Journal of Usability Studies
Vol. 11, Issue 4, August 2016 pp. 124–130

Democracy Is a Design Problem

Dana Chisnell
Co-Director
Center for Civic Design
5443 Tates Bank Road
Cambridge, MD 21613
United States
dana@civicdesign.org

The Butterfly Ballot Changed Everything

It was a form—an election ballot—that changed everything about design in elections in the United States. It came to be called the *butterfly ballot*, and it was used in Palm Beach County, Florida in the presidential election in 2000.

Up to this point, a usable ballot was one that the voting system could reliably count.

It hadn't really occurred to anyone that a ballot is a designed artifact. The design of ballots was driven by what the voting systems and the election management systems could handle. Everyone in election administration assumed that the voting part was easy.

The butterfly ballot used a simple technology—a punch card—that first came into use in computing in the late 1950s. The punch card is a rectangle of card stock printed with a grid of numbers. Around each number is a perforated box called a *chad*.

For voting, the punch card slides into an apparatus behind pages that are similar to a book. The pages list the candidates for each office and any ballot questions. All of the candidates are listed on the left hand page. Each candidate is numbered. (See Figure 1.)

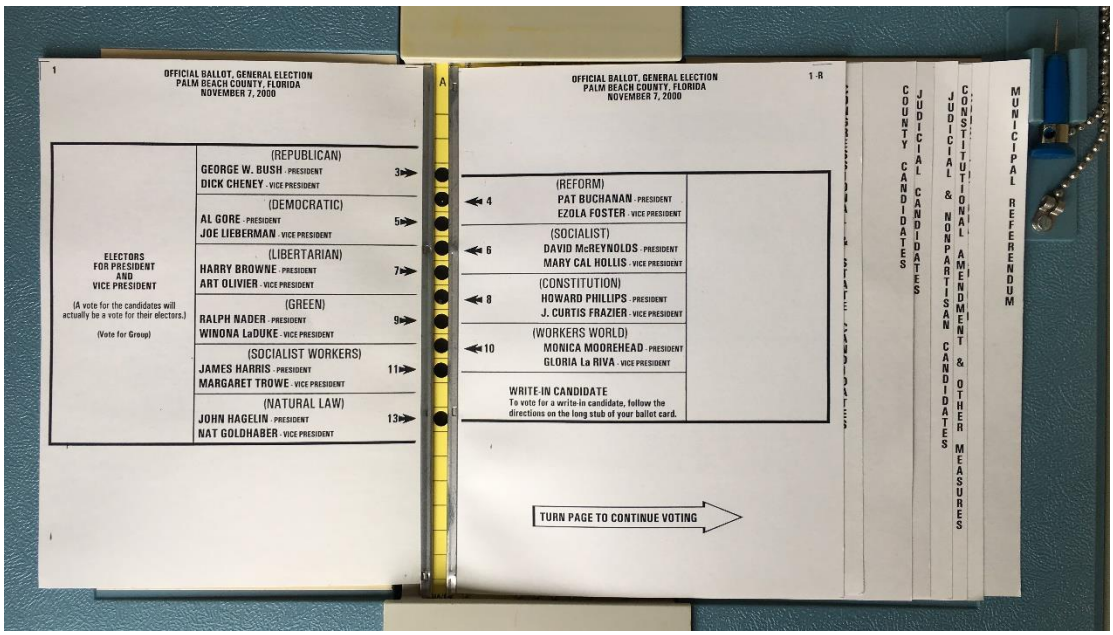

Figure 1. Butterfly ballot example of the 2000 presidential election (photo by Steve Krug).

Between each double-page spread is a column of holes. To vote, the voter pushes a pin through the hole that lines up with the candidate she wants to vote for. Pushing the pin through the hole with enough force pushes the appropriate chad out of the punch card. When the voter is done voting, she pulls the card out of the apparatus, puts it into a privacy envelope, and drops it into a ballot box. All the ballots are collected and then sent to a central processing location, where a computer that reads the holes in the punch cards quickly tabulates them all.

An interesting design decision made the Palm Beach ballot the butterfly ballot. The election official in charge of laying out the ballot knew she had lots of older voters. The voters had complained before about how small the type was on some of the listed offices.

She did what any self-respecting designer would do. She did what any of us would have done if we had been in the same situation. She increased the type size. This flowed the list of candidates over two pages, facing each other, interlaced. What could possibly go wrong?

So, in that election, on that ballot, if you wanted to vote for Al Gore and Joe Lieberman, you punched the third hole, even though they were listed second on the left hand page. If you pushed the pin through the second hole thinking you were voting for the second candidate, you actually cast a vote for Pat Buchanan and Ezola Foster. Thousands of voters went home from the polling place realizing that they had not voted the way they intended—they had voted for Pat Buchanan rather than Al Gore.

