From Locomotive to Bullet Train:
Street-Level Implementation of E-Voting

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Abstract:

The Help America Vote Act and other legislation required that local election agencies throughout the United States upgrade voting equipment and consequently implement new technology at the polling place. Funding was made available to purchase new equipment and for the training of the people who administer the elections on the street level, poll workers. This paper looks at the implementation challenges of moving from a hand-counted or mechanical system to one that employs a variety of electronic technology. For some participants in the process, this is like moving from a Locomotive to the Bullet Train in six years or less. We analyze a survey of poll workers and find large variations in how well prepared they felt to operate machines and assist voters, across technologies. Our preliminary findings illuminate inequities at the polling places, raise questions about the one person, one vote principle, and point to issues of possible vote dilution.

Introduction

They are called Poll workers, Precinct board members or Election day workers and are commonly referred to as the 'army of volunteers' who staff polling places around the country each election day, working long hours for varying, but uniformly little pay. They are the guardians, facilitators, policing authorities, access granters and gate keepers of the in-person voting process nationwide. They are the unsupervised links in the Election Day chain that makes no allowance for error. They are the weak links, as we will explain below!

This paper is based on a simple premise: in order to have equity in the in-person (as opposed to absentee) voting process, voters should have a uniform experience at the polling place, with equal access to information and assistance if required. Only if these factors are in place will the constitutional "one person, one vote" doctrine truly be met.

In the following pages, we analyze a survey of poll workers in the Primary Election of 2006 and find large variation in how well they felt the training prepared them to operate and explain equipment to voters across various technologies. We also find great differences in whether poll workers were trained on how to use and explain equipment to disabled voters.

Some Context and Previous Work on Poll Workers

Since the passage of the Help America Vote Act (HAVA) in 2002[1], there has been more attention paid to these workers, but the systematic study of them has lacked sorely. HAVA among other things seeks to increase uniformity in election administration ranging from registration databases to poll worker training.
When poll workers are in the spot light, they are usually there because the U.S. election system failed at one of the hundreds of thousands of polling places that are staffed in each election[2]. They are talked about when voters report that they were discriminated against[3],

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[1] "Help America Vote Act of 2002," (HAVA), Pub. L. No. 107-252, 116 Stat. 1666 (2002)

[2] Any internet search using the terms: poll workers and problems will reveal hundreds of accounts of documented failures to administer elections properly. Below are just a couple of links. The Verified Voting Foundation and the Election Protection coalition are non-profit organizations that also track poll worker problems as they are reported by voters. Groups like the League of Women Voters, NALEO, Maldef and APALC have also collected data on this topic, through self-reports by voters and polling place observations by volunteers on election day.

Poll worker jailed after allegedly choking voter: Dispute over whether man has to cast ballot in judicial race boils over in Ky. http://www.msnbc.msn.com/id/15611865/

Lines, malfunctions and untrained poll workers plague some states; http://www.boston.com/news/nation/articles/2006/11/08/lines_malfunctions_and_untrained_poll_workers_plague_some_states/

[3] COMPLAINTS REVEAL WIDESPREAD PATTERNS OF VOTING DISCRIMINATION AGAINST NEW YORKERS WITH DISABILITIES http://www.nysilc.org/News%20-

when voters were turned away in error[4], when polling places don't function as they should. More recently, poll workers have made the news because there were not enough of them to staff polling sites[5]. They also made news when significant numbers of them did not report to work in one California County on Election Day[6], and polling places remained closed for much of the morning, only to be opened by inexperienced workers who did not properly operate voting machines.

Given the obvious importance of this 'volunteer army,' one might ask why there has not been more study of them. The answer is simple: they are extremely difficult to study because of the widely varying environments in which they operate and the lack of data available to study them.

