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Binary Democracy: Voter Confidence and Voting Technologies

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Binary Democracy: Voter Confidence and Voting Technologies

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ABSTRACT

The specific type of voting machine used by voters could have an affect on the amount of confidence they feel about the accuracy of their votes being recorded. This thesis studies different types of voting machines and the ramifications they have on voters. Using a survey of more than 400 people, this paper seeks to find a relationship between different methods of voting and the amount of confidence a voter feels. The results show that voters who interface with a voting machine that leaves a paper trail are more likely to feel confident that their votes are recorded correctly. The antiquated federal system for updating voting equipment should be changed so that states receive a yearly appropriation to keep their voting technology up-to-date.

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CHAPTER 1. INTRODUCTION

One requirement for the expression of democracy lies in the ability of the citizens of a society to voice their opinions to their government. The most effective and direct method for people to make their opinions heard by their government in the United States results from the action of casting a ballot. In the words of Thomas Paine, voting is “the primary right by which other rights are protected” (Paine 1795, 14). The technology to cast a ballot is an important part of the voting process. Current technologies for voting are aging rapidly and many are in need of upgrade or replacement (Hammer et al. 2010). Voting should be an accessible, streamlined and simple process for citizens to accomplish that instills confidence in the results of that election and voting technology should promote confidence in the voter.

The machinery of voting is the physical process by which voters directly participate in democracy. Casting ballots via machinery presents several advantages but also some shortcomings. The particular models of voting machines vary throughout the United States, sometimes on a county-by-county basis. The particular model of ballot casting technology voters interface with may have an impact upon the amount of confidence they feel about the accuracy of their votes.

This paper examines the technologies utilized by localities throughout the United States and seeks to determine the path forward that is most likely to promote confidence in the electorate. This thesis further explores future technologies such as online voting which is currently being employed by other nations showing innovations the United States might implement in the future. The research methods applied in this thesis include case studies and personally conducted surveys. By gathering and processing the opinions of more than 400

people, this paper seeks to find evidence of a correlation between voter's confidence in voting equipment and variables such as age, party affiliation, and equipment utilized. This information will help in suggesting a course of action in regards to voting technology policies that might help alleviate some uncertainty among voters. The main hypothesis is that there is a relationship between the type of voting machine used by the voters and the amount of confidence they feel in the fact that their votes were recorded correctly.

The problems with current voting technologies are abundant. The presidential election of 2000 proved that the methods for recording and counting votes play a vital role in the confidence that citizens have in the accuracy of the election and possibly even the outcome of that election. Although many states updated their equipment after the fiasco of the 2000 election, those machines are rapidly aging and now need new modifications (Norden and Famighetti 2015). Trust in election outcomes also may vary given newer technologies including computer-based machines that sometimes leave no paper trail for the purposes of a recount. Additionally, networked technologies increase the possibility for interfering with the outcome of an election through hacking.

One of the most substantial obstacles to instigating a nation-wide program of trustworthy voting machines lies in the fact that in the United States' laws regulating voting practices originate in individual states. This means that the federal government currently possesses little power to regulate or mandate particular technologies for voting. This arrangement, known as federalism, was instituted to dilute the power of a central national government and allows states to remain somewhat autonomous in certain areas of lawmaking. This sharing of governmental responsibility often becomes evident at the forefront of many controversial issues in the United States, including the integration of voting technology.

The Help America Vote Act of 2002 distributed federal money to individual states to upgrade their voting equipment. This one time appropriation helped localities institute a more trustworthy and reliable set of machinery for the casting of votes (Card and Moretti 2007). This thesis explores the possibilities and ramifications of moving forward with legislation like the Help America Vote Act of 2002 to perhaps alleviate some of the problems associated with the current state of voting technology.

1.1 LAYOUT OF STUDY

This thesis begins with a review of the literature available about the technology of voting. The literature review will examine many aspects of voting technology, beginning with the concept of federalism, which separates the division of power between state and national officials. The topic of the literature review then moves to a discussion of methods of voting historically and then touches on the topic of the ramifications of the 2000 election as it pertains to voting technology.

The seminal piece of legislation that drove voting equipment toward modernity was the Help America Vote Act of 2002. I will discuss that and then move toward an exploration of the current state of confidence in voting technology. The literature review then explains how technology changed after the Help America Vote Act. The final portions of the second chapter presents concepts about confidence in the 2016 presidential election and the potential for incorporating online voting into the nation's voting technology.

Chapter three discusses the methods to discover the relationship between voting technology and the amount of confidence voters felt that their votes were recorded correctly. This chapter explains that surveys were utilized to measure confidence in voting technology.

These surveys also asked respondents which type of voting technology was used by the county where they voted.

The fourth chapter examines the results of the survey data. It finds that there is a relationship between the amount of confidence voters feel about the validity of their vote and the type of machine they voted with. The fifth chapter offers a conclusion and discussion of the issues at hand. This chapter offers suggestions for legislation moving forward in the realm of voting machinery as the technology becomes more complex and sophisticated.

