class*, 148–54, at 148 (1950), in *Inequality and Society*, eds. Jeff Manza & Michael Sauder, 2009).

¹⁰ See, e.g., *Wash. State Communication Access Project v. Regal Cinemas*, 293 P.3d 413, 422 (Wash. Ct. App., Jan. 28, 2013).

¹¹ Convention on the Rights of Persons with Disabilities, GA Res 61/106, UN Doc. A/RES/61/106 (December 13, 2006) (hereinafter, CRPD); available at: <http://www2.ohchr.org/english/law/disabilities-convention.htm> (accessed December 6, 2012).

¹² CRPD, *ibid* (emphasis added). See also Jerome E. Bickenbach, *Disability, Culture and the U.N. Convention, Disability and Rehabilitation*, 31;1111–1124 (2009). See also Court of Justice of the European Union, Press Release No. 82/13, Luxembourg (July 4, 2013); re: Judgment in Case C-312/11: Commission v. Italy, case; available at: <http://curia.europa.eu/juris/documents.jsf?num=C-312/11> (accessed July 18, 2013).

¹³ CRPD, *ibid* (Article 1) (emphasis added).

Among its protections, the CRPD (Article 9, Accessibility) established that comparable access to communications technology and to the web are fundamental rights.¹⁴ Johan Borg and colleagues believe that the CRPD declares for people with disabilities the right to technology equality “to ensure their *full and equal enjoyment* of all human rights and fundamental freedoms.”¹⁵ Although as of yet the U.S. Senate has declined to ratify the treaty, the ADA, like the CRPD, directs that in a free society, people with disabilities have the right to use online materials to learn, work, play, communicate, shop, and participate fully in their communities.

WEB UBIQUITY

According to the website Internet World Stats, one-third (32%) of the world’s almost seven billion individuals use the web, and almost half of all users (45%) live in Asia.¹⁶ While India has the largest number of English-speaking persons, China has the most web users.¹⁷ After Asia, Europe accounts for about one-fifth of all web usage (22%), with North and Latin America and the Caribbean contributing another one-fifth (22%).¹⁸ Since the year 2000, use of the web has increased more than five-fold globally.

Web usage is expected to accelerate for those who have previously faced barriers to it, including those with disabilities and who are aging (or who acquire disabilities with age), those living in poverty, and others who face economic and political restrictions to web access. More people use mobile and tablet devices to access the web than desktop personal computers, and to a greater extent these users have lower incomes.¹⁹ In 2013 alone, there were more than one billion smartphones and tablets bought worldwide, and this number is set to double by 2015.²⁰ There are almost seven billion mobile subscriptions across the globe and 50 billion mobile applications were downloaded in 2013.²¹ How many of these “apps” are accessible to and usable by persons with cognitive and other disabilities? At astounding rates, people are accessing web content on multiple devices, and often simultaneously, expecting real-time responsiveness and ubiquitous usage across contexts and environments. Do persons with cognitive disabilities have such equivalent opportunities?

¹⁴ CRPD, *ibid*.

¹⁵ Johan, Borg, Stig Larsson, & Per-Olof Östergren, The right to assistive technology: for whom, for what, and by whom?, *Disability & Society*, 26(2), 151–167, at 165 (2011) (emphasis added).

¹⁶ See Internet World Stats, <http://www.internetworldstats.com/stats.htm> (accessed August 24, 2012).

¹⁷ Wolfgang F.E. Preiser & Korydon H. Smith, Introduction, *Universal Design Handbook*, at xxvii–iii at xxviii (2nd ed. 2011) (Hereinafter “*UD Handbook*”).

¹⁸ See Internet World Stats, <http://www.internetworldstats.com/stats.htm> (accessed July 4, 2012).

¹⁹ Henry Blodget, The Future of Digital, *Business Insider* (2012) (smartphones and tablets outsell PCs in 2011); available at: <http://www.businessinsider.com/future-of-digital-slides-2012-11#-11> (accessed December 5, 2012). *Id.* at <http://www.businessinsider.com/future-of-digital-slides-2012-11#-19>.

²⁰ See Natasha Lomas, Gartner: 1.2 billion smartphones, tablets to be bought worldwide in 2013; 821 million this year: 70% of total device sales, *AOL Tech* (Nov. 6, 2012); available at: <http://techcrunch.com/2012/11/06/gartner-1-2-billion-smartphones-tablets-to-be-bought-worldwide-in-2013-821-million-this-year-70-of-total-device-sales/> (accessed June 10, 2013); Jun Yang, Smartphones in use surpass 1 billion, will double by 2015, *Bloomberg* (October 17, 2012); available at: <http://www.bloomberg.com/news/2012-10-17/smartphones-in-use-surpass-1-billion-will-double-by-2015.html> (accessed June 10, 2013).

²¹ See Global Mobile Statistics 2013 Home: all the latest stats on mobile web, apps, marketing, advertising, subscribers, and trends..., *MobiThinking* (May 2013); available at: <http://mobithinking.com/mobile-market-ing-tools/latest-mobile-stats> (accessed June 21, 2013).

Web Content

What is web content? As a general matter, computer engineers and scientists, policymakers, and disability advocacy groups consider web content to be online digital information derived from human and machine operations and transferred to users by various means. Nonetheless, the definition of web content is far from clear for purposes of legal analysis.²² Social networking websites often distinguish among web content, online data, and metadata (“data that explains or describes other data”).²³ Generally, however, each is a form of knowledge-based digital material that allows for web participation and the sharing of information in electronic text, images, and other modes of communication, and expressed in computer code, data, and semantic information in machine-readable formats.²⁴ The W3C’s WGAG 2.0 similarly conceives of web content as the “information and sensory experience to be communicated to the user by means of a user agent (e.g., a browser), including code or markup that defines the content’s structure, presentation, and interactions.”²⁵

User-Based Content

The web’s architecture enables social media services to organize and maintain online information about users in computer code. One common form of metadata collection is the “cookie,” which is a tracking device that creates personal summary forms of web data.²⁶ Other user-based content derives from the use of the web and its applications, such as information about electronic book (eBook) usage and purchases made using a browser service.²⁷

Location-based web content and services may then be provided by using metadata such as the information retrieved from a device’s global positioning system (GPS) and Internet service provider (ISP). This information may be used by the web service to provide users with advertisements tailored to user preferences and choices *in situ*. “Click data” from the user’s interaction with an advertisement thereafter is assessed by the advertisers to determine the ad’s effectiveness and closure of e-sales. Websites often create other data from user information; for instance, using embedded GPS sensors and location information to provide contextual real-time information and content feedback to the user. Many e-commerce organizations sell this content to external

²² See, e.g., European Commission, Proposal for a Directive of the European Parliament and of the Council on the accessibility of public sector bodies’ websites, at 14 (December 3, 2012) (web “content” as “information to be communicated to the user by means of a user agent, including code or mark-up that defines the content’s structure, presentation, and interactions”); available at: <http://ec.europa.eu/digital-agenda/en/news/proposal-directive-european-parliament-and-council-accessibility-public-sector-bodies-websites> (accessed December 5, 2012).

²³ See, e.g., Facebook, Statement of Rights and Responsibilities (date of last revision: June 8, 2012); available at: <http://www.facebook.com/legal/terms> (accessed November 16, 2012). See also See W3C, Web Services Glossary (February 11, 2004); available at: <http://www.w3.org/TR/ws-gloss/> (accessed December 30, 2012).

²⁴ Facebook, Data Use Policy: Information We Receive About You; available at: <http://www.facebook.com/about/privacy/your-info> (accessed November 16, 2012) (passim this paragraph).

²⁵ See W3C, Definition of a Web Content; available at: <http://www.w3.org/TR/WCAG20/> (accessed December 6, 2012).

²⁶ See, e.g., LinkedIn, Cookies on the LinkedIn site (September 26, 2012); available at: http://www.linkedin.com/legal/cookie_policy (accessed January 2, 2013). See also Paul Baker, John C. Bricout, Nathan W. Moon, Barry Coughlan, & Jessica Pater, Communities of participation: A comparison of disability and aging identified groups on Facebook and LinkedIn, *Telematics and Informatics*, 30, 22–34 (2012).

²⁷ Facebook, Data Use Policy: Information We Receive About You, *supra*.

third-party enterprises for complementary and other marketing purposes. This web content is dynamic, in part derived from user-generated content in multiple channels from text, photos, movies, and audio. User-based content exemplifies the extraordinary capacity of online service providers to provide personalized and customized experiences to individual visitors and to respond to the needs and preferences of the individual.

Semantic Content

The web's inventor, Tim Berners-Lee, along with his colleagues, from the start conceived of the web as a responsive (experiential) and machine-assisted "semantic web." The semantic web is a term to reflect a common structure for understanding and processing web content with the assistance of computer algorithms (rules for computer processing).²⁸ The conception of a semantic web draws on advances in natural language processing (NLP: computers drawing meaning from human language) and the ability of machines to recognize human speech and convert it to electronic text. The power of the semantic web was demonstrated, for instance, when IBM's Watson "cognitive system" computer competed on the *Jeopardy* television quiz show, and by Siri, Apple's iOS "intelligent personal assistant," which uses voice recognition software.²⁹

Generally speaking, the semantic web is a conceptual, machine-based framework that enhances access to and use of web content by diverse users. It does this by aiding in the understanding, organization, and interpretation of digital information. Intelligent web design conceived presently has not (and may never) replicate the intricate state of human knowledge processing and interaction; however, it has the promise to make web content accessible and usable (in its broadest form, universally usable) by persons with and without disabilities. The semantic web, along with other innovations discussed later, is poised to support the opportunity for web enjoyment to be individualized in consideration of a user's preferences, skills, motivation, use of assistive technology (AT, such as screen reader software), and myriad applications across desktop and mobile platforms, operating systems and devices.

The capacity for semantic and user-based content to form both universal and individualized web content for persons with cognitive and other disabilities is supported and increasingly delivered through "cloud computing." The cloud, or, more precisely, public and private "clouds of clouds," allows web users ubiquitous access as they move through various contexts and settings in their day and interact with myriad web-enabled and interconnected devices. Through access to software stored in the cloud, users are not inexorably tied to one access configuration, one location, one device, and one form of AT. Cloud computing enables a user to utilize AT and invoke preferences on any enabled device. No longer are individuals bound to the device that has AT or preferences installed; instead, they may enjoy the freedom of web content

²⁸ See W3C, *W3C Semantic Web Activity*; available at: <http://www.w3.org/2001/sw/> (accessed July 4, 2012). See also Lee Feigenbaum, Ivan Herman, Tonya Hongsermeier, Eric Neumann, & Susie Stephens, The semantic web in action, *Scientific American*, 297, at 90–97 (December 2007), available at: <http://thefigtrees.net/lee/sw/sciam/semantic-web-in-action> (accessed July 4, 2012).