The scarce formal literature in the areas of political science, public policy, and public administration that has addressed poll workers at all has done so in interesting ways: Alvarez and Hall situated poll workers in principle-agent theory. This is a bit of a stretch because principle-agent theory involves primarily the 'hiring of an agent,' a selection and a monitoring process, among other items. However, poll workers are in theory and practice 'volunteers' that receive stipends rather than wages or salaries. Registrars of Voters (RoVs) are in a constant fight to keep this classification because that is the only way they can get around minimum wage laws that would break the bank in most counties. Poll workers are also usually not screened, but rather everyone who wants to serve as a poll worker can do so. In the words of more than one election administrator we have interviewed, their requirements are "to have a pulse." And finally, poll workers are not monitored. They work in almost complete isolation during Election Day.
Poll workers, then, really are the implementers of laws, and the street-level bureaucrats of Election Administration that Lipsky talks about[7]. Kropf and Kimball[8] have treated RoVs in this capacity in their 2006 paper, arguing that local election administrators (LEOs) are the ones who actually put rules and procedures into place. We concur with their opinion that LEOs play a large role in the implementation (or lack thereof) of federal, state and local laws. However, when it comes to in-person voting at the polling place, the poll worker is the ultimate decision making authority that decides who gets to vote, what ballot they receive and whether needed assistance is provided. They are the ones who

%20backup_info/03-08-05_Voting%20Discrimination%20Report.htm and see on racial discrimination: http://www.aaldef.org/docs/AALDEF_Sen_VRAreport_rls_2006.6.13.pdf

[4] http://www.adc.org/index.php?id=2352&type=100

[5] Voters, brace for national poll worker shortage:

http://media.www.dailytexanonline.com/media/storage/paper410/news/2004/11/01/WorldNation/Voters.Brace.For.National.Poll.Worker.Shortage-788111.shtml

[6] http://www.sfgate.com/cgi-bin/article.cgi?file=/c/a/2006/06/19/BAG8QJGDBL1.DTL&type=printable
ELECTION 2006: Touch-screen voting's steep learning curve - Rollout in 21 counties brings glitches
http://votetrustusa.org/index2.php?option=com_content&do_pdf=1&id=1483

[7] Lipsky, Michael. 1980, *Street Level Bureaucracy: Dilemmas of the Individual in Public Services.* New York. Russell Sage Foundation.

[8] The Street-Level Bureaucrats of Elections: Selection Methods for Local Election Officials; David Kimball and Martha Kropf, 2006

invent coping mechanisms to deal with uncertainties and work pressures, and in fact become the policy makers as they carry public policies out one polling place at a time.

Alvarez and Hall briefly mention poll workers in their 2005 paper "The Next Big Election Challenge[9]" in the context of electronic voting. Their recommendations include a push for more students to get involved in working at polling places. Unfortunately, as the 2006 primary showed, elections are also conducted when school is not in session, and the previous reliance on high school students resulted in a near catastrophic shortage of poll workers in the State of California.

HAVA presented a huge milestone in Election Administration, but most of its funding from the federal government to the States was used to purchase voting machines. It is thus no surprise that the vast majority of the literature in Election Administration since the passage of HAVA has also dealt with issues of electronic voting machines. However, some have noted that there may indeed be more to this issue than technology itself: Ansolabehere and Stewart, for example, studied residual vote patterns by technology and found that "60% of the variation is accounted for by the county, rather than by demographics or technology."[10] They suspect that local election administration plays a large role in this finding.

The data, the subjects and the environment

The data for this paper come primarily from three original sources. One, we are using an original dataset that was created from a statewide survey of poll workers in the Primary Election of 2006 in the State of California. Two, our data are analyzed with help of observations of trainings in 22 counties over a period of 2 years and three, we conducted participant observations of up to 20 polling places respectively on Election Days in 4 elections in up to 5 California counties.

The survey data were collected from election poll workers (or precinct board members), who worked at polling places throughout California during the Primary election on June 6, 2006, as part of a study that was jointly funded by the California Secretary of State's office and the Election Administration Research Center (EARC) at UC Berkeley. It was conducted in collaboration with the California Association of Clerks and Election Officials (CACEO).