This tiny, apparently mundane change to try to do the right thing for voters turned out to be less-than-ideal usability.

How did we get here? Let me walk you through the factors in this important episode in the history of usability, some of the constraints, and how far we've come in 16 years. And then let's look at a few actions you can take to help continue the improvements.

This Incident Forced a New Focus on Voting System Design

There were several recounts of the ballots in Palm Beach County, Florida, in which ballots were examined closely by representatives from the two major political parties. And then there was a Supreme Court case challenging a recount. All of this generated a lot of discussion about the general state of voting systems in the United States.

It's the Technology

At the time, many of the over 5,000 voting jurisdictions in the US used a similar punch card system. New York State was still using mechanical lever machines (the last of which were taken out of commission in 2012). A rare few jurisdictions had moved to more modern systems already. (Rhode Island adopted paper optical scan voting systems in 1996. These are systems where the voter colors in a bubble or a box to mark their choice and a scanning machine reads the ballot to tally the votes.)

Congress and the voting system vendors saw an opportunity to modernize elections. The Help America Vote Act (HAVA) was introduced into Congress in November 2001. George W. Bush signed it into law in 2002. HAVA set aside $3.9 billion for states to buy new voting systems. The hope was that by moving to newer voting systems, voters would not make the same kinds of mistakes. Everyone assumed that the states would move to more modern touch screen systems.

But with new technology comes new problems. As touch screen systems rolled out and started to be used in elections, we saw new administrative problems. One key issue was that there was no physical artifact to recount. Many states have laws that automatically call for recounts when the elections are close. Candidates can also call for recounts.

It's the Usability

But there was another problem. It was also difficult for voters to verify that they had voted the way they intended. Though touch screen voting systems routinely show voters summaries of how they voted, these summaries were either difficult to understand or voters ignored them. People who research design in voting systems theorize that most voters don't review the summary before casting their ballot because they don't realize that casting the ballot is the next step. Many voting systems make it difficult to navigate back into the ballot to make changes. Voters weren't confident that they had made the right selections.

It's the Process

Elections are all about process. An election is a process built to protect the security of the ballots and the verifiability of the vote. It's a designed experience for voters, but it wasn't designed that way, intentionally. Instead, the service design of voting comes from centuries (if not millennia) of tradition and legislation. Local election officials exist to carry out the process. Most of them are excellent public servants. But like the person who made the decision to increase the type size on the butterfly ballot, they make their decisions about the design of the process based on limited data. The process drives the design of the voter experience.

Election officials tweak designs all the time. There are actually many more elections every year than most people realize, so there are excellent opportunities to make small, iterative improvements to solve problems. Unfortunately, the typical approach to solving usability problems in elections is to create another form or add time to training for poll workers. We've learned over the last decade or so that bandaging over usability problems doesn't work. It doesn't work because election officials think of the problems as process problems. But the problems are actually usability and user experience design problems.

Why Design in Elections Is Hard

Before 2005, people who designed voting systems didn't consider usability or accessibility much. The systems were engineered based on simple technology, in the service of collecting or registering votes. Voting system vendors did not involve voters in the design, and systems were not tested for usability. When the U.S. Election Assistance Commission asked AIGA to conduct research in 2006 to develop a best practice ballot design for optical scan voting systems, none of the voting systems on the market could actually support that ballot design. It has taken about 10 years to get to systems that do.

Technology doesn't come close to solving the problems. In fact, it creates them. Process is important, but you can't solve the whole problem through process changes. This isn't about design theory, it's about design practice.

Until recently, election officials didn't speak design or usability at all. They're generally not design-school designers, and they do not have designers on staff. They don't contract designers or usability specialists. They didn't see the need because there were other problems to solve—and because they didn't see the difference between good and bad design. They just knew they had pain. Election administrators *have been* actually doing design. But it is only lately that they are learning baseline usability techniques and guidelines that give them a shot at design literacy. They are quickly learning the value of design and how it can ease their pain. The uptake has been pretty amazing over the last few years. The improvements are remarkable. There are some great before-and-after examples at http://civicdesign.org/showcase/.

Advances in Election Design Literacy

What you may not know is that tools have been developed for election officials that make it easy for them to gain some design literacy to apply to a better design. (Full disclosure: I'm honored to have been involved in all of these projects, sometimes in minor roles, sometimes as a lead. More importantly, I've been fortunate to always get to work with world-class colleagues, like my co-director at the Center for Civic Design, Whitney Quesenbery; Ginny Redish; Sharon Laskowski of NIST; Kathryn Summers of University of Baltimore; Cyd Harrell; and Drew Davies of Oxide Design Co.—and so many others.)