²⁹ See Ross Lazerowitz, *What is Natural Language Processing?*, Information Space, School of Information Studies, Syracuse University (May 11, 2012); available at: <http://infospace.ischool.syr.edu/2012/05/11/what-is-natural-language-processing/> (accessed December 26, 2012). See also Apple, iOS, Learn more about Siri; available at: <http://www.apple.com/ios/siri/siri-faq/> (accessed December 26, 2012); IBM Watson: Ushering in a new era of computing; available at: <http://www-03.ibm.com/innovation/us/watson/> (accessed December 26, 2012).

equality in an information technology ecosystem that undergoes continuous and dynamic change (e.g., updating of content), and which leverages the exponential power of computer data mining, search capacity, and semantic content generation and interpretation. The technological capacity has been achieved; the mandate and the will to embrace universal design and web content equality are being achieved through the efforts of advocates and individuals who ask that their right to web equality be upheld and enabled.

STORIES FROM THE FRONT

Progress towards web content equality has been born out of the lived stories of individuals with disabilities seeking their right to participate fully in daily life. In *Rights of Inclusion: Law and Identity in the Life Stories of Americans with Disabilities*, David Engel and Frank Munger chronicle stories of those fighting for disability rights and the “opportunity to explore from the ... outset what rights actually did and how they mattered.”³⁰ The life stories of disability advocates are fitting points to ground this discussion of web content equality because, as Patrick Henry Wilson has commented generally, they are models for our world experience.³¹ As never before, people with disabilities are pursuing their rights to join in their communities. Sometimes they are successful, often they are not. Some have sought to change the law and influence its interpretation and implementation. Others endorse a business-case rationale, pointing to commercial and non-commercial advantages to engaging consumers with disabilities.

Robert is blind and was one of the first individuals in the U.S. to raise his right to web equality under the ADA because an airline’s website was not equally usable by him. He was not successful in this early legal challenge.

Bruce, Melissa, and James are blind and, along with the National Federation of the Blind (NFB), brought one of the first successful class action lawsuits to ensure their right to equally enjoy the website of Target Stores; they wanted to shop online at Target.com, but it was not compatible with their screen reader software.

Jennifer and Edward are deaf, and along with the Greater Los Angeles Agency on Deafness (GLAD), challenged CNN to caption CNN.com so that they could have the opportunity to learn of the world’s news as did millions of others. CNN responded that if it was forced to caption CNN.com it would violate the company’s right to freedom of speech.

Lee, a deaf individual, along with others from the National Association of the Deaf (NAD), confronted Netflix to caption its online streaming media programming. Alan, another NAD member who is deaf, along with his wife, who is also deaf, have two hearing teenage sons who had asked their parents to subscribe to Netflix; they refused because, without the possibility for conversion of sound to text, they were not able to

³⁰David M. Engel & Frank W. Munger, *Rights of Inclusion: Law and Identity in the Life Stories of Americans with Disabilities*, at ix (2003). See also Janikke Solstad Vedeler & Naomi Schreuer, Policy in action: stories on the workplace accommodation process, *Journal of Disability Policy Studies*, 22 (2), 95–105 (2011).

³¹Patrick Henry Wilson, The next 50 years: a personal view, *Biologically Inspired Cognitive Architectures*, 1, 92–99, at 95 (2012). See also Lived Experience Research Network (2013); available at: <http://www.lernetwork.org/index.html> (accessed June 22, 2013); ADA Story Teller Project, Southwest ADA Center (2013); available at: <http://www.southwestada.org/html/adastoryteller/about.html> (accessed June 26, 2013).

monitor their children's shows and watch programming as a family.³² Donald, who is deaf, challenged Netflix's practices, saying that the company's failure to caption imposed a "deaf tax," because its DVD-by-mail plans, which provided him access to the video programming, were sold at a premium as compared with Netflix's online streaming subscription.³³

Angela is blind and tried to use Redbox's touch-screen kiosk at a California supermarket to rent a DVD, but it was not accessible to her because it needed to be operated by sight.³⁴ Angela was not able to use the kiosk to rent movies independently and had to ask others for help.

Karen has bipolar disorder and lost her battle to maintain her cancer survivor's online social network on Facebook. The court sympathized with Karen's situation, her lackluster experience with Facebook's customer services, and losing connection to her online lifeline.³⁵

Melissa, who is deaf, wanted to be a seller on eBay. She was not able to use the service because to register as a seller on eBay.com required that she verify her identity using an automated telephone process. Melissa asked that eBay use a readily available, simple, and inexpensive solution to fix this problem, but eBay had responded that she would have to use the service with its Live Help function.

Alexander claimed his cognitive and visual impairments were not effectively accommodated in Sony's online gaming systems and that this prevented him from enjoying them equally with others.³⁶ Sony contended that it was not required to make its products "easier" in order to be played by people with disabilities. Likewise, Todd alleged that Google, YouTube, and Myspace discriminated against him because of his reading disability by denying him the equal enjoyment of their online theaters.

Courtney could not take university classes requiring library research and Blair could not read recommended texts to complete his physics classes.³⁷ This was because they are blind and did not have equivalent access to the contents of their university libraries. These students, along with the NFB and others, defended their right to have access to the online information society in their education that was comparable to others without print disabilities.

Cari and Amber were annual pass holders to the Disneyland Resort in California. Teresa was a visitor of the Walt Disney World Resort in Florida. They have visual impairments and wanted to enjoy Disney's parks. However, they could not make use of Disney.go.com and other Disney websites because they were not accessible to them.

³²Netflix, Complaint for Declaratory and Injunctive Relief, at 9 (June 16, 2011); *available at*: <http://www.dredf.org/pdf-downloads/NAD,%20et%20al.%20v.%20Netflix%20Complaint.pdf> (July 13, 2012). *See also* Elizabeth Ellcessor, Captions on, off, on TV, online: Accessibility and search engine optimization in online closed captioning, *Television New Media*, 13, 329–52, at 329–30 (2012), Netflix to stream film online for free but without captions and persons with hearing impairments protested). *Id.* at 348. *See* Matt Huenerfauth & Pengfei Lu, Effect of spatial reference and verb inflection on the usability of sign language animations, *Universal Access in the Information Society*, 11;169–184 (2012).

³³*See Cullen v. Netflix*, 880 F.Supp.2d 1017, at 1021 (N.D. Cal. 2012). *Id.* at 1028–29.

³⁴*Lighthouse for the Blind and Visually Impaired v. Redbox Automated Retail and Save Mart Supermarkets*, U.S. District Court, Northern District of California, San Francisco Division, Case No. C12-00195 LB (Jan. 12, 2012).

³⁵*See Young v. Facebook, Inc.*, 790 F.Supp.2d 1110, at 1118–19 (N.D. Cal. May 17, 2011).

³⁶*Stiern v. Sony* 459 Fed. Appx. 609 (9th Cir. 2011).

³⁷*See Author's Guild v. HathiTrust*, Brief for Intervenor Defendants-Appellees, at 1 (2nd Cir., May 28, 2013) (citation omitted).

Mika, along with members of the NFB of Massachusetts, wanted to be able to use the smartphone mobile applications LevelUp and Square Wallet, as others could without visual disabilities. They were not able to use these mobile apps to make payments and receive special offers from e-merchants. Both companies agreed that future versions would enable individuals with print and other disabilities to access equivalent services offered to its sighted users, with the same ease of use and quality of experience.

Ali worked at Marriott Hotels and is blind. He sought to keep his job and advance at the company. Ali had requested that the company's intranet system operate effectively with his screen reader software program JAWS in order to perform his job and participate in management training programs. Marriott claimed the requested modifications were not reasonable, and Ali brought suit for discrimination under ADA.

Kerry claimed that ITT Educational Services did not accommodate his visual disability during the online hiring process. ITT had required Kerry to complete an online job assessment within time constraints. His use of screen reader software did not enable him to process the questions in the required time frame, and he requested a reasonable extension of time. ITT refused the request and noted that, in any event, Kerry would face other online barriers during the new employee orientation process. Kerry, along with the Equal Employment Opportunity Commission (EEOC), filed a charge of employment discrimination under the ADA.

Michael, an attorney who worked at the U.S. Customs and Border Protection ("CBP") services, is blind. Like other employees, he wanted to telecommute to work on certain days. Unfortunately, the intranet at CBP was not usable with JAWS. CBP's online remote security systems and virtual learning center were also not compatible with Leiterman's screen reader software. Leiterman filed a complaint that CBP's technologies were discriminatory, in violation of the Rehabilitation Act of 1974 and its Sections 501 and 508, laws with similar antidiscrimination principles as found in the ADA.

These are only a handful of the stories discussed in *eQuality*; the book more fully outlines the principles derived from these challenges and the gains made by individuals who have fought not to be outcasts of the web-connected information society. They are joined by many others, some whose challenges have received wide public attention. Together, these stories form the fabric of the disability rights movement.³⁸ They are about individuals who sought the right to enjoy all that society has to offer, not as an "advantage" over or to "burden" others, but to participate equally and be heard as individuals. Their advocates, the disability "cause lawyers," as Michael Waterstone, Michael Stein, and David Wilkins call them, have pursued equality rights on their behalf:

Their claims commonly represent a core set of ideas and commitments that members of the disability rights community broadly support. In bringing these kinds of cases, *the movement's lawyers have sought to improve the daily lived experiences of their clients* and also to stake out rights via settlements that extend to the larger American disability community.³⁹

It would be unfair to suggest that disability advocates are alone in pursuit of web equality. Many technology, educational, and business leaders support the vision of

³⁸ See Peter Blanck, Justice for all? Stories about Americans with disabilities and their civil rights, *Journal of Gender, Race & Justice*, 8, 1–32 (2004); Peter Blanck, Americans with disabilities and their civil rights: past, present, future, *University of Pittsburgh Law Review*, 66, 687–719 (2005).

³⁹ See also Cause Lawyering for People with Disabilities, Book Review by Michael Ashley Stein, Michael E. Waterstone, and David B. Wilkins, of Samuel Bagenstos' *Law and the Contradictions of the Disability Rights Movement* (2009), *Harvard Law Review*, 123, 1658, at 1661–62 (2010) (hereinafter "Cause Lawyering").

equal enjoyment of the web. Indeed, *eQuality* is based on collaborations over several years with the Coleman Institute for Cognitive Disabilities at the University of Colorado, which is focused on web equality for people with cognitive disabilities.⁴⁰ Bill Coleman, the founder of the Institute and a technology entrepreneur, envisions the web as the primary means to open the world to people with cognitive disabilities who face digital barriers and online exclusion.⁴¹

Individuals with cognitive disabilities are web users; they are children and older adults and like other web users, they want to use the web for interactions, information, and entertainment. For Justin, who is 15, web equality means the possibility for friendships and to not be lonely.⁴² As a person with Down syndrome and other cognitive and physical disabilities, Justin was disenfranchised early in life and relegated to inferior educational opportunities. If Justin's parents had not fought back, he would have faced segregation and a path towards second-class citizenship.⁴³ Jenny is 29 years of age, is a vibrant woman who fought for her right to live and work independently in her community, and has Down syndrome. Don, in his 60s, is an older adult who has faced disability discrimination because of his intellectual disability. Though of different generations, Justin, Jenny, and Don each benefited from exerting their civil rights.