California's 58 counties had roughly 25,000 polling places in the Primary election that were staffed by approximately 100,000 poll workers. By law, California's polling places have to be staffed by a minimum of 3 poll workers, but some counties, depending on

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[9] The Next Big Election Challenge: Developing Electronic Data Transaction Standards for Election Administration; 2005 http://www.businessofgovernment.org/pdfs/AlvarezReport.pdf

[10] Residual Votes Attributable to Technology; Stephen Ansolabehere and Charles Stewart III in The Journal of Politics, Vol 67, No. 2, May 2005, pp. 365-389

availability, will hire as many as 6 workers to fill special needs, usually to add workers with second language skills. On average, a precinct board consists of 4 members. The initial goal of the study was to deploy the survey instrument to all 58 California counties. Due various administrative hurdles, and a tight timeframe only 25 counties were able to participate. In the 3 weeks before the election, EARC distributed over 55,000 surveys to 25 counties.[11]

The survey instrument consisted of 32 questions, printed on a double sided 8 ½" x 11" sheet of paper. We stapled a self-addressed postage-paid business reply envelope to each survey, coded them by county, and collated them into packs of 4, 5, 6 or 8, depending on requests by counties. The surveys were then packaged into a large envelope that was stamped "For Inspector and Poll Workers", one for each precinct, and delivered to the counties for inclusion into the precinct supplies.

Our assumption was that poll workers, upon unpacking their supplies, would find the envelope, distribute the surveys amongst themselves, fill them out either on or after Election Day, and drop them into the mail to EARC. During a pilot study in one county during the fall 2005 special election, EARC received responses from 68% of surveyed workers – we expected a high response rate to this survey as well, and we were not disappointed; to date, we have received back approximately 42 percent of the surveys state-wide. Responses are still coming in however, at this point they have slowed to a few per week.

For this paper, we created a state-wide dataset by merging all the counties into one file. The dataset consists of the 15408 responses that were coded, entered and analyzed so far. For smaller counties, we entered all responses, for larger counties, at minimum a statistically significant number of responses, randomly selected.

Many of the survey questions were designed to allow the poll workers to provide county specific feedback, which we presented to the respective counties in report format.

The participating counties used a wide variety of voting technology. Some had scanners in their precincts, some used paper ballots that were centrally scanned, and others used touch screen or other DRE voting machines. To meet the HAVA accessibility requirement, some of the optical scan counties had ballot marking assistance devices and some used DRE machines. We elaborate on the technology further below. Overall, the sample is representative for the State of California.

Leading up to the primary of 2006; some of the counties in our sample had already changed their election equipment once since the discontinuation of punch cards. In March and April of 06, some counties conducted local elections that were used by election administrators as a dry-run for the primary.

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[11] The counties that received surveys were: Alameda, Colusa, Contra Costa, Fresno, Humboldt, Kern, Lassen, Los Angeles, Mariposa, Marin, Monterey, Napa, Nevada, Orange, Riverside, Sacramento, San Bernardino, San Francisco, San Luis Obispo, San Mateo, Santa Cruz, Shasta, Solano, Tuolumne and Yolo.

The counties were also struggling to comply with federal laws that demanded voting technology be placed in every polling place that would make it possible for disabled voters to cast a ballot independently and secretly. State law in California also requires that voters be able to verify their electronic votes with a Voter Verified Paper Audit Trail (VVPAT). Both requirements had to be implemented beginning January of 2006. While none of this came as a surprise to the counties, and they were well aware of both deadlines in advance, what they could not anticipate was that some voting machines would not be certified by the Secretary of State for use by 2006, while others in fact were decertified altogether. Many counties found themselves in situations in which the voting machines they had purchased with federal HAVA grants were collecting dust in some warehouse, either obsolete or awaiting certification or a printer component. Thus, many counties rolled out the paper ballot option again and used optical scanning equipment to read and tabulate the votes. In some counties, the optical scanners were placed in each precinct. In others, a 'central count' was conducted, meaning that the ballots were delivered to a central location, either a city hall or the registrar's office, to be scanned after the election was over. Some counties ended up using a combination of systems. One county, for example, used a previously certified, but then discontinued machine called the Eagle (by Optech) along with the Automark ballot marking device (by ES&S) for voters with disabilities. Other counties tried to avoid electronic voting altogether and ended up not having any voting devices for the disabled available at all for this election. In this environment, we conducted our study of poll workers.

