

A Consideration of Voting Accessibility for Injured OIF/OEF Service Members: Needs Assessment

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Annotated Literature Review Results

Accessibility of Voting Systems

Appelbaum, P. S. (2000). "I vote. I count": Mental Disability and the right to vote. *Psychiatric Services*, 51(7),849-850.

Despite advances in suffrage rights for other groups, individuals with mental disabilities still experience significant barriers to voting. The authors discuss nationwide considerations of mental fitness for voting. With advances in technology, the mental requirements for voting are constantly changing. For example, some modern voting machines do not require voters to be able to read, because the machine can read to the voter. Legislatures should keep pace with technological advances and societal sentiments.

Bundy, H. (2003). Election reform, polling place accessibility, and the voting right of the disabled. *Election Law Journal*, 2(2),849-850.

Historically, much of the focus on improving voting accessibility has been directed towards issues of polling place accessibility, while voting machine accessibility has received less attention. Despite this insight, the paper mostly addresses physical accessibility issues and associated laws and litigation. Special attention is given to the Help America Vote Act (HAVA) of 2002. Although HAVA omits many significant accessibility requirements, it explicitly references previous laws that cover those requirements.

Election Assistance Commission (2010). Election Management Guidelines, Chapter 19: Accessibility.

This chapter on voting accessibility provides many examples of ways to improve accessibility. Recommendations for how to incorporate these good practices into all aspects of election administration are provided. The chapter recommends that election officials seek assistance from community groups that support individuals with disabilities. This is a unique source of recommendations for appropriate behavior by poll workers as they interact with disabled voters, and the authors recommend specific training for this purpose. This is also one of the few sources that discuss the accessibility of mail-in ballots; it described a system whereby voters complete a ballot on their home computer (which is accessible), print the ballot, and mail it in.

Goler, J. A., Selker, E. J., & Wilde, L. F. (2006). *Augmenting voting interfaces to improve accessibility and performance*. Paper presented at the CHI 2006 Workshop, Montreal, Canada.

Approximately one in seven voters is reading disabled (RD). The error rates between RD voters and non-RD voters using current voting technologies differ considerably. Previous research has indicated that RD voters are less likely to make errors when voting using a full-faced screen whereas non-RD voters are less likely to make errors when voting using a page-by-page system. The Low Error Voting Interface (LEVI) was created in an effort to improve performance for all voters. The next goal for the Caltech/MIT voting technology project is to improve the LEVI for RD voters.

Human-Centered Computing Lab, Clemson University (n.d.). Prime III. Retrieved from <http://www.primevotingsystem.com/>.

The Human Centered Computing Lab at Clemson claims that the electronic voting system (Prime III) developed by the lab is the world's most accessible voting system. The key to the system to visibility is its multimodal interface and easy to use design that can accommodate users with a wide variety of disabilities. Assistance is only required at the beginning of the voting process, when a poll worker initiates the voting session. Voters can interact with the system by touch or voice, via a touchscreen or microphone, respectively. Ballot information is provided visually and audibly. When an audio-speech interface is used, the order of candidate names is randomized so that voter privacy is ensured.

Keller, A. M., Dechert, A., Auerbach, K., Mertz, D., Pearl, A., & Hall, J. L. (2005). *A PC-based open-source voting machine with an accessible voter-verifiable paper ballot*. Paper presented at USENIX '05, Anaheim, CA.

A variety of social, practical, and economic considerations are pushing a patron to tour the adoption of computerized voting systems in lieu of mechanical systems. In general, computerized voting systems provide more opportunity than mechanical systems for accommodating voters with disabilities. However, most computerized voting systems do not provide a voter-verifiable paper audit trail (VVPAT). A solution is to simply create a computerized voting system that provides the voter with a printout of the voted ballot, which the voter can then take to a separate machine for verification. This dual-system design reduces susceptibility to malicious tampering. This is one of the few solutions available for providing a VVPAT to blind voters.

Kruse, D. L., Schriener, K., Schur, L., & Shields, R. (1999). A study of the political behavior of people with disabilities, what determines voter turnout. Executive Summary: Empowerment through Civic Participation. Final Report to the Disability Research Consortium Bureau of Economic Research, Rutgers University and New Jersey Developmental Disabilities Council. Retrieved from <http://www.independentliving.org/docs5/disvoters.html>.