When Justin was about to enter his public middle school, his teachers told his parents that he should no longer be taught in mainstream classrooms. They suggested this path even though it was not consistent with his individualized education plan (IEP), as required by the Individuals with Disabilities Education Act (IDEA). When he returned to school, Justin was often taught in isolation without use of a computer and access to the web. His father said that Justin spent the day mostly by himself completing paper workbooks by hand, which was difficult because of his limited dexterity.

What was striking, but perhaps not surprising, was that when Justin went home after school he played on his computer.⁴⁴ Justin used the web to enjoy games and watch videos, buy and listen to music, and, with support from his family, send messages and video chat with friends on social networking websites. In fact, researchers Jinjuan Feng and colleagues found that eight out of 10 children with Down syndrome they studied started using computers by the time they were 6 years old, and they used the computers for communication, learning, gaming and entertainment.⁴⁵ Unfortunately, Justin's web use did not follow him to school. Justin's parents decided not to fight the school; they sold their house and moved to a district that agreed to teach Justin with an inclusionary approach. Justin's new school, his father said, "is a different culture, open to including kids with an emphasis on mainstreaming and giving them the same access to resources and technology."

⁴⁰ See James Sullivan, Clayton Lewis, & Jeffery Hoehl, Implications of cloud computing for people with cognitive disabilities, in C. Stephanidis (Ed.), *Universal Access in HCI*, Part II, 372–381 (2011).

⁴¹ Sullivan et al., *ibid.* at 373.

⁴² Justin is a pseudonym, but the circumstances are based on lived stories.

⁴³ See Blanck, Americans with disabilities and their civil rights, *supra*; Peter Blanck, Closing: Special issue on disability policy and law, flattening the (in-accessible) cyber world for people with disabilities, *Assistive Technology Journal*, 20, 175–80 (2008); Peter Blanck, "The right to live in the world": Disability yesterday, today, and tomorrow, *Texas Journal on Civil Liberties & Civil Rights*, 13, 367–401 (2008).

⁴⁴ For related findings, see Mary Hart, Autism/Excel Study, 136–41, at 141ACM Assets'05 (Oct. 2005). See also, Clayton Lewis, HCI and cognitive disabilities, *Interactions*, 14–15 (May/June 2006).

⁴⁵ Jinjuan Feng, Jonathan Lazar, Libby Kumin, & Ant Ozok, Computer usage by children with Down syndrome: challenges and future research, *ACM Transactions on Accessible Computing*, 2 (3), 13–56 (2010). See also Jinjuan Feng, Jonathan Lazar, Libby Kumin, & Ant Ozok, Computer usage by young individuals with Down syndrome: An exploratory study. In *Proceedings of ACM (ASSETS'08)*, 35–42 (2008).

Jenny fought a court battle to live a life of her choosing as an adult with Down syndrome.⁴⁶ The Virginia state court rejected her parents' guardianship petition that would have required Jenny to live in a group home, not to have access to her online community and her smartphone, and to limit the individuals with whom she may choose to socialize. Guardianship as proposed would have resulted in Jenny's social death, with a lack of choice in the ways she participated in society. The judge rejected the petition, recognizing that with appropriate supports in decision-making, Jenny could live independently in ways of her choosing.⁴⁷ Jenny's case is among the few in this area that recognize "an individual's right to choose how to live and the government's progress in providing the help needed to integrate even those with the most profound needs into the community."⁴⁸

Don has intellectual disabilities and is non-verbal. I first met Don many years ago, when he was working in a sheltered workplace, which typically only employs persons with cognitive disabilities. Don communicated using an electronic communication device. The EEOC and local advocates were representing Don in an ADA employment discrimination case.⁴⁹ Don had been fired from his previous employment at a restaurant chain, even though his job performance was excellent and his co-workers enjoyed working with him.⁵⁰ A regional manager had visited the restaurant and on seeing Don took the local supervisor aside and criticized her for hiring one of "those people."⁵¹ After returning to the restaurant, the regional manager fired Don. The case went to trial and the jury found against the company, awarding Don \$70,000 in damages. To make its point that this discrimination would not be tolerated, the jury awarded Don \$13 million in punitive damages. The company appealed the award on the grounds that Don's disability made it "highly unlikely" that he would experience distress because of his termination.⁵² But the court imposed the maximum allowable damages,⁵³ stating "the breathtaking magnitude of an eight-figure punitive damages award demonstrates that the jury wanted to send a loud, clear message."⁵⁴

Years after the trial, I visited Don at his home. He used a paper picture book to communicate. I wondered what Don would choose to say if he had access to web technology, as Justin did. Countless other individuals with cognitive and other disabilities are disconnected, even when they are able to use the web.⁵⁵ Michael

⁴⁶ See Theresa Vargas, Woman with Down syndrome prevails over parents in guardianship case, *Washington Post* (Aug. 2, 2013).

⁴⁷ See *Ross et al. v. Hatch*, Order, Case No. CWF120000426P-03 (VA Cir. Ct., Newport News, Aug. 2, 2013).

⁴⁸ See Vargas, Woman with Down syndrome prevails over parents in guardianship case, *supra*.

⁴⁹ *EEOC v. CEC Entm't, Inc.*, No. 98-C-698-X, 2000 WL 1339288 (W.D. Wis. Mar. 14, 2000).

⁵⁰ Cf. Press Release, EEOC, *Chuck E. Cheese's Must Pay Maximum Damages Under the ADA to Mentally Retarded Employee Following Multi-Million Dollar Jury Award*, EEOC.gov (Mar. 15, 2000); available at: <http://www.eeoc.gov/press/3-15-00.html> (accessed July 4, 2012).

⁵¹ *Id.* (quoting trial testimony).

⁵² See Leye Jeannette Chrzanowski, *Jury Finds Hiring and Firing Based on Ability Not Myths, Fears and Stereotypes*, Great Lakes ADA News Service, (January 31, 2000); available at: <http://www.uic.edu/orgs/ada-greatlakes/adanews/001juryfinds.htm> (accessed July 4, 2012) (quoting Chuck E. Cheese attorneys).

⁵³ Civil Rights Act of 1991 provides for employers with more than 500 employees, compensatory and punitive damages in ADA employment discrimination cases are capped at \$300,000, exclusive of attorney's fees and costs. 42 U.S.C. § 1981a(a)(1), (b)(3)(D) (2000); see Blanck, et al., *supra* at 304-05.

⁵⁴ EEOC, *Chuck E. Cheese's Must Pay Maximum Damages Under the ADA to Mentally Retarded Employee Following Multi-Million Dollar Jury Award*, EEOC.gov (Mar. 15, 2000); available at: <http://www.eeoc.gov/press/3-15-00.html> (accessed July 4, 2012).

⁵⁵ See, e.g., Libby Kumin, Jonathan Lazar, Jinjuan Heidi Feng, Brian Wentz, & Nnanna Ekedebe, A usability evaluation of workplace-related tasks on a multi-touch tablet computer by adults with Down syndrome, *J. Usability Studies*, 7 (4), 118-42, at 118 (2012).

Waterstone and Michael Stein believe such stories reflect a “harmful preconception ... that the legal and social standing of people with disabilities is not the same as that of other citizens.”⁵⁶

But there is much more to these lived stories; it is, as the leading disability scholar Mark Weber has commented, that people with disabilities, and especially those with cognitive disabilities, are not only among the most stigmatized individuals, but they also face barriers to social acceptance in a world that forces them to be “invisible.”⁵⁷ Prior to the ADA’s passage, in *Alexander v. Choate*, the U.S. Supreme Court understood that such discrimination is “most often the product, not of invidious animus, but rather of thoughtlessness and indifference – of benign neglect,” and it “is primarily the result of apathetic attitudes rather than affirmative animus.”⁵⁸ When people with cognitive and other disabilities are forced to remain invisible, they are not given the opportunity to participate. Web content equality fosters all individuals’ right to be active participants in society.

COGNITIVE DISABILITIES AND THE WEB

Besides attitudinal discrimination and technological barriers, there are structural reasons why people with cognitive disabilities are excluded from the web. Poverty and lack of inclusive education, inadequate job training, and negative expectations limit the opportunity to access computer technology and services provided online. There are associated barriers facing those across the spectrum of disability in transportation, healthcare, social and recreational activities, and housing.

The examination of cognitive disability and web content equality involves consideration of arguably the largest meta-group of people with disabilities.⁵⁹ Admittedly, it is artificial to consider cognitive disability as a discrete category or condition, as cognition itself is linked to intellectual, sensory, emotional, and motivational characteristics and preferences.⁶⁰ Moreover, within cognitive disabilities there are wide individual disparities in access to and use of online services.⁶¹ Nonetheless, there is a general lack

⁵⁶ Michael Waterstone & Michael Ashley Stein, Disabling prejudice, *Northwestern Law Review*, 102, 1351–78, at 1353 (2008) (citations omitted).

⁵⁷ Mark C. Weber, *Disability Harassment*, at 23–24 (2007). See also Elizabeth F. Emens, Disabling attitudes: U.S. disability law and the ADA Amendments Act, *American Journal of Comparative Law*, 60, 220–33 (2012); Brigida Hernandez, Christopher Keys, & Fabricio Balcazar, Employer attitudes toward workers with disabilities and their ADA employment rights: a literature review, *Journal of Rehabilitation*, 66 (4), 4–16 (2000); Nicole Ditchman, Shirli Werner, Kristin Kosyluk, Nev Jones, Brianna Elg, & Patrick W. Corrigan, Stigma and Intellectual Disability: potential application of mental illness research, *Rehabilitation Psychology*, 58 (2), 206–16, 208 (2013); Shira Yalon-Chamovitz, Invisible access needs of people with intellectual disabilities: A conceptual model of practice, *Intellectual & Developmental Disabilities*, 47, 395–400 (2009).

⁵⁸ *Alexander v. Choate*, 469 U.S. 287, 293, 295–96 (S. Ct 1985).

⁵⁹ See Frank La Rue, *Report of the Special Rapporteur on the Promotion and Protection of the Right to Freedom of Opinion and Expression*, United Nations, General Assembly, Human Rights Council, A/HRC/17/27, at 6 (May 16, 2011); Michael Schaten, Accessibility 2.0 – New approach to web accessibility for people with cognitive and intellectual disabilities. In T. Amiel & B. Wilson (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications*, at 2868–2877 (2012). See also Kate Ellis & Mike Kent, *Disability and New Media*, at 7 (2011).

⁶⁰ See, e.g., Michael D. Melnick, Bryan R. Harrison, Sohee Park, Loisa Bennetto, & Duje Tadin, A strong interactive link between sensory discriminations and intelligence, *Current Biology*, 23, 1013–1017, at 1015 (2013)

⁶¹ See Singanapalli Balam, *UD Handbook*, supra, at 3.8.

of commitment to web content equality for cognitive disability,⁶² despite the fact that technological advances for persons with cognitive disabilities complement and extend access strategies for those with visual, hearing, dexterity, and other conditions.⁶³ Many presupposed barriers to web content equality are not only surmountable, but also capable of resolution for individuals with diverse text- and print-related, intellectual, developmental, and neurological impairments.