Analysis

We analyzed some of the data we collected in our survey to find out whether there are differences in how confident poll workers feel in operating the various technologies in the polling place, and whether they feel competent in explaining machines to voters. The only time that poll workers have an opportunity to familiarize themselves with the machines is during a county training. Those are held immediately prior to each election. Common sense dictates that if poll workers are comfortable with the voting technology they are more likely to offer assistance to voters, more willing to trouble shoot the technology, and will have a better experience at the polling place, which in turn will translate into a better experience, i.e. more access for voters.

There were 6 different types of in precinct voting machines in use in the Primary Election of 2006 in California. Those were the Diebold Optical Scanner, Diebold Touch Screen machines, Es&S scanners, the Hart eSlate, the Optech EAGLE scanner and the Sequoia Edge Touch Screen machine. We are excluding counties that did not have technology in each precinct from this analysis, i.e. those that scanned their paper ballots centrally or did not have machines available for another reason.

The answers to the questions below are on a Likert scale ranging from 1, 'not well at all' to 5, "very well." 0 indicates that while respondents attended training for this election, they were not trained on machines. Rather, their training may have consisted of laws and procedures and how to fill out paper work. In our analysis, we were most interested in

how the data broke down on both sides of the 3 value because we found a tendency by respondents who didn't want to take much time to simply check off the middle values. This was true even if they used the open ended questions at the end of the survey to elaborate on their machine training and essentially indicate that their assessment on the Likert scale should have been different. We should also note that we believe that this survey is generally biased toward the higher values because some poll workers can simply not find anything wrong with their RoVs, and they feel like they would criticize them if they would indicate that the training was not helpful.

In Table 1, we show a cross tab of type and make of Voting Equipment in the polling place and the question: "How well did the training prepare you to operate any voting equipment (such as ballot marking devices, ballot scanners, electronic machines) on Election Day?" only for those that said that they attended a formal training for this election.

TABLE 1: Voting Technology by Preparation for Operating Equipment								
Voting Technology		Preparation for Operating Equipment						Total
			0	.05-2.5	3	3.5-5	99	
DpOS Diebold Scanner	Trained	Count	150	174	365	369	57	1115
		% within trained - Diebold OS	13.45	15.61	32.74	33.09	5.11	100.00
DpTSx Diebold Touch Screen	Trained	Count	13	80	175	188	5	461
		% within trained - Diebold TS	2.82	17.35	37.96	40.78	1.08	100.00
EpOS ES&S scanner	Trained	Count	109	190	567	702	59	1629
		% within trained - ES&S scanner	6.69	11.66	34.81	43.09	3.62	100.00
HpeS Hart eSlate	Trained	Count	17	105	246	307	15	691
		% within trained - Hart eSlate	2.46	15.20	35.60	44.43	2.17	100.00
OpOS Optech EAGLE Scanner	Trained	Count	19	58	133	228	23	461
		% within trained - Optech EAGLE OS	4.12	12.58	28.85	49.46	4.99	100.00
SpTS Sequoia Edge Touch Screen	Trained	Count	18	127	499	897	40	1581
		% within trained - Sequoia Edge TS	1.14	8.03	31.56	56.74	2.53	100.00

We find a stark difference in the level of preparedness on Direct Record Electronic (DRE) machines. Comparing the Sequoia Edge Touch Screen to the Diebold Touch Screen, we find that almost 57% felt that they were well prepared on the Sequoia DRE as opposed to 41% on the Diebold machine. Simply comparing technology, i.e. a scanner to a DRE, the difference becomes even more extreme, ranging from 57% on Sequoia's DRE to only 33% for the Diebold scanner! Even when comparing the different types of

scanners there is a tremendous range of responses, with 49% of respondents feeling well prepared on the Optech EAGLE, but only 33% reporting the same value on the Diebold scanner.