One of the first tools to come on the scene came from a project of the then Usability Professionals Association. A group of practitioners and academics met up in 2006 to devise a few small documents that election officials could use as instructions and templates to run their own usability tests on ballots. It's called the LEO Usability Testing Kit (http://www.usabilityinciviclife.org/resources/leo-testing-kit/). The idea of untrained people running their own usability tests was scandalous at the time. But now, it's fairly common—even in election departments.

At about the same time, the AIGA was conducting a design research project for the Election Assistance Commission (EAC) on how people interact with ballots. They spent a year testing out designs with hundreds of voters. In 2007, the EAC published the findings along with extensive design specifications in a report called *Effective Designs for the Administration of Federal Elections* (http://www.eac.gov/election_management_resources/designing_polling_place_materials.aspx).

The National Institute of Standards and Technology (NIST) also commissioned research on voting system usability for voters and poll workers as they oversaw development of the Voluntary Voting System Guidelines (VVSG; http://www.eac.gov/testing_and_certification/voluntary_voting_system_guidelines.aspx). The VVSG includes guidance on voting system usability and accessibility. If voting system manufacturers want their systems to be legal for use in federal elections, their systems must be tested and certified to meet the VVSG guidelines.

One of the key people on the Effective Designs project, Marcia Lausen, director of the School of Design at the University of Illinois at Chicago and founder of the Chicago office of Studio/lab, tried to answer the question: *If election officials could just do a few things that were easy, cheap, and legal to improve the design of ballots, what would those things be?* In 2008, Marcia winnowed down hundreds of pages of design specs to 10 guidelines that the AIGA posted and the EAC started distributing to election officials.

Around 2010, money for design research projects related to voting started to dry up. At the same time, those of us working in this area realized that local election officials weren't using the big reports that the federal government published—Effective Designs and the NIST reports among them.

Marcia's Top Ten list was one of the inspirations for the *Field Guides To Ensuring Voter Intent* (http://civicdesign.org/fieldguides/). Each field guide includes 10 simple guidelines on a single topic based on design research and best practices. The first edition of the first four titles came out in 2012 with the support of the John D. and Catherine T. MacArthur Foundation and 320 generous Kickstarter backers. There are now 10 volumes covering everything from ballot design to accessible websites, with about 5,000 sets extant in the world.

Much of voting is focused on paper. But paper ballots are hard for people with disabilities to use. Designers know a lot about how to make technology accessible for people who are blind, have low vision, have hearing loss or are deaf, as well as people with mobility and dexterity problems. But what about accessibility for people with invisible disabilities? What would voting look like for people with low literacy or mild cognitive disabilities? The Anywhere Ballot (http://anywhereballot.com/) created a prototype digital ballot interface that incorporated all of the usability and accessibility guidelines from the VVSG along with new research about accessibility for people with low literacy, aphasia, and short-term memory loss. The pattern library (http://anywhereballot.com/library/) and code package for the Anywhere Ballot are open source and available on a Creative Commons license, funded by the Information Technology and Innovation Foundation from a grant from the EAC.

In 2013, Whitney Quesenbery and I formed the Center for Civic Design when we won a grant from Future of California Elections funded by the Irvine Foundation to study how California counties could meet information challenges for voters with low English proficiency and low involvement in elections. With the League of Women Voters, we conducted research in 2014 and 2015 with hundreds of people to create templates, guidelines, and webinars for election officials to use to write and design effective voter information guides (http://civicdesign.org/projects/how-voters-get-information/). This work continues into 2017 as we learn how well the voter guides worked in the elections in 2016.

Through a Knight Challenge, partners Center for Technology and Civic Life (CTCL) and the Center for Civic Design with election officials from Hillsborough (Florida), Inyo (California), and suburban Cook (Illinois) counties are developing and testing a civic engagement tool kit for election officials, including templates for accessible election websites that answer voters' questions about elections (http://electiontools.org/).

What Does the Future of Civic Design Look Like?

For the November 2016 U.S. presidential election, it's fairly likely that your ballot will be more usable, more accessible, and closer to plain language than ever before. This is especially true if you live in a large jurisdiction like Los Angeles County. But you'll also see improvements since the last general election across California, and in Ohio, New York, Florida, Pennsylvania, Virginia, Minnesota, Rhode Island, and Wisconsin.

If your jurisdiction has one of the newest touch screen voting systems, you may even interact with variations on the design of the Anywhere Ballot, which several of the voting system manufacturers have picked up parts of.