Web content is produced by developers using authoring tools, such as for editing with HTML5 and for presentation and format styling with Cascading Style Sheets 3 (CSS3). Digital content is available on browsers used on desktop computers and mobile devices capable of multimedia presentation.⁶⁴ For web content to operate with a user agent (e.g., browsers, AT screen reader software), it must be machine-readable.⁶⁵ Computer code allows AT software to convert content to speech for screen reading functions and audio information to text for captioning.⁶⁶ People with cognitive disabilities benefit from these same mechanical and verbatim translations. As for blind individuals who use screen readers or deaf individuals who use captioning to access web content, people with cognitive disabilities profit from conversions that format text to audio and the reverse, as well as from the opportunity to use content presented in multiple communication modalities and to alter the viewing format of the information presented. This is the case where text alternatives for audio information are presented as captions and include important non-dialogue audio information such as sound effects⁶⁷ (e.g., the sound of footsteps approaching a hidden protagonist). The use of text to explain audio information that is integral to the plot helps individuals understand and note significant non-verbal information.

Sometimes, however, people with cognitive disabilities face additional challenges in the use of web content as expressed purely in text alternatives. A user's reading level, which is not a monolithic characteristic, affects comprehension and understandability, and the processing of text. Individuals with cognitive impairments who may have hearing impairments often have lower levels of linguistic capabilities, especially if a gestural language such as American Sign Language (ASL) is their first language. Some individuals may require ASL, or other sign languages not based in English grammar, to aid in web content usability and comprehensibility.⁶⁸ Consequently, within the domain

⁶² Elizabeth Ellcessor, *Access Ability: Policies, Practices, and Representations of Disability Online*, A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy (Communication Arts), University of Wisconsin-Madison, at 342 (2012).

⁶³ Ellcessor, *ibid* at 342–43.

⁶⁴ For review, see Kevin Cullen, Lutz Kubitschke, David McDaid, Peter Blanck, William Myhill, Gerard Quinn, Patrick O'Donoghue, & Rune Halverson, *Accessibility of ICT products and services to disabled and older people: Evidence-based analysis for a possible coordinated European approach to web accessibility*, European Commission Information Society & Media Directorate, at 16 (2008); available at: http://ec.europa.eu/information_society/activities/einclusion/docs/access/comm_2008/coordinated_approach.doc (accessed July 24, 2012). See also Jaka Sodnik, Matija Jekovec, Grega Jakus, & Sašo Tomatič, *The future of the web*, *E-Society Journal: Research & Applications*, 2(1), 27–38 (July 2011).

⁶⁵ See W3C, *Understanding Conformance*; available at: <http://www.w3.org/TR/UNDERSTANDING-WCAG20/conformance.html> (accessed Dec. 28, 2012).

⁶⁶ See W3C, *Understanding Conformance*, *ibid*.

⁶⁷ See Captions (Live): *Understanding SC 1.2.4, W3C*; available at: <http://www.w3.org/TR/UNDERSTANDING-WCAG20/media-equiv-real-time-captions.html> (accessed Nov. 12, 2012). For an excellent discussion, see Ellcessor, *supra* at 342 (“visual cues, movements, expressions, and sounds that add to the tone or plot may be left out of online captioning, leaving deaf and hard-of-hearing users with a somewhat impoverished version of the original.”).

⁶⁸ I thank Matt Dietz for this comment. See also *Web Content Accessibility Guidelines (WCAG) 2.0, W3C Recommendation* (December, 11 2008).

of content transformation and modification, there is a need to consider an array of cross and coexisting characteristics.

What are Cognitive Disabilities?

David Braddock and his colleagues describe cognitive disabilities as “a substantial limitation in one’s capacity to think, including conceptualizing, planning, and sequencing thoughts and actions, remembering, interpreting subtle social cues, and understanding numbers and symbols.”⁶⁹ Cognitive disability covers conditions that may be based on the interaction of biology and environment over the life course – autism spectrum disorders (autism or Asperger syndrome⁷⁰), intellectual and developmental disabilities, cerebral palsy, traumatic brain injury (TBI), brain injury acquired from aging, physiological and environmental conditions, post-traumatic stress disorder (PTSD), Alzheimer’s disease, dyslexia and learning disorders and other conditions called print-related disabilities. Often, these conditions coexist with sensory, physical and dexterity impairments and with mental health conditions (e.g., depression and bipolar disorder), and have a diversity of causes, severity, and episodic presentation. Cognitive disability is affected separately and in combination by individual characteristics, environmental demands, and social supports.

The International Classification of Functioning, Disability and Health (ICF) is the World Health Organization’s (WHO) framework for measuring health domains by use of functional capacity in a social context. Although not without its limitations, the ICF attempts to “‘mainstream’ [...] the experience of disability and recognises it as a universal human experience.”⁷¹ The ICF approach reduces reliance on the medical model to adopt the social model of disability as applied in the ADA, the CRPD, and other disability rights laws. It recognizes the importance of individual characteristics and the environment in defining disability. For purposes of the right to the web, the ICF recognizes the centrality of environmental supports, such as the use of AT to facilitate independence and societal engagement by persons with cognitive and other disabilities.⁷²

Although in some instances cognitive disability may be associated with lower levels of intelligence as defined by standard tests and measures of daily functioning, this is not necessarily the case. Many individuals with cognitive disabilities have average and high levels of daily life functioning and intellectual skills. These individuals, whether with dyslexia, acquired brain injury, or autism, may experience limitations in social and communication abilities due to a range of factors.⁷³ Moreover, contrary to popular belief, the majority of individuals with cognitive disabilities have conditions that are

⁶⁹ David Braddock, Mary Rizzolo, Micah Thompson, & Rodney Bell, Emerging Technologies and Cognitive Disability, *Journal of Special Education Technology*, 19 (4), 49–56, at 49 (2004). *Id.* at 50 (citations omitted).

⁷⁰ See Autistic Self Advocacy Network (ASAN), About Autism; available at: <http://autisticadvocacy.org/about-autism/> (accessed Nov. 17, 2012).

⁷¹ See WHO, *International Classification of Functioning, Disability and Health (ICF)*, available at: <http://www.who.int/classifications/icf/en/> (accessed July 14, 2012).

⁷² See, e.g., K-R. Foley, P. Dyke, S. Girdler, J. Bourke, & H. Leonard, Young adults with intellectual disability transitioning from school to post-school: A literature review framed within the ICF, *Disability & Rehabilitation* (2012); Early Online: 1–18; available at: <http://informahealthcare.com/doi/pdf/10.3109/09638288.2012.660603> (accessed July 14, 2012); Borg et al., *supra* at 153.

⁷³ Referring to Autism Spectrum Disorder, which includes autistic disorder, Asperger Syndrome, and some pervasive developmental disorders. See E. Michael Foster & Erin Pearson, Is inclusivity an indicator of quality of care for children with autism in special education?, *Pediatrics*, 130, S179–85, at S180 (2012).

relatively mild and moderate.⁷⁴ Having said this, the experience of severe cognitive disability over the life course is not a presumption against the same opportunity for individual preference and choice in daily life, often with human and technological supports in certain circumstances. For people with some cognitive disabilities, autonomous choice takes on new meaning when supported decision-making is bolstered by on-demand technological and web-based supports across the life cycle to maximize independence and fulfillment.⁷⁵

Cognitive disabilities, therefore, represent an array of conditions and behaviors, which may be present at birth such as Down syndrome, acquired by a life event, or result from the aging process. These conditions coexist with others. Individuals with Down syndrome, for instance, often have vision, hearing, and dexterity impairments.⁷⁶ For these reasons, generalizations across individuals are made with caution. Nevertheless, changes to the policies and practices in regard to web equality may apply to an individual or groups with cognitive disabilities who face common online barriers.

Cognitive Load

The process and rate involved with the delivery and transformation of electronic text generally determine the “cognitive load” that the information presents to an individual and that person’s capacity to meaningfully acquire the information. Cognitive load is affected by how online tasks (websites) are designed, organized and presented, as well as by individual characteristics.⁷⁷

Generally, for all individuals, with and without disabilities, the proliferation of online devices, services, and multitasking has made cognitive load a crucial functional and performance issue of the hyper-information age.⁷⁸ In interacting with a web service, there is an expected distribution of cognitive load to be generated across the population of users. Unfortunately, web services are typically designed to be accessible and usable only to a limited range of the distribution of web users and often to an idealized “normal user” without consideration of disability and the effects of other factors, such as environment, task, individual or collective interaction. Disability antidiscrimination laws set out certain parameters to define when that range of usage is unfairly limited due to disability and, hence, discriminatory. The requirement for reasonable modifications is meant to mitigate such unfair restrictions, as long as they do not fundamentally

⁷⁴ Richard Hemp graciously reviewed disability prevalence rates as reported in the World Report on Disability (2011); available at: http://whqlibdoc.who.int/publications/2011/9789240685215_eng.pdf (accessed August 3, 2012). See also David Braddock, Richard Hemp, Mary C. Rizzolo, Emily Shea Tanis, Laura Haffer, Amie Lulinski, & Jiang Wu, *State of the States in Developmental Disabilities*, at 72 (2013) (hereinafter “*State of the States*”).

⁷⁵ For discussions of supported decision-making for people with cognitive disabilities, see, e.g., Terry Carney, Participation and service access rights for people with intellectual disability: A role for law? *Journal of Intellectual & Developmental Disability*, 38 (1): 59–69 (2013); Nina A. Kohn, Jeremy A. Blumenthal, & Amy T. Campbell, Supported Decision-Making: A Viable Alternative To Guardianship? (Oct. 2012); available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2161115 (accessed April 20, 2013).

⁷⁶ Ruimin Hu, Jinjuan Feng, Jonathan Lazar, & Libby Kumin, Investigating input technologies for children and young adults with Down syndrome, *Universal Access in the Information Society*, at 2; online 10.1007/s10209-011-0267-3 (2011). See generally Feng, Lazar, Kumin, & Ozok, *supra*.

⁷⁷ John Sweller, Paul Chandler, Paul Tierney, & Martin Cooper, Cognitive load as a factor in the structuring of technical material, *Journal of Experimental Psychology: General*, 119(2), 176–192, at 176 (1990).

⁷⁸ See Tony Schwartz, Faced with overload, a need to find focus, *life@work*, *New York Times* (May 17, 2013); available at: <http://dealbook.nytimes.com/2013/05/17/faced-with-overload-a-need-to-find-focus/> (accessed May 20, 2013).

alter the essence of the task or present an undue burden to the content producer. This general conception applies across disability types and functional severity, although cognitive disabilities by description directly implicate issues of cognitive load.