On the other end of the scale, the differences are less extreme but may still turn out to be significant in further analysis. 8% of respondents felt not well trained on the Sequoia DRE as opposed to 17% on the Diebold DRE. We also found interesting that only 1% of respondents checked N/A on the Sequoia DRE training, meaning that they attended a training but were not trained on machines, but 13% said that they were not trained on the Diebold Scanners.

Table 2 crosstabs Voting Equipment with the question "How well did the training prepare you to demonstrate to voters how to operate any voting equipment (such as ballot marking devices, ballot scanners, electronic machines)?" We find similar response patters to the question above, but slightly less confidence overall in their ability to demonstrate as opposed to their ability to operate the machines. We attribute this to the fact that while most counties train poll workers on how to use the machines, only some explicitly mention how voters should be treated when questions arise, leaving this up to poll workers to figure out for themselves. To some, this comes easier than to others apparently.

TABLE 2: Voting Technology by Preparation to Demonstrate to Voters How to Operate Equipment								
Voting Technology		Preparation to Demonstrate to Voters						Total
			0	.05-2.5	3	3.5-5	99	
DpOS Diebold Scanner	Trained	Count	159	283	459	429	18	1349
		% within trained - Diebold OS	11.79	20.98	34.03	31.80	1.33	100.00
DpTSx Diebold Touch Screen	Trained	Count	11	83	187	256	1	538
		% within trained - Diebold TS	2.04	15.43	34.76	47.58	0.19	100.00
EpOS ES&S scanner	Trained	Count	54	233	653	882	23	1846
		% within trained - ES&S scanner	2.93	12.62	35.37	47.78	1.25	100.00
HpeS Hart eSlate	Trained	Count	12	139	325	404	14	894
		% within trained - Hart eSlate	1.34	15.55	36.35	45.19	1.57	100.00
OpOS Optech EAGLE Scanner	Trained	Count	38	68	180	289	19	595
		% within trained - Optech EAGLE OS	6.39	11.43	30.25	48.57	3.19	100.00
SpTS Sequoia Edge Touch Screen	Trained	Count	13	203	748	1177	18	2160
		% within trained - Sequoia Edge TS	0.60	9.40	34.63	54.49	0.83	100.00

Again, as in Table 1, respondents were best prepared to explain the machines to voters for the Sequoia DRE with 54% and least prepared on the Diebold Scanner with 32%. Within DREs, the differences narrowed to 9 points between the Sequoia DRE (54%) to the Hart eSlate (45%). The scanner differences were much larger with 49% for the Optech EAGLE as opposed to 32% for the Diebold Scanner. We should note here that the ES&S scanner is usually paired with the AutoMark, which is a separate ballot marking machine for the disabled. In two counties, the Diebold scanners are also paired with the AutoMark. Comparing the ES&S scanner results with 48% of respondents saying that they felt well or very well prepared, to the Diebold Scanner with 32% of respondents reporting that level of confidence, is an even more staggering difference taking into consideration that an additional device may have made polling place operations more complex for poll workers.

On the other end of the scale, we see slightly less preparedness on the Sequoia DRE as compared to the question in Table 1 (9.4% and 8.03%) but again the difference to the Diebold Scanner is dramatic and has, in fact increased with 9% for the Sequoia Edge and 21% for the Diebold Scanner (16% in Table 1).

For Table 3, we refined our data more. For counties that deployed the same equipment for all voters, meaning that they did <u>not</u> have specific equipment in the precinct that was reserved for use by disabled voters, we added all types of Optical Scan equipment and all types of DRE machines and then crosstabed those values against poll worker's feedback on how well the training prepared them to operate the equipment.