CHAPTER 2. LITERATURE REVIEW

When studying the academic literature that addresses the issues surrounding voting technology, one finds that two distinct groups work to expand understanding of the machinery to cast a ballot. The first group, political scientists, tends to study the ramifications a particular voting practice might have on the very nature of our democracy. The second group that studies voting technology is computer scientists. The computer scientists focus more on the possibilities and limitations of specific technologies, particularly in the realm of security.

This literature review examines works from both disciplines because both political scientists and computer scientists have something to offer in discussing the way that voters interact with the machinery of democracy. Without studying the security implications of voting technologies, fundamental aspects of the examination of the subject might be missed. Because this thesis studies the confidence voters have in their voting technology, security concerns present themselves throughout the literature.

The review of the literature covers topics from the earliest development of voting technologies all the way to the presidential election of 2016. The important legislative benchmarks are studied, as well as the potential for moving forward based on what can be learned from other countries as it relates to online voting. Throughout this section, confidence in voting technology is shown to be of great importance.

2.1 Federalism

One very unique aspect of the political system of the United States rests on the fact that the government is not unitary, but instead governmental powers are shared between a national

government and fifty different state governments. This disparate form of governance known as federalism creates an atmosphere where both the federal government and individual states fight hard to gain new power and to keep tight control on the power that they already possess. As David Brian Robertson states succinctly, “Opponents have used federalism as a strategic weapon, either as a shield against change, or as a sword to bring change about.” (Robertson 2012, 9)

Several types of federalism manifest themselves in the execution of the government in the United States. One type of federalism is called “coercive federalism” (Kincaid 1990). This is a top-down sort of arrangement where the federal government issues a mandate that a state must follow. Often coercive federalism creates an unfunded mandate because the acts required by the states are not accompanied by any sort of federal monies to accomplish the goals of the national government. Another type of federalism is known as “cooperative federalism” (Grodzins 1966). Under cooperative federalism states retain an element of control over the issue at hand and this control is often accompanied by federal funding for the changes desired. This sort of federalism requires more compromise and allows the states and federal government to work closely together in the decision-making process. Currently, neither of these types of federalism concepts are being fully employed in regards to the upkeep and regulation of election equipment. The United States’ federal government has maintained a policy that leaves individual states the power to decide what type of equipment to employ.

Federalism applies to election law in many ways. The national American government typically does not intervene in the administering of elections. This activity was clearly delegated to the states in the Constitution of the United States of America. The Constitution plainly declares that the states are the controlling entities when it comes to national elections. The actual

text reads “The Times, Places and Manner of holding Elections for Senators and Representatives, shall be prescribed in each State by the Legislature thereof” (US Constitution, Article I, Section IV). While this sentence makes it clear that the states hold the responsibility for governing election law, the next sentence gives the national government the discretion to regulate the activities of the states. It reads “but the Congress may at any time by Law make or alter such regulations” (US Constitution, Article I, Section IV).

Congress seldom intervenes legislatively in the regulation of elections. The few times the national government interjected itself in the execution of election laws primarily manifested from instances that protected minorities and helped to provide equal access to voting. An example is the Voting Rights Act of 1965, which outlawed literacy tests and other discriminatory practices that some states were using at the time aimed at stifling the votes of minorities (Alvarez and Hall 2005).

When it comes to the actual mechanisms for administering elections, Congress retains a mostly hands-off approach. There are no national level laws on the books regulating what kind of equipment may be used during elections. State and local officials enjoy enormous decision-making power in the regulation of elections. As stated in the Michigan Law Review, “because state law forms the foundation of election regulation, grate variety exists in how elections are administered across state lines” (Weinstein-Tull 2016, 754). Some states have statewide voting procedures while other states leave the decisions to the county or even precinct level.

For example, in the 2016 Presidential election, the entire state of Oklahoma employed a single type of technology, a Hart optical scan machine, throughout the state. This allowed for uniform counting and electoral procedures. Under this system, Oklahoma counties can share equipment when needed and potentially cut down on confusion during Election Day. Florida is

an example of the inverse. In Florida, 67 discreet counties make individual decisions about what kind of machine to procure for the fulfillment of election procedures. Taylor County, Florida has touch screen machines that leave no paper trail; those in Miami Dade County, Florida are touch screen with a paper trail; and Gulf County, Florida relies on optical scan machines to count the votes. There are many types of equipment in place in Florida and the specific model varies by county as well.

On the surface, this hodgepodge of procedures implemented throughout the nation might seem completely counterproductive and unreasonable. There is an argument to be had, however, that the very patchwork nature of our voting machine infrastructure makes it very difficult to infiltrate (Norden and Lazarus 2007). A completely centralized system might be more vulnerable to hacking attacks. Because of the diversity of machinery in the United States' election system, a hacker would be very unlikely to change the outcome of an election. That hacker would have to become an expert on many different types of machines and execute malicious actions across the country, sometimes on a county-by-county basis. In this regard federalism helps secure the confidence of the electorate.