For instance, although screen reader software and augmentative technologies may transform electronic content to aural presentation, the structure of the website, its navigability, and complexity of its organization may independently affect presentational comprehensibility and hence cognitive load.⁷⁹ Cognitive load or capacity is further tested when considering multimedia and dynamic (constantly updated) web content requiring links across interfaces. For example, cognitive disabilities may result in memory-processing limitations that affect attention capabilities, which reduce the ability to perform certain sequenced web-based tasks.⁸⁰ Without the opportunity for alternatives, augmentations, sequenced feedbacks and supports, web use is effectively limited.⁸¹

In these situations, Susan Feinberg and Margaret Murphy distinguish extraneous from intrinsic cognitive load in the development of online web educational materials.⁸² Intrinsic cognitive load is implicated in the processing of the substantive task at issue, while extraneous cognitive load is tapped when processing the presentation and format of web content.⁸³ Often, without the opportunity for effective modifications, online services make cascading demands on cognitive resources, creating an overload that makes extrinsic and intrinsic cognitive processing unnecessarily difficult. A website's presentational (navigational) format itself, as John Sweller and colleagues comment, may require considerable cognitive capacity.⁸⁴ Generally, accessible and usable web design, with effective operability with AT, offers the opportunity to reduce *unnecessary* cognitive load, especially those substantive and presentational formats that are cumbersome or nonessential to the meaning of web content.⁸⁵ Of course, "unnecessary" cognitive load is a relative term and, as we will see, depends on the perspectives of the content owner and producer, and the individual user.

⁷⁹ See, e.g., Yury Puzis, Yevgen Borodin, Faisal Ahmed, & I. V. Ramakrishnan, An intuitive accessible web automation user interface, ACM, *Proceedings of the International Cross-Disciplinary Conference on Web Accessibility*, 41–44 (2012).

⁸⁰ Compare Peter G. Fairweather, How Older and Younger Adults Differ in their Approach to Problem Solving on a Complex Website, ACM ASSETS'08, 67–72, at 67 (Oct. 13–15, 2008). See also Harper & Yesilada, *supra* at 16. *Id.* at 17. See also Iosif Klironomos & Julio Abascal, *An Introduction to the Key Issues Relating to Accessible User Interfaces*, Cardiac-EU, available at: http://www.cardiac-eu.org/user_interfaces/key.htm (accessed July 27, 2012); John Gill and Julio Abascal, *Accessible User Interfaces: Priorities for Research*, Cardiac-EU; available at: http://www.cardiac-eu.org/deliverables/accessible_user_interfaces.htm (accessed July 27, 2012); Julio Abascal, et al., Coordination Action in R&D in Accessible and Assistive ICT, CARDIAC—Coordination Action in R&D in Accessible and Assistive ICT, Deliverable D3.2: Trends on Inclusive User Interface Design, ADVANCE DRAFT REPORT (2012); available at: <http://www.cardiac-eu.org/deliverables/d3-2.pdf> (accessed July 27, 2012).

⁸¹ Fairweather, *supra* at 71.

⁸² Susan Feinberg & Margaret Murphy, Applying cognitive load theory to the design of web-based instruction, IPCC/SIGDOC '00 *Proceedings of IEEE Professional Communication Society International Professional Communication Conference and Proceedings of the 18th Annual ACM International Conference on Computer Documentation: Technology & Teamwork*, 353–60, at 354 (2000).

⁸³ Feinberg & Murphy, *supra* at 354. See also Puzis et al., *supra*, at 41.

⁸⁴ Sweller, *supra* at 176. See also Peter G. Fairweather, How Older and Younger Adults Differ in their Approach to Problem Solving on a Complex Website, ACM ASSETS'08, 67–72, at 67 (2008).

⁸⁵ Compare Brief of Amici Curiae Telecommunications for the Deaf and Hard of Hearing, Inc., National Association of the Deaf, and the Hearing Loss Association of America in Support of Appellees Greater Los Angeles Agency on Deafness, Inc., et al., Urging Affirmance, *GLAD v. CNN*, at 4 (9th Cir., Oct. 25, 2012).

Universal Design

When the opportunity for web content accessibility and usability is possible in the broadest sense, it trends towards “universal design” (UD), which enables participation by diverse users to the maximum degree.⁸⁶ UD is well beyond a minimum standard of accessibility.⁸⁷ As formulated by Ron Mace and others, it is “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.”⁸⁸ Rob Imrie has further described UD as “making products *easier to use by reducing their complexity* and minimizing individuals’ reliance on their physical and cognitive capabilities in interacting with them.”⁸⁹ Reductions in task complexity, and conveyance of information in alternative channels of communication lessen cognitive demands (load) because capacity is effectively deployed and not expended on extraneous and multiple tasks. Individual cognitive capacity may be increased with the use of universal adaptation and customization strategies (which may be thought of as individualized accommodations) that allow for interrelated complex tasks to be broken down into accessible and alternative components that are presented in different and multiple modalities.

In theory, UD exists when there is an equivalent opportunity for diverse individuals to use web content easily and comprehensibly, and within reasonable bounds. To paraphrase Imrie, it is an “avoidance of discriminatory design” in the technological world, with similar, although less ubiquitous, consequence in physical world design.⁹⁰ In practice, UD represents an aspiration to achieve equal and individualized participation regardless of disability and other human characteristics, as mediated by the unique characteristics of design, deployment, and integration with other related products and services.

CONCEPTS OF WEB CONTENT EQUALITY

Without web equality, people with cognitive disabilities often “end up on the side of the [digital] divide with others who do not have access to or use technology.”⁹¹ This divide means a lack of access to comparable web content across multiple devices and screens, platforms, and browsers.⁹² The lack of functional and equivalent access to web content

⁸⁶ See, e.g., Judy Brewer, Accessibility of the World Wide Web: Technical and Policy Perspectives, *UD Handbook*, supra, at 33.2. For review, see Edward Steinfeld & Jordana Maisel, *Universal Design: Creating Inclusive Environments* (2012).

⁸⁷ See Jack L. Nasser, Are Retrofitted Wheelchair Entries Separate and Unequal?, *UD Handbook*, supra, at 41.2.

⁸⁸ See Rob Imrie, Universalism, universal design and equitable access to the built environment, *Disability & Rehabilitation*, 34(10): 873–882, at 873 (2012) (citing Ronald Mace, *Universal design: Housing for the lifespan of All People*, at 1 (1988)).

⁸⁹ Imrie, *ibid* at 873. Jim Tobias, Universal design: Is it really about design? *Information Technology & Disabilities*, 9(1): 2–10 (2003). See also “Complex,” *Merriam-Webster Dictionary* (2013); available at: <http://www.merriam-webster.com/dictionary/complex> (accessed June 22, 2013).

⁹⁰ Imrie, *ibid* at 875. *Id.* at 876.

⁹¹ Emily Shea Tanis, Susan Palmer, Michael Wehmeyer, Daniel K. Davies, Steven E. Stock, Kathy Lobb, & Barbara Bishop, Self-report computer-based survey of technology use by people with intellectual and developmental disabilities, *Intellectual and Developmental Disabilities*, 50 (1), 53–68, at 53 (2012).

⁹² See, e.g., La Rue, *Report of the Special Rapporteur*, supra at 4, 17. See also Tania Sebastian, ‘Copyright world’ and access to information: conjoined via the Internet, *Journal of Intellectual Property Rights*, 17, 235–42, at 235 (2012). See also International Telecommunication Union (ITU) (hereinafter “ITU 2013”) at 4 (May 2013); available at: http://www.itu.int/dms_pub/itu-d/opb/reg/D-REG-TTR.14-2013-SUM-PDF-E.pdf (accessed June 20, 2013).

affects individuals across the spectrum of disability, as well as other “non-standard” web users. But, persons with cognitive disabilities are among those most profoundly affected by web content inequality. Researchers Peter Fairweather and Shari Trewin write:

Sensorimotor processes in some sense are more fundamental than the cognitive functions that depend on them. By the same token, deficient sensorimotor processes are understood to perturb the functions of everything that depends on them. *For good reasons, the accessibility community has focused on sensory and motor impairments....* The next layer, the cognitive layer, transforms sensory or lightly processed data into information.... Impairments or distortions of these transformational processes affect how people interact with computers.⁹³

This is the challenge and opportunity in web content equality for persons with cognitive disabilities.

As a general proposition, then, web equality for people with cognitive disabilities necessitates consideration of the meaning of web content. But as illustrated by the lived stories described earlier, it must include more. Examination of the intended purpose of web content and the design of the online service itself is essential. Analysis requires examination of the “equivalent enjoyment of web content” from the perspective of the content owners and designers, and content users in context.

Given the web’s inclusive possibilities, it is fitting, therefore, to aim for development of a principled basis in law to web equality for persons with cognitive disabilities. This endeavor is not to divert attention for web equality from those with other disabilities; rather, it is to focus attention on a stigmatized and ostracized segment of individuals on the spectrum of disability. Moreover, the potential benefits of web content equality for those with cognitive disability transcend cognitive disability and apply to many other coexisting conditions.

For people with cognitive disabilities, there may be proposed at least two recognized meta-functional dimensions of web content equality: “ease of use” of web content; for instance, in navigational and multimedia access and operability; and “comprehensibility” of web content, for instance, in its understandability and substantive usability.⁹⁴ These dimensions of web content equality are not zero-sum choices, but rather reflect a continuum of user experience that must be considered in context, with or without the use of AT and other supports.⁹⁵ They are multi-dimensional concepts that are influenced by, and affect, individual preferences and differences, and the web ecosystem. Individuals with similar backgrounds and characteristics may prefer different ways to interact with web content in different situations and under varying conditions.⁹⁶

For example, Micah Mazurek and colleagues conducted one of the first nationally representative studies of the patterns of web use by youths with autism.⁹⁷ Autism

⁹³ Fairweather & Trewin, *supra* at 145. See also Barbara Collier, Sarah W. Blackstone, & Andrew Taylor, Communication access to businesses and organizations for people with complex communication needs, *Augmentative & Alternative Communication*, 28 (4): 205–218, at 211 (2012).

⁹⁴ See, e.g., Kasper Hornbaek, Current practice in measuring usability: Challenges to studies and research. *International Journal of Human-Computer Studies*, 64 (2), 79–102, at 91 (2006).

⁹⁵ See, e.g., Diana Ruth-Janneck, An integrative accessibility engineering approach using multidimensional classifications of barriers in the web, In *Proceedings of the International Cross-Disciplinary Conference on Web Accessibility*, ACM, at 10–13 (2011). See also Katie Ellis & Mike Kent, *Disability and New Media*, at 26–27 (2011).

⁹⁶ See Fairweather, *supra* at 71.