Table 3: Optical Scanner versus DRE and Preparation to Operate Equipment								
OPT vs. DRE in Precinct			0	.5-2.5	3	3.5-5	99	Total
1 - Optical Scan for all in Precinct	Trained	Count	198	631	1,335	1548	76	3,790
		% within	5.2%	16.6%	35.2%	40.8%	2.0%	100.0%
2 - DRE for all in precinct	Trained	Count	28	436	1,273	1796	59	3,592
		% within	0.8%	12.1%	35.4%	50.0%	1.6%	100.0%

We find a 9 point difference between the DRE and the Optical Scan equipment, irrespective of the make or model, with 50% of the respondents saying that they felt well, or very well prepared to operate the DREs, as opposed to 41% who felt the same way about the Optical Scan technology. 12% reported not feeling well prepared on DREs versus 17% for the scanners. We mentioned the use of the AutoMark ballot marking device above, which is paired with optical scan equipment in some counties. In further research, we plan on controlling for the use of this device to see whether the difference between DRE and scanner is partially attributable to the fact that scanners often come with an additional and separate marking device. We believe that especially returning poll workers may have been wary about the AutoMark because there were many reported

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problems with this device during past elections, leaving poll workers unable to put them to use.

Table 4 shows a crosstab of all Optical Scanners and all DREs by how well poll workers felt the training prepared them to demonstrate the equipment to voters. We used the same categories here as in Table 3, adding the Optical Scan and DRE equipment respectively, for counties that deployed this equipment for all voters.

Table 4: Optical Scanner versus DRE and Preparation to Demonstrate Equipment to Voters								
OPT vs. DRE in Precinct			0	.5-2.5	3	3.5-5	99	Total
1 - Optical Scanner for all voters	Trained	Count	251	584	1,292	1600	60	3,790
		% within	6.6%	15.4%	34.1%	42.2%	1.6%	100.0%
2 - DRE for all voters	Trained	Count	36	424	1,260	1837	33	3,592
		% within	1.0%	11.8%	35.1%	51.1%	0.9%	100.0%

Interestingly, as opposed to the overall confidence drop on the high and low ends of Tables 1 and 2, when these data are summarized, there is a slight increase in how well prepared poll workers felt to explain the equipment as opposed to operating it. The explanation for this difference may lay in the tables below, in which we analyze cases with technology for the disabled against those that deployed the same equipment for all voters. Again, we see more confidence on the DREs than the optical scan technology with 51% versus 42%. 15% reported not being well prepared on optical scanners versus 12% on the DREs.

As mentioned above, for Table 5, we took a different strategy. We wondered whether there is a difference in how well poll workers felt their training prepared them to operate the equipment when we differentiated between precincts in which the technology was reserved for disabled voters only versus precincts that had the same equipment available for every voter. There were 3 counties in the Primary that reserved DREs for disabled people. In one of those 3 counties, the other voters had to vote paper ballots that were centrally scanned; the other two had optical scanners (no AutoMark) in the precinct. The counties that decided to offer technology only to disabled voters had various reasons for doing so. In one county, there was an equipment shortage and not enough machines were available. To be in compliance with HAVA, the machines were distributed one per polling place and reserved for disabled voters. In another county, the RoV was simply not convinced that the voting technology was ready for a large roll-out and opted for an incremental approach of letting voters see the equipment but only use it if they specifically asked because they were disabled. Because only 3 counties made the

decision to only let disabled voters use the DRE equipment, we have fewer responses for these cases.

Table 5: Equipment in Precinct for all Voters versus only for Disabled by Preparation to Operate

Equipment in Precinct			Preparation to Operate					
			0	.5-2.5	3	3.5-5	99	Total
1 – same equipment for all voters	Trained	Count	226	1,067	2,608	3344	135	7,382
		% within	3.1%	14.5%	35.3%	45.3%	1.8%	100.0%
2 - DREs for disabled only	Trained	Count	156	22	53	122	12	366
		% within	42.6%	6.0%	14.5%	33.3%	3.3%	100.0%