The problem is that not only are the decisions left up to the states and counties, the responsibility of paying for the purchase and upgrade of this equipment is also decentralized (Kimball and Baybeck 2013). This often leaves officials with no hope of upgrading outdated equipment due to the limited nature of their individual budgets. The federal government could provide a yearly appropriation to the localities for the maintenance of voting machines. This would enable the states and counties to keep hold of their decision-making authority while providing a much-needed method for the outlay of cash for new machinery. Those officials responsible for the procurement of election equipment and the execution of election laws will not

willingly give up that power without a substantial effort by outside interest groups or an event that makes it clear that a national level structure is needed.

2.2 Methods of Voting

The founding fathers of the United States of America understood that they were instigating a grand experiment in democracy. Voting existed elsewhere in the world, but America would implement the idea of governing by the consent of the people in entirely new ways including innovations in the actual procedures to cast a ballot. Consent of the governed would come from a majority of voters and the ideals behind this new form of governance came from philosophers such as John Locke (1689) who imagined a government that could be responsive to the will of the governed. Throughout the history of the Republic, the United States of America employed many methods for casting votes.

Because of federalism, states create their own laws governing voting procedure and the rules might even vary from precinct to precinct (Alvarez, Hall and Hyde 2008). Therefore, when changes occur in voting practices those may not take place nation-wide and it might take years or decades for some states to succumb to national trends. From the beginning of American history the practice of voting was conducted in many different ways. For some small localities a simple voice vote sufficed to decide which candidate might meet the voter's approval for holding office. In most cases the early days of the nation saw voting conducted with pre-printed paper ballots. Even this method of voting depended upon the technology of its time because the invention and access to the printing press determined the manner in which people voted. From the pre-printed ballot America moved toward what is known as the "Australian secret ballot." The secret ballot was designed to prevent certain kinds of fraud, specifically vote buying and coercion. One of the

basic ideals of American democracy is the secret ballot, the ability to cast a vote without external players knowing which decisions voters make when marking a ballot.

This was not always the case in the United States. In the early days of our union, ballots were not filled out at all but were instead pre-printed with the candidate's names on them. Candidates made it a practice to physically differentiate their ballots from the ballots of their competitors. For example a party might make its ballots larger than the ballots of the opposing party, or they might be a different color. This differentiation made it possible to discern what choices individuals were making when they cast their votes. Having knowledge of voting behavior created problems in the early days of our democracy and it can create even more problems in our digitally connected world (Alvarez and Hall, 2008).

When a party knows the voting behavior of the individual, that voter might be compelled to vote in a particular way. Under a secret ballot system, paying people to vote for a particular candidate is not a rational action because the payer cannot verify that the voter cast a ballot in the manner desired. Removal of anonymity reinstates the incentive for paying for votes.

The Australian secret ballot began to be used on a widespread basis in the United States around the 1880s and 1890s. These were ballots that were pre-printed by the government with the full slate of candidates on the page. Under this system the secrecy of the vote was easier to ensure and it helped transform voting from a party oriented activity into a more civic guided action (Card and Moretti 2007).

The first move into the modern era was the implementation of lever voting machines. Invented in 1890, lever voting machines became rather ubiquitous as they were the most common type of voting interface until the mid 1980's (Herrnson et al. 2008). These were often large devices with a curtain where the voter would step into a booth and cast a vote for a

preferred candidate. These machines had a series of levers that were associated with particular candidates. Individual levers were selected and then the voter pulled a large master lever that recorded the vote. This voting technology is important in the history of voting because this set the precedent for a voting method that left no paper trail. The results found in the final tally of the machine were final and left no room for a re-count or external validation. Also, if the vote tally of the machine was reset to zero before recording the votes all of those votes would be forever lost (Saltman 2006).

There was a trick that would allow someone to alter the election through lever machines. A person who wished to diminish the vote count of a particular candidate or referendum could simply insert the tip of a lead pencil behind the lever that selected that option. The lever would still appear to function correctly, but the votes were not recorded. Throughout the day, as voters used that lever, the lead would erode to the point that it was no longer evident that it was ever placed there. The machine could be altered in a way that affected the outcome of the election, but there would be no evidence of that alteration (Rubin 2006). Lever voting machines represent the first technology that allowed for the possibility of hacking an election.

Many studies concern themselves with the relationship between residual votes and the various voting methods available to citizens (Kimball and Kropf 2008). Residual votes are any ballots cast which are disregarded as improperly or erroneously completed. There are two major categories of residual votes. The first is the overvote. An overvote occurs when a voter returns a ballot with more than one candidate selected for one particular race. An example might be during the Presidential election of 2008; if a voter selected both John McCain and Barack Obama for the highest office that would be considered an overvote. The second category of residual

votes is undervotes. An undervote occurs when a ballot is returned without a mark on the ballot for the race at the top of the ticket.

Many of the studies that examine residual votes show that electronic voting systems greatly reduce residual votes. One such study was conducted in the Netherlands in 2008. The study shows a “strong negative effect” on the amount of residual votes present in a given election when DRE machines are used (Allers and Kooremann 2008). DRE machines are Direct Recording Electronic voting machines. These are touch screen machines similar to an ATM machine used by the banking industry. The authors explain that this occurs because DRE machines by their very nature disallow or at