⁹⁷ Micah Mazurek, Paul Shattuck, Mary Wagner, & Benjamin P. Cooper, Prevalence and correlates of screen-based media use among youths with autism spectrum disorders, *Journal of Autism and Developmental Disorders* (published online, December 2011).

affects social and communication skills and is related to cognitive functioning in memory and processing, although it is not necessarily tied to intelligence, with behaviors changing over time and with environmental cues and stressors.⁹⁸ Their findings show that youths with autism prefer solitary and challenging screen-based media (e.g., video gaming) at higher rates than socially interactive and collaborative online media (e.g., chat room participation), regardless of their economic status, and as compared with youths with intellectual disabilities.⁹⁹ Preference in web use does not necessarily equate with simplification (and is relative to context), and greater comprehensibility (or simplicity) is not necessarily synonymous with intellectual challenge and cognitive demands. Although individuals with autism may experience differences in sensory and speech processing, and in sensitivities to the human voice itself, these characteristics in social communications are not necessarily tied to individual intelligence and capabilities.¹⁰⁰

Nevertheless, for many people with cognitive disabilities, ease of use and simplicity directly tie to the nature of web content accessibility and usability.¹⁰¹ Melissa Dawe Schmidt conducted an ethnographic study with young adults with cognitive disabilities, and their parents and teachers on their use of AT.¹⁰² The study, entitled “Desperately Seeking Simplicity,” found overwhelmingly that these participants desired developers to “keep it small and simple, please!”, and among the most desirable features were ease of use, functionality, and portability. The opportunity for ease of use and comprehensibility was among the central means for sustaining interest.¹⁰³

QUESTIONS TO BE ANSWERED IN THE SHIFT TOWARDS WEB EQUALITY

It is not too soon to ask whether, by the year 2040, on the 50th anniversary of the ADA and the 32nd anniversary of the CRPD, a generation of users with cognitive and other disabilities will be engaged fully and equally with the web of everything. More and more students with an array of cognitive disabilities will have attended post-secondary

⁹⁸ See Mazurek et al., *ibid.* See also Gareth Cook, The autism advantage, *New York Times* (November 29, 2012); available at: http://www.nytimes.com/2012/12/02/magazine/the-autism-advantage.html?_r=0 (accessed December 30, 2012).

⁹⁹ Mazurek et al., *supra*. See also Cecilia Li-Tsang, Susanna Yeung, Chetwyn Chan & Christina Hui-Chan, Factors affecting people with intellectual disabilities in learning to use computer technology, *International Journal of Rehabilitation Research*, 28 (2), 127–133, at 132 (2005); Daniel Davies, Steven Stock, & Michael Wehmeyer, Enhancing independent internet access for individuals with mental retardation through use of a specialized web browser: A pilot study, *Education and Training in Mental Retardation and Developmental Disabilities*, 36 (1), 107–113 (2001). See also Alex Wong, Chetwyn Chan, Cecilia Li-Tsang, & Chow Lam, Competence of people with intellectual disabilities on using human–computer interface, *Research in Developmental Disabilities*, 30, 107–123 (2009).

¹⁰⁰ See, e.g., Daniel A. Abramsa, Charles J. Lynch, Katherine M. Cheng, Jennifer Phillips, Kaustubh Supekar, Srikanth Ryali, Lucina Q. Uddin, & Vinod Menon, Underconnectivity between voice-selective cortex and reward circuitry in children with autism, *Proceedings of the National Academy of Sciences*, at 4 (2013).

¹⁰¹ See Gregg Vanderheiden, Fundamental principles and priority setting for universal usability, CUU '00 *Proceedings on the 2000 Conference on Universal Usability*, ACM, 32–38, at 36 (2000).

¹⁰² Melissa Dawe, Desperately Seeking Simplicity: How Young Adults with Cognitive Disabilities and Their Families Adopt Assistive Technologies, ACM, CHI 2006, 1143–1152, at 1143, 1147–49 (April 22–27, 2006).

¹⁰³ Dawe, *ibid* at 1148.

education and be seeking to enter the competitive workforce.¹⁰⁴ By that time, the number of persons in the U.S. over the age of 65 will have doubled, and many people will use the web to support independence in all aspects of their daily lives.¹⁰⁵ Fortunately, there is a growing body of expertise in accessibility to meet the increasing demand to make web technologies accessible. March 2014 saw the formal launch of the International Association of Accessibility Professionals (IAAP): “a global community for people and organizations working in accessibility to share expertise and resources, support one another’s work, and follow developments in this fast-changing field.”¹⁰⁶ This sharing of resources and standards of practice is an important part of building universal web equality.

Optimistically, before too long, binary views of web accessibility and usability will be relics of the past. Instead of “one size fits all” web content for standard users, there will be opportunities for auto-personalization “one size fits one”¹⁰⁷ web content, reflecting a globalized alignment of the web as an enabler of human rights as envisioned by the CRPD.¹⁰⁸ Still, there will be complexities to the mass customization of web content, such as the need for developers to maintain design simplicity and ease of use with the proliferation of niche operations, which is where open source ecosystems will come into play.¹⁰⁹

Hardware and software architectures will coexist with smarter environments – homes, schools, libraries, workplaces, healthcare centers. Embedded ambient intelligence from the clothes we wear will converge in cloud infrastructures. Web content will be semantically responsive and intuitive, and less design- and code-dependent.¹¹⁰ Content will be available in real-time on-demand services in homes (with home appliances), schools (with online teaching materials) and workplaces (with job training and advancement programs). The web will provide options for collaborative crowd-sourced feedback and services for individuals, groups, and communities in areas from the management of healthcare and financial transactions, to the preparation for natural and manmade disasters. Digital cooperatives will not only enhance the sharing and

¹⁰⁴ See Association of Research Libraries, Report of the ARL Joint Task Force on Services to Patrons with Print Disabilities, at 6, 14 (Nov. 2, 2012).

¹⁰⁵ See *State of the States*, *supra*, at 83 (citing U.S. Census Bureau, 2012).

¹⁰⁶ Rob Sinclair, Microsoft Will Help Launch a New Association for Accessibility Professionals (December 17, 2013); available at: <http://blogs.msdn.com/b/accessibility/archive/2013/12/17/microsoft-will-help-launch-a-new-association-for-accessibility-professionals.aspx> (accessed on December 22, 2013).

¹⁰⁷ See Jutta Treviranus, You say tomato, I say tomato, let’s not call the whole thing off: the challenge of user experience design in distributed learning environments, *eLiterate* (July 1, 2008); available at: <http://mfeldstein.com/you-say-tomato-i-say-tomato-let%E2%80%99s-not-call-the-whole-thing-off-the-challenge-of-user-experience-design-in-distributed-learning-environments/> (accessed January 22, 2014).

¹⁰⁸ See Gary Heil, Tom Parker, & Deborah C. Stephens, *One Size Fits One: Building Relationships One Customer and One Employee at a Time* (1999); Jordan Novet, The web isn’t one-size-fits-all anymore, so the as-a-service world just keeps on growing, Gigacom (May. 31, 2013); available at: <http://gigaom.com/2013/05/31/the-web-isnt-one-size-fits-all-anymore-so-the-as-a-service-world-just-keeps-on-growing/> (accessed June 6, 2013); WebAim, Design Considerations, *supra*. One Size Fits All? (2013) available at: <http://webaim.org/articles/design/> (accessed June 6, 2013).

¹⁰⁹ Compare One size fits one: tailoring technology to consumer needs, *Knowledge@Wharton* (April 20, 2005); available at: <http://knowledge.wharton.upenn.edu/article.cfm?articleid=1178> (June 6, 2013).

¹¹⁰ Tim Berners-Lee, *Weaving the Web*, at 159 (1999), at 168. See also G. Liotta, E. DiGiacomo, R. Magni & F. Corradi, Web solutions for rehabilitation and daily life, in *Assistive Technology Assessment Handbook*, Stefano Federici & Marcia Scherer (Eds.), at 366 (2012); Rich Picking, Alexia Robinet, John McGinn, Vic Grout, Roberto Casas, & Ruben Blasco, The Easyline+ project: evaluation of a user interface developed to enhance independent living of elderly and disabled people, *Universal Access in the Information Society*, 11, 99–112 (2012).

development of knowledge, but also be central to the management and growth of a free and open information society.¹¹¹

Functional Access

Although aspects of online solutions will increasingly be tailored for all persons, the WCAG 2.0 and other standards will also have trended towards functional use criteria for universal applicability.¹¹² Discussion will not be one of whether online services must be universally usable versus disability-specific. Consider Elizabeth Ellcessor's view that "[e]quality does not require uniformity,"¹¹³ nor need it result in mediocrity. Rather, personalization as an option will be offered across a range of digital inclusive environments.

Ideally, corresponding concepts of accessibility and usability will fade, replaced by a paradigm shift towards innovation in web content regardless of disability. The inventor of the web, Tim Berners-Lee, understood this centrality of choice and cohesiveness to web content equality when he said that its "flexibility and openness" make it possible "to build services and applications that are truly accessible for people with disabilities, as well as people who need to transform content for purposes other than that for which it was originally intended."¹¹⁴ To "transform content for purposes other than that for which it was originally intended" is to provide meaningful and autonomous choice in the web ecosystem. It is to reach diverse audiences, without stifling innovation and creativity, without trampling on individual privacy, and by spurring market growth and consumer loyalty, and importantly, participation in one's community.

Before there was established law on the right to the web, Berners-Lee said:

we have to be careful that [the web] allows for a just and fair society. The Web must allow equal access to those in different economic and political situations; to those who have *physical or cognitive disabilities*; those of different cultures; and those who use different languages with different characters that read in different directions across a page.¹¹⁵

A number of coming technologies will further support an inclusive web. The semantic web will give way to a cloud-driven semantic web, a "social-semantic" web¹¹⁶ that will provide the opportunity for contextually aware multichannel communications,

¹¹¹ See Gregg C. Vanderheiden, Jutta Treviranus, Maria Gemou, Evangelos Bekiaris, Kasper Markus The Evolving Global Public Inclusive Infrastructure (GPII) in *Universal Access in Human-Computer Interaction. Design Methods, Tools, and Interaction Techniques for eInclusion, Lecture Notes in Computer Science* Volume 8009, 2013, at 107–116.

¹¹² Simon Harper & Yeliz Yesilada, Chapter 11 – Web accessibility: current trends, 172–90, at 175, in *Handbook of Research on Personal Autonomy Technologies and Disability Informatics* (ed. Javier Pereira) (2011).

¹¹³ Ellcessor, *supra* at 346. *Id.* at 347.

¹¹⁴ See Timothy Berners-Lee, Testimony Before the United States House of Representatives Committee on Energy and Commerce Subcommittee on Telecommunications and the Internet Hearing on the "Digital Future of the United States: Part I – The Future of the World Wide Web", at 1, 4 (Mar. 1, 2007) [hereinafter Berners-Lee 2007 Testimony].

¹¹⁵ Berners-Lee, *supra* at 165 (emphasis added).

¹¹⁶ Mark Greaves & Peter Mika, Editorial, Semantic Web and Web 2.0, *Web Semantics: Science, Services and Agents on the World Wide Web*; 6, 1–3, at 1 (2008).

using facial expressions and tone of voice, eye blinks and movements, gestures, and sign languages.¹¹⁷

Denis Anson believes that such breakthroughs will facilitate mass interoperability and personalization among the components of the entire online ecosystem.¹¹⁸ Legal and policy regimes domestically and transnationally will need to keep pace with these advances to support and not stymie harmonization and innovation in web content ownership, licensing and open source agreements, and user agents built into the systems and accessed externally by web interfaces and the cloud.¹¹⁹ Like law and policy, these systems will experience constant updating, given dynamic operating schemes and websites, and the means to aggregate and summarize web content.