We find that when the DRE equipment is reserved for disabled voters only, poll workers feel much less well prepared to operate the technology (33%) than when the same equipment is available for everyone (45%). Some of this may be due to the added complexity that poll workers faced having to learn two different technologies, scanners and DREs, which was the case in two of the three counties. We will analyze this further in the future. There may also be a correlation here to when the equipment was rolled out, and we will look into this issue further as well as we explore these data in more detail. What we found extremely interesting in this table is that 43% of those who attended a training for this election, and who worked in a precinct that had equipment available for disabled voters only, reported that they received no training (0 = N/A) at all on the equipment! This is in stark contrast to the 3% who reported 0 or N/A in counties that had equipment available for all voters!

In Table 6, we crosstabed the same summary as in table 5, counties that had the same equipment available to all voters as opposed to those counties that specifically made DREs available to the disabled only against how poll workers responded when asked how well prepared they were to explain the equipment to voters.

Table 6: Equipment in Precinct for all Voters versus only for Disabled by Preparation to Demonstrate Operation to Voters

Equipment in Precinct			Preparation to Demonstrate Operation of Equipment					
			0	.5-2.5	3	3.5-5	99	Total
1 – same equipment for all voters	Trained	Count	287	1,009	2,552	3437	93	7,382
		% within	3.9%	13.7%	34.6%	46.6%	1.3%	100.0%
2 – DREs for disabled only	Trained	Count	160	16	56	124	10	366
		% within	43.7%	4.4%	15.3%	33.9%	2.7%	100.0%

We find the same data pattern here as above, with a staggering 43.7% of poll workers reporting that they were not at all trained on how to explain to voters how to operate equipment in counties that reserved DREs for disabled voters only. Given that some would say that HAVA was about access for disabled people, we were surprised that counties that were obviously paying attention to the law, would drop the ball in the implementation to this extent and fail to, essentially, prepare a large number of their pollworkers to assist disabled voters!

Only 4% report N/A in counties that had the same equipment available to everyone. On the other end of the scale, poll workers felt well or very well trained to explain equipment to voters in counties that had the same technology for all, with 47% as opposed to 34% for those counties that had equipment for disabled voters only.

In sum, we find differences across the types of Voting Technology in how confident poll workers are in both operating and explaining technology, and we find differences between whether the same types of machines were available for all voters or just some and a variation of confidence in operating and explaining technology based on this. All of this suggests that as the level of complexity in the polling place increases, poll workers' confidence level and thus the way they are able to assist voters will drop. Consequently, as uniformity decreases, equal access may also decrease.

Broader Discussion

Since Bush v Gore, equal protection and the 14th amendment have been interpreted quite narrowly, however, the courts may not have realized how unequal the in-person (as opposed to absentee) voting experience is in practice and how pressing the need for uniformity is on the front-lines of election administration. Certainly, just because the courts are not at the forefront of this issue does not mean that the American public is not interested in improving this situation. Inequity in access in terms of voting technology at the polling place may indeed be a form of administrative vote dilution, and thus fall under the federal Voting Rights Act. Until now, scholars have basically turned a blind eye to this problem in this context. Again, there has been little systematic study of what happens at polling places on Election Day, and vote dilution is usually studied in the context of gerrymandered districts and racial/ethnic discrimination.

As we mention throughout this paper, this is a very rough first stab at analyzing a huge dataset. We plan on doing much more analysis, including Logit/Probit models for our qualitative measures of poll worker perceptions, and regressions if we find that Likert scales do not have to be treated as Probits.

We may find in further analysis that there are county variables that help explain some of the variation, such as the counties' socio-economic make-up. But the variation in this field is such that things may not be quite that simple.

Poll workers come in all shapes, sizes, colors and backgrounds. Their demographics, interestingly, do vary by county, and their motivation to serve does as well.[12] While for most people, the image of the poll worker consists of a grey haired octogenarian lady who adjusts her glasses while running a shaky index finger through the precinct index in hopes of finding the voters name, the actual age of poll workers ranges from high school students to everything above. In some counties, most poll workers are eligible for the AARP discount, in others, the average age is noticeably lower. On average, however, more poll workers are retired than still in the workforce. None of the RoVs we have interviewed collect any information about who their poll workers are.