This study conducted a telephone survey containing general questions about voting, including difficulties at the polling place, with transportation, and abilities. The results indicated that people with disabilities were more likely to experience difficulties at the polling place than those who did not have disabilities, and that this differentially affects voter turnout for the two groups. The study concluded that greater attention needed to be given to accessibility at the polling place.

Roth, S. K. (1998). Disenfranchised by design: Voting systems and the election process. *Information Design Journal*, 9(1), 29-38.

This is considered one of the seminal papers on voting accessibility, and one of very few papers on the topic written before the 2000 election. It discusses the evaluation of voting systems from the human factors perspective. Although it deals with a somewhat outdated electronic voting system, its methods and the accessibility concerns it raises are still relevant today. The organization and format of ballots can raise accessibility issues, regardless of the type of technology upon which the ballot is displayed.

Roth, S. K. (n.d.). Human factors research on voting machines and ballot designs: An exploratory study.

This paper provides historical overview of voting technologies and associated usability issues up to and including the U.S. elections in 2000. After summarizing a number of usability issues associated with systems used historically, the author proposes that the ease of use of future voting technologies be assessed according to six criteria, including: ease of use; accessibility to voters with disabilities; information design; reduction of user error; reduction of intentional under voting; and time required to vote.

Selker, E. J., Goler, J. A., & Wilde, L. F. (2005). Who does better with a big interface? Improving voting performance of reading disabled voters. Unpublished manuscript.

Three electronic voting systems were compared to examine how different voting systems affect the performance of voters with reading disabilities. Two of the systems were full-faced systems where all races and selections are displayed simultaneously. The third system was a touchscreen system where only a few races are presented on each screen. The authors found that voters with a diagnosed reading disability performed worse on the touchscreen system and better on the full-faced systems than did the control group. Voters who had not previously been diagnosed with a reading disorder but performed poorly on the reading test had the largest number of errors for all three systems. The results suggest that individuals with known reading disabilities have learned coping techniques that allow them to interact effectively with the full-faced system. Individuals with undiagnosed reading disabilities have not learned these coping techniques, so they were the most error-prone for all three systems. The authors suggest that a hybrid design incorporating the advantages of both systems will be beneficial to all users.

Smith, B., Laskowski, S., & Lowry, S. (2009). *Implications of graphics on usability and accessibility for the voter*. Paper presented at E-Voting and Identity: Second International Conference, Luxembourg.

The use of graphical elements, such as icons, thereof, and alerts symbols, raise usability and accessibility issues. Certain types of graphical elements may enhance usability for individuals with disabilities. For example, graphical elements might be particularly beneficial for voters who have low reading ability. Also, animations might be beneficial for conveying instructions. However, empirical studies are needed to validate these conclusions.

The Ragged Edge. (2000). Voters with disabilities face discrimination nationwide. Retrieved from <http://www.raggededgemagazine.com/1100/1100votestory.htm>.

This article gives some specific anecdotes related to barriers to accessible voting. People describe inaccessible polling places and barriers to voting in private.

Trace Center, University of Wisconsin-Madison. (2008). Voting accessibility. Retrieved from <http://trace.wisc.edu/voting/>.

The Trace Center researches accessible voting. They created the EZ Access keypad, which helps make voting machines more accessible. This website provides presentations and publications by the Trace Center on voting accessibility.

United States General Accounting Office. (2001). *Voters with disabilities: Access to Polling Places and alternative voting methods*. Washington, DC: GAO.

This report was produced prior to the passing of the Help America Vote Act of 2002, and many of its findings were used to guide that Act. For instances in which an accessible voting place is not available, alternative methods for voting are suggested. These include options such as curbside polling, absentee voting, and Internet voting. Advantages and disadvantages associated with each alternative method are discussed.

Vanderheiden, G. C. (2004). Using extended and enhanced usability (EEU) to provide access to mainstream electronic voting machines. *Information Technology and Disabilities*, X(2), retrieved from <http://trace.wisc.edu/docs/2005-EEU-voting/>.

Many precincts offer two types of voting machines: a “normal” machine and an accessible machine. Some voters, such as older adults and recently injured individuals, may not realize that they need an accessible voting machine. If they attempt to use an inaccessible voting machine, they will experience difficulty. A solution to this problem is to employ a single type of voting machine that is accessible to all users. The authors conducted a series of usability and prototypes studies to identify possible solutions. The EZ Access keypad, developed by the University of Wisconsin, is a promising solution. It is a simple, wired controller that can be plugged into a voting machine. A system that employs an EZ Access keypad, speech input, and audio output could be highly accessible.