These imaginings follow on existing automation capabilities to simplify user interfaces. Yury Puzis and his colleagues comment that screen reader software presently allows users to develop their own macros for automation of certain tasks, such as to look up unknown words in a dictionary.¹²⁰ These researchers, and others, are examining the means to automate web content to reduce unnecessary cognitive load and to maximize cognitive flourishing. The release of Microsoft's Windows 8, and its built-in AT, hints at some of the opportunities for personalization of web content.¹²¹ For people with cognitive and other disabilities, consider its "Ease of Access Center," with customizable commands.¹²²

HCI researchers are developing on-demand analytics for web content that incorporate individual learning, and reading histories and styles. IBM researcher Eser Kandogan is developing "just-in-time descriptive analytics" using means in real-time "to help users easily understand the structure of data as seen in visualizations."¹²³ Kandogan's image-to-text analytics identify informational trends automatically and are able to "decrease the cognitive load on users by automatically explaining structure in real-time as they interact."¹²⁴ The annotation model is user-driven at the time of interaction to enhance understanding. With a similar outcome in mind, Bill Gates

¹¹⁷ See, e.g., Aleksandra Krolak & Pawel Strumillo, Eye-blink detection system for human-computer interaction, *Universal Access in the Information Society*, 11:409-419, at 418 (2012). See, e.g., Whistle (2013) (web-based monitor for dogs); available at: <http://www.whistle.com/company/> (accessed June 13, 2013); Mike Hendricks & Roxie Hammill, New devices mind pets while owners are away, *New York Times* (September 11, 2013) (listing products similar to Whistle); available at: http://www.nytimes.com/2013/09/12/technology/personaltech/new-devices-mind-pets-while-owners-are-away.html?src=day&_r=1& (accessed September 12, 2013).

¹¹⁸ Denis Anson, Email to author and attached memorandum (March 20, 2013) (available from author) (hereinafter "Anson Memo," and discussed *passim*).

¹¹⁹ In 2013, NIDRR issued the proposed research priority "Inclusive Cloud and Web Computing" (Fed. Reg., Vol. 78, No. 10, at 2919-23 (January 15, 2013)). See also Anson Memo, *ibid*.

¹²⁰ Puzis et al., *supra* at 42.

¹²¹ Accessibility in Windows 8 (2013) (*passim*); available at: <http://www.microsoft.com/enable/products/windows8/> (accessed June 6, 2013). Compare, Anirban Lahiri, Is Windows 8 a Step Back in Accessibility?, SSB Bart Group (Oct. 31, 2012); available at: <https://www.ssbartgroup.com/blog/2012/10/31/is-windows-8-a-step-back-in-accessibility/> (accessed June 6, 2013); Mardon Erbland How good are Windows 8 accessibility features for the blind?, betanews (2012); available at: <http://betanews.com/2012/03/02/how-good-are-windows-8-accessibility-features-for-the-blind/> (accessed June 6, 2013).

¹²² See, e.g., Jessica Hullman, Nicholas Diakopoulos, & Eytan Adar, Contextifier: Automatic Generation of Annotated Stock Visualizations, ACM CHI 2013 (April 27-May 2, 2013); David McNaughton & Janice Light, The iPad and mobile technology revolution: Benefits and challenges for individuals who require augmentative and alternative communication, *Augmentative and Alternative Communication*, 29 (2), 107-16, at 109, 110 (2013).

¹²³ See Eser Kandogan, Just-in-time annotation of clusters, outliers, and trends in point-based data visualizations, *IEEE Transactions on Visualization and Computer Graphics*, 73-82, at 73 (2012).

¹²⁴ Kandogan, *ibid* at 73-74.

and his co-inventors recently submitted a patent filing for a technology application to autogenerate video from electronic text.¹²⁵ These advances will enhance web content equality through the integration of automated annotation and summarization techniques with semantic, perceptual, cognitive, communication, lingual and features based on personal preferences and capabilities, all in real time.

The W3C and other groups are developing complementary tools to support the inclusive web, such as the Web Ontology Language (OWL V.2), for web applications to process content.¹²⁶ Ontologies are vocabularies of web content – terms, words, microformats, and metadata – organized by rules and their relationships to other terms.¹²⁷ These capabilities, when combined with collective and machine-based knowledge from cataloguing and search capabilities, offer personalized opportunities for people to interact with the web. The late disability leader and historian Paul Longmore pointed out that critics of disability rights laws complain that people with disabilities “want it both ways;” that is, to have equality and full integration along with the opportunity for “special treatment” such as accommodations.¹²⁸ In the advancing world of the web, both are possible, not only for the disabled, but for all. The full and equal enjoyment of the web means the opportunity for equivalent and comparable engagement, but not necessarily identical usage.

Return on eQuality

Online service providers thus face a convergence of markets and demographic forces – vast numbers of new and aging consumers with divergent interests and needs, increased cognitive complexity and situational disability (noise and visual distraction, low lighting, and so forth) – in the use of online services.¹²⁹ The obvious trend is towards use of mobile devices with cloud infrastructures, and legal and regulatory domestic and transnational standards developments.¹³⁰

These shifts are not lost on Wall Street, as investment follows recognition of new and expanding markets. Whether for raising operational capital or business valuation by financial analysts and shareholders, web content equality is an asset to be prized, akin to the assessment made of a company’s physical real estate for sustainable environmental purposes. Business valuation may be determined by market penetration, as measured

¹²⁵ See Victoria Slind-Flor, Bill Gates, HP, Warner Music, Deere: intellectual property, *Bloomberg News* (August 20, 2013); available at: <http://www.businessweek.com/news/2013-08-20/bill-gates-hp-warner-music-deere-intellectual-property> (accessed Sept. 3, 2013).

¹²⁶ See W3C, OWL Working Group; available at: http://www.w3.org/2007/OWL/wiki/OWL_Working_Group (accessed Nov. 13, 2012).

¹²⁷ See W3C, OWL 2 Web Ontology Language Document Overview, W3C Recommendation (October 27, 2009); available at: <http://www.w3.org/TR/owl2-overview/> (accessed Nov. 13, 2012). See also Anupriya Ankolekar, Markus Krotzsch, Thanh Tran, & Denny Vrandečić, The two cultures: mashing up Web 2.0 and the semantic web, *Web Semantics: Science, Services and Agents on the World Wide Web*, 6, 70–75, at 71 (2008).

¹²⁸ Paul K. Longmore, Disability policy and politics: considering consumer influences, *Journal of Disability Policy Studies*, 11: 36–44, at 43 (2000).

¹²⁹ See, e.g., Hugo Nicolau, Disabled ‘R’ all: bridging the gap between health and situational induced impairments and disabilities, *Sigaccess Newsletter*, 102, at 21–24 (Jan. 2012).

¹³⁰ These ideas stimulated by Richard Schwerdtfeger, Presenter at the State of the Science Workshop, Trace Center (August 31, 2012). Schwerdtfeger is CTO for the Accessibility IBM Software Group. See also Richard S. Schwerdtfeger, Making the GUI talk: new technology holds promise for blind and learning-disabled people who live in a GUI-oriented world, IBM. *BYTE* (1991); available at: <ftp://ftp.software.ibm.com/sns/sr-os2/sr2doc/guitalk.txt> (accessed September 1, 2012).

by web equality in terms of service usability by diverse and repeat customers in growing markets.¹³¹ Amazon reports that the majority of its e-commerce business is from repeat customers, and shoppers who visit Amazon have high sales conversion rates.¹³² Other studies show the benefits of corporate social responsibility (CSR) programs to brand loyalty.¹³³ Research is needed on CSR benefits in the online space to document this value proposition – benefits from management leadership and commitment to accessibility, and to usability testing, as related to organizational image, reputation, customer loyalty, and shareholder value.¹³⁴

Regulations

When industry self-regulation and monetization are not sufficient, laws and prescriptive standards are needed to safeguard against service provider paternalism, unfair practices, non-consensual data collection, and censorship. This is particularly the case for those least able to participate and with the least power to exert pressure for web content equality. This is the *sine qua non* for disability rights laws and their global expression in the CRPD, and the reason why advocates fiercely defend their principles.

Supporters believe that the law is but one piece of a larger and progressive policy framework of the political, economic and social ecosystem needed to eliminate disability discrimination in educational, employment, health care, housing, governmental support programs, and in access to the built and digital environments. But there are contradictions and conflicts in the operation of many of these laws and policies as affecting persons with disabilities.¹³⁵ Changes in law and policy have been achieved incrementally and through the cumulative effects of advocacy, where discrimination is challenged and brought to the fore. But litigating disability rights has resulted in advances and retrenchment.

¹³¹In a 2000 study of the web's 50 most popular sites, Terry Sullivan and Rebecca Matson found that Amazon, Google, and Microsoft were generally ranked as accessible and usable. See Terry Sullivan & Rebecca Matson, Barriers to use: usability and content accessibility on the web's most popular sites, *ACM Proceeding CUU '00 Proceedings on the 2000 conference on Universal Usability*, 139–144, at 144 (2000).

¹³²See Titus Hoskins, What Amazon shows us about achieving higher conversion rates, *SiteProNews* (December 30, 2011); available at: <http://www.sitepronews.com/2011/12/30/what-amazon-shows-us-about-achieving-higher-conversion-rates/> (accessed November 21, 2012).

¹³³See Technosite et al., eAccessibility Impacts: SMART 2009–0072, D7 Final Report (June 2012) (I served as advisor to this report); available at: <http://www.eaccessibility-impacts.eu/researchResults.aspx> (accessed December 5, 2012) at 56–57 (citing, e.g., Manuela Weber, The business case for corporate social responsibility: A company-level measurement approach for CSR, *European Journal of Management*, 26, 247–261, at 259 (2008)). See also Peter Linkow, with Linda Barrington, Susanne Bruyère, Ivelys Figueroa, & Mary Wright, Leveling the playing field: Attracting, engaging, and advancing people with disabilities, *The Conference Board, Research Report*, R-1510-12-RR, at 29–30 (Feb. 2013)

¹³⁴Southwest Airlines and Travelocity are sponsors of programs with the National Federation of the Blind to ensure their online services are fully accessible and usable. After the *Target* litigation, Target.com improved its web accessibility and usability. See NFB, *Imagineering Our Future*, Issue 43 (July 2012); available at: <http://nfb.org/wiki/imagineering-our-future> (accessed July 24, 2012). See also Jonathan Frank, Web accessibility for the blind: corporate social responsibility or litigation avoidance?, *Proceedings of the 41st Hawaii International Conference on System Sciences*, 1–8, at 5–6 (2008) (Target and retailers improved accessibility of websites after the *Target* litigation); available at: <http://www.computer.org/comp/proceedings/hicss/2008/3075/00/30750284.pdf> (last viewed July 26, 2012); Eleanor T. Loiacono, Nicholas C. Romano, Jr., & Scott McCoy, The state of corporate website accessibility, *Communications of the ACM*, 52 (9), 128–32 (Sept. 2009) (modest improvements over time); Eleanor T. Loiacono & Soussan Djamasbi, Corporate website accessibility: Does legislation matter?, *Universal Access in the Information Society*, 12, 115–124, at 120 (2013) (accessibility testing related to usability testing).