Whether a poll worker performs well on Election Day largely depends on the resources that s/he has available. These resources include their own abilities and previous experience, reference materials available, access to a 'help-line' or supervisor who can answer questions quickly, and most importantly the training before election day and fellow poll workers that are also trained.

California has 58 counties, containing, on that level 58 election authorities called Registrars of Voters (RoVs) or County Clerks. The position with the ultimate responsibility over Elections in California is the elected, partisan office of the Secretary of State. Of the county authorities, whom we refer to collectively as RoVs in this paper, approximately 60% are elected and remainder is appointed by their respective County Boards of Supervisors, who are in turn elected. One effect of HAVA has been the shift of increasing responsibility from the county election authorities to the State; however, with multiple levels of elected officials who are largely autonomous, and that are accountable to different constituencies, the implementation of oversight at the State level has been wrought with problems. Adding to this the fact that elections are a 'seasonal' fiscal item, thus staffing varies tremendously and often consists of temporary workers with varying expertise, and that counties have different levels of resources available to them due to their sheer size differences, and researchers are presented with a hodge-podge of a research environment.

In sum, these factors among others have led to a field of election administrators that have reinvented the wheel 58 times in topics ranging from purchasing equipment to selecting and training poll workers. Most of the election administrators that we have interviewed are convinced that their respective differences make this a necessity. In terms of conducting research on the training of poll workers, this looks as follows:
The State election authority may have issued various guidance documents to the counties[13], but because the implementation of everything poll worker related, in particular recruitment and training lies at the county level, that is where this has to be studied. Due to the 'seasonal' nature of elections, the county RoVs staff up and down as their funding varies, and funding often depends on the relationship they have with their board of supervisors. Some RoVs will conduct poll worker training themselves. Those are mostly RoVs that are elected and from smaller counties. Training can vary based on whether the RoV is up for election or not. In other counties, training is conducted by

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[12] See Glaser & Mac Donald: "The Attraction of working from 6am to 9:30pm for a fraction of minimum wage: Poll workers and their motivation to serve" presented at MPSA conference, Chicago, 4/15/07
[13] http://www.ss.ca.gov/executive/press_releases/2003/03_032.pdf

temporary workers that are hired a few weeks prior to the election and trained by either other temporary workers or permanent staff in the elections office. These trainers are not available for interviews prior to the election, because they are busy, or after the election, because they are gone. In some counties there is very little continuity or institutional knowledge in the training of poll workers because of this and general staff turn over. In the Primary of 06, the 58 California counties used 11 different technologies. Different technology requires different training (in theory), at least on the voting machine component. In theory, other procedures could be taught uniformly throughout the State. Trainers have varying expertise and most have no formal pedagogical education. In our research we have encountered unemployed comedians, corporate trainers, clerical workers, retired school teachers, students and everything in between. Training varies by county, and within the county at times as well, in terms of length and content. Quality of training is almost impossible to measure due to the factors above and also because the knowledge and abilities of the students are rarely known prior to the training, and many trainers do not ask. Some counties divide experienced from inexperienced poll workers for trainings, others don't. Some counties train every poll worker, others don't. The sizes of training classes can vary between 10 students and 100 or more. Some trainings have hands-on components; others are broken up into two sessions on separate days. Some poll workers are paid for attending training, others are not. Sometimes training is mandatory, sometimes encouraged, for others it is discouraged, and for some it is non-existent.

In short, what we know from this paper is that there are wide variations in the comfort levels of poll workers with the different technologies. What we seek to discover in the future is whether some technologies are inherently more difficult to work with, if the training is inadequate or whether when we control for the back grounds of the poll workers, we may find that they are not well suited for this job educationally or otherwise. Now that we have identified the dependent variable, we will explore how much is driven by background, training, technology and various other county effects.