But what's next? Will voting always be like this? Interacting with a single-purpose machine in a polling place? The near future will give us new models for voting that combine personal devices, paper artifacts for tracking and recounts, and universal usability. For example, Los Angeles County and Travis County (Texas) are both designing their own voting systems, from the ground up.

In Los Angeles, the team there is exploring the idea that you'd mark a ballot on your own device, get a QR code with that data embedded, and then take that code to a vote center to get an official printout of your choices, which you can review, change if needed, and then cast. This way, voters can do research and vote on their own time, and their choices are private and secure. Vote centers mean that voters are no longer tied to a single polling place to cast ballots. Marking a ballot on your own device, along with rethinking what voting should be like in a polling place, means that more people who have disabilities will be able to vote privately and independently than ever before. The design and the technology are great, but it's also remarkable that Los Angeles has worked to include various communities in every step of design and development, including getting agreement on guidelines from both disability rights advocates and election security activists. These new systems should be ready in time for the next presidential election in 2020.

An incidental finding from our work in California showed us how important the Voter Bill of Rights, published in voter guides and on posters for polling places, is to voters who might otherwise be marginalized or disenfranchised. Whitney Quesenbery worked with the California Secretary of State's office and conducted an extensive community review that catalyzed major

changes in how the Secretary's office approaches important content like the Voter Bill of Rights. These changes in approach reach beyond voting and elections to everything that a Secretary of State controls.

One of the marvelous outcomes of this flowering of design in voting is that it has spilled over into other areas of civic life. We're also seeing attention to usability and accessibility in critical interactions that the public has with government at every level, from participatory budgeting for cities and counties, to protecting consumer finance and applying for citizenship at the federal level.

The movement is in no way exclusive to the United States. The United Kingdom's Government Digital Service (GDS) was established in 2011 to lead a digital transformation in delivering simpler, clearer, and faster services to the public using the Internet. After GDS came the United States Digital Service (formed by President Obama to help federal agencies modernize their technology and design processes and practices), and then 18F (a full-service U.S. government digital consultancy for hire by the federal government), the Digital Transformation Office in Australia and others like them in New Zealand, Finland, Belgium, France, and a dozen or so other countries.

What's Left and How to Help

We're just at the beginning of this enlightenment. There's still so much to do. And you can help. The options range from writing emails to digging in to some knotty problems.

Get government out of the business of specifying design. In every state, there are laws that include design specifications that are outdated or inappropriate. For example, in elections, the statutes include specified typefaces and sizes, grid and layout, and wording and placement of instructions. Email your legislators and urge them to remove this over-specification. Help them do the research and then draft new legislation that works better for voters and makes it easier for government to do good design.

Call for plain language. The single biggest complaint we hear when we conduct usability testing on ballots is that voters don't understand ballot measures, questions, propositions, and referenda. These will become laws if they pass, and they are often written in legalese—even the summaries that appear on the ballot. Again, contact your representatives in government and urge them to use plain language in their writing and to pass laws that require plain language on ballots.

Work on unsolved problems. Most of the low-hanging fruit has been picked. There are still many unsolved problems in design in elections. Just on ballots, we have questions about voter performance when there are many types of contests on the same ballot. Also, more and more jurisdictions are being required to provide ballots and voter information in languages other than English to comply with the Voting Rights Act. But how many languages can you have on one paper ballot before having the languages hurts more than it helps? What happens when you have several types of contests on a ballot and three or four languages as well? What could we learn from research about languages on ballots that would be useful on other forms?

Help locals know there are resources. If you live in a small city or a town, it's likely that your local government hasn't heard about any of the stuff I've written about here. You might know your mayor or your town clerk. If you do, tell them about the resources I've included, and offer to help. If you don't know your mayor or your town clerk, this is a chance for you to do some field research. Go introduce yourself. Ask to interview them about their biggest challenges, and learn how government works from the inside.

Sign up for civil service. If you look at job listings for local, state, or federal government—or for non-profits—you're unlikely to see openings for designers. But you might see roles for analysts who need design skills. Apply. Do public service for a year or two. Bring your private sector practices and community with you. Embed yourself for a while and soon you'll see the difference you'll make in the lives of thousands of people every day.

Acknowledgements

Big thank-yous go to Steve Krug for the photo of the butterfly ballot and especially to Whitney Quesenbery for so many years of excellent work in this space and her close read of drafts of this piece.

About the Author

Dana E. Chisnell
Ms. Chisnell, co-director of the Center for Civic Design with Whitney Quesenbery, is an elections nerd who researches design in elections. She has trained thousands of election officials on plain language and usability. She's the lead on a project to develop a series of Field Guides To Ensuring Voter Intent.