¹³⁵See generally Bagenstos (2009), *supra*; Robert Silverstein, The emerging disability policy framework: a guide for developing public policy for persons with disabilities, *Iowa Law Review*, 85, 1691–1796 (2000).

Yet, to imagine the world without an ADA and the CRPD is to envision continued segregation, where human separation on the basis of functional difference alone is accepted. In this world, disabled individuals and their families are unable to participate fully in the web of things. There is little tolerance for individual difference and accommodation of dissimilarity. Fundamental human liberties take on a skewed meaning, with equal participation only for some. Unfortunately, the community of individuals with cognitive disabilities and their families know what it is like to live in such as world.¹³⁶ In the ADA and the CRPD, however, as former U.S. Attorney General Dick Thornburgh has said, “the world community has taken an important – and long overdue – step toward bringing people with disabilities all over the world into the mainstream of the human rights.”¹³⁷

Advocacy

Leading advocates typically try to resolve disputes without litigation. Rather than a reactive, “wait and see” strategy, many advocates partner with organizations large and small, public and private, in innovative ways to remove barriers.¹³⁸ Sometimes, cooperative and structured negotiations and agreements are used to resolve the issues.¹³⁹ Michael Waterstone and his colleagues find that, on the whole, disability cause lawyers do not attempt to create new legal rights, as much as they seek to leverage existing laws to change behavior collaboratively and with litigation only when necessary.¹⁴⁰ But even with public and private attorney engagement, the ADA’s access provisions remain under-enforced, which perpetuates a cycle of non-compliance and reactive approaches.¹⁴¹

When informal resolution is not possible, organizations respond to the litigation, or the threat of it.¹⁴² Hard-fought litigation is costly, not just in financial terms, but also in the lost opportunity to enhance services and expand a loyal consumer base. Although stymied initially perhaps because of a resistant organizational culture, lack of effective top leadership, or simply bad legal advice, many of the cases discussed herein eventually resolve in consideration of combined legal and market forces.¹⁴³ This impact

¹³⁶ See, e.g., Harold Pollack, Do liberals disdain the disabled?, *New York Times* (February 27, 2012); available at: http://www.nytimes.com/2012/02/27/opinion/do-liberals-disdain-the-disabled.html?_r=2 (accessed July 6, 2012).

¹³⁷ Dick Thornburgh, Respecting the Convention on the Rights of Persons with Disabilities, Testimony before the Foreign Relations Committee of the U.S. Senate (July 12, 2012); available at: http://www.foreign.senate.gov/imo/media/doc/Dick_Thornburgh_Testimony.pdf (accessed July 13, 2012).

¹³⁸ Compare Jeb Barnes & Thomas F. Burke, The Diffusion of Rights: From Law on the Books to Organizational Rights Practices, *Law & Society Review*, 40 (3), 493–524 (2006).

¹³⁹ See, e.g., Lainey Feingold, *Disability Rights Legal Advocacy* (2012); available at: <http://lfllegal.com/> (accessed Aug. 17, 2012).

¹⁴⁰ Waterstone, Stein, & Wilkins, *Cause Lawyers*, *supra* at 1330–31.

¹⁴¹ The U.S. DOJ’s Project Civic Access is an example of a nationwide proactive endeavor to encourage state governments to implement the ADA to eliminate barriers that prevent people with disabilities from participating fully in their communities. See Project Civic Access; available at: <http://www.ada.gov/civica.htm> (accessed July 6, 2012). See also Michael Waterstone, The Untold Story of the Rest of the Americans with Disabilities Act, *Vanderbilt Law Review*, 58, 1807, 1853–54 (2005).

¹⁴² Barnes & Burke, *supra* at 514.

¹⁴³ Barnes & Burke suggest that the “presence of litigation, while not necessary [alone] to stimulate an organizational response, still made a big difference,” and as such in some cases “litigation was an integral part of creating an internal organizational system that created the most proactive and systematic rights practices.” Barnes & Burke, *ibid* at 515. *Id.* at 516.

quickly ripples through a business sector, in which some organizations choose to embrace the opportunity that comes with change, while others resist.¹⁴⁴

The stink of disability segregation, however, is apparent in the many life stories discussed earlier. Aptly, Sam Bagenstos has written:

A single step in front of a store may not immediately call to mind images of Lester Maddox standing in the door of his restaurant to keep blacks out. But in a crucial respect they are the same, for a step can exclude a person who uses a wheelchair just as surely as a no-blacks-allowed rule can exclude a class of people.¹⁴⁵

Inaccessible and unusable web content sends the same message to persons with cognitive disabilities; keep out of the web. Inclusion and active participation has always been the remedy to segregation, and they are the principles set out in disability rights laws for equal opportunity, independent living, and economic self-sufficiency.

U.S. disability non-discrimination law has yet to be applied systematically to web content equality for people with cognitive disabilities.¹⁴⁶ For many persons with cognitive disabilities, however, reasonable and appropriate choices for online readability, navigation, and language are available, without affecting web content meaning.¹⁴⁷ Web content accessibility and usability are interrelated dimensions, each intimately tied directly to the user experience.¹⁴⁸ Designers and online service providers, as well as other stakeholders, progressively understand that their choices and attitudes profoundly affect web content equality for increasingly diverse and global users, with and without disabilities.¹⁴⁹

“We” Means All of Us

At its 2013 conference, the assembly of the Coleman Institute adopted a *Declaration of the Rights of People with Cognitive Disabilities to Technology and Information Access*.¹⁵⁰ The

¹⁴⁴ And yet, in their studies of 10 organizational responses to title III’s physical wheelchair access requirements, Barnes and Burke “did not find examples in which organizations that failed to comply with access law were similarly stigmatized; in fact, it was the *enforcers* of the law – lawyers and plaintiffs who brought access complaints – who were often criticized in media accounts of controversies over access.” See Jed Barnes and Thomas F. Burke, Making Way: Legal mobilization, organizational response, and wheelchair access, *Law & Society Review*, 46 (1), 167–98, at 178 (2012) (emphasis in original).

¹⁴⁵ Bagenstos, The perversity of limited civil rights remedies: The case of “Abusive” ADA litigation.” *UCLA Law Review* 54, 1–38, at 25 (2006).

¹⁴⁶ Eve Hill, Legal and policy implications of cloud computing, *Lecture Notes in Computer Science*, 6765, 478, 481 (2011).

¹⁴⁷ See generally Steven E. Stock, Daniel K. Davies Michael L. Wehmeyer, & Yves Lachapelle, Emerging new practices in technology to support independent community access for people with intellectual and cognitive disabilities, *NeuroRehabilitation*, 1; 28(3): 261–9 (January 2011). For review, see also Catherine Easton, The Web Content Accessibility Guidelines 2.0: an analysis of industry self-regulation, *International Journal of Law & Information Technology*, 19 (1), 74–93, at 89–92 (2010).

¹⁴⁸ See, e.g., Accessibility vs usability, *Internet Magazine* (2004); available at: http://www.sean.co.uk/a/webdesign/inet_website_accessibility.shtm (accessed July 5, 2012)

¹⁴⁹ Evelyn Lee Barney, Designing Websites for Universal Usability, at 8–10 (November 17, 2011); available at: <http://elbarney.com/accessibility/PDF/universal%20usability.pdf> (accessed August 5, 2012).

¹⁵⁰ Coleman Institute for Cognitive Disabilities, Declaration of the Rights of People with Cognitive Disabilities to Technology and Information Access, Thirteenth Annual Coleman Institute National Conference on Cognitive Disability and Technology, Broomfield, Colorado (October 2, 2013); available at: <http://www.colemaninstitute.org/declaration> (accessed January 21, 2014) (almost 150 organizations have endorsed the declaration). See also David Braddock, Jeffery Hoehl, Shea Tanis, Enid Ablowitz, & Laura Haffer, The rights of people with cognitive disabilities to technology and information access, *Inclusion*, 1 (2), 95–102 (2013) (providing an excellent overview).

declaration recognizes that people with cognitive disabilities are entitled to full inclusion under law, which includes the right to web equality. This means the opportunity to use and comprehend online information to promote independence and self-determination in support of individual security, privacy, and dignity. The pronouncement calls for the achievement of web equality with all deliberate speed.¹⁵¹ In the U.S., it may be that amending the ADA and/or revising its implementing regulations will be needed to ensure that web content equality is a right available to all persons with disabilities.¹⁵²

The life stories discussed earlier demonstrate the very personal commitment to achieving web content equality. Although Robert lost his fight to make the Southwest Airlines website usable, today Southwest is a partner of the NFB. Bruce, Melissa, and James, who are blind, championed their right for the equal use of Target.com, which today is more accessible and usable to all. Netflix is now committed to captioning all its online streaming media programming.

Tim Berners-Lee understood that the web loses its participatory integrity when its content is controlled by a few:¹⁵³ “I would like to keep the conduit separate from the content. *I would like there always to be a choice of the unbiased way*, combined carefully with the freedom to make commercial partnerships.”¹⁵⁴ This is what the self-advocates seek. Not to stymie web operations, market penetration, and creativity, but rather to have the choice to partake in the same ways as do others. Web content equality stimulates the free market just as it does free speech. Choice to participate does not sacrifice the voice of the minority; it embraces it.

The question we must then ask is not what the world would be like without web content equality, but why we would choose to live in a world without it. In the U.S., our Constitution is framed by all of us, “We the People.” U.S. Supreme Court Justice Ruth Ginsburg has written that those with disabilities are among the “people.”¹⁵⁵ Web content equality supports the liberties of independence and dignity, and the opportunity to participate in the human endeavor. With continued resolve, we will approach web *eQuality*, and this is bound to lead us all towards greater freedoms and individual flourishing.

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¹⁵¹ Given advances in technology, web equality for people with cognitive disabilities appropriately prohibits discrimination on the basis of functional characteristics in the presentation of web content and is responsive to individual modifications and accommodations to ensure equal web content. In other areas, Martha Fineman has commented that U.S. law has yet to approach this broader conception of equality that protects individuals against societal discrimination on the basis of disability, what she calls “certain inherent individual characteristics,” and constitutes “a universal right to access social and economic goods based on individual needs, aspirations, and achievement of personal security.” See Martha Albertson Fineman, *Beyond Identities: The limits of the antidiscrimination approach to equality*, *Boston U. Law Review*, 92, 1713–70, at 1724 (2012).

¹⁵² See also Fineman, *supra*, at 1748–50. *Id.* at 1736 (“a discrimination model built around personal characteristics or identities will not be sufficient to meaningfully ensure equality of access and opportunity unless accompanied by measures that take into account structural disadvantages” in society). Conceptions of digital “information justice” are pursued at American University Washington College of Law’s Program on Information Justice and Intellectual Property; available at: <http://www.wcl.american.edu/pijip/go/about-pijip/> (accessed April 9, 2013).

¹⁵³ Berners-Lee, *supra* at 132.

¹⁵⁴ Berners-Lee, *supra* at 132 (emphasis added).

¹⁵⁵ *Tennessee v. Lane*, 541 U.S. 509, at 536 (2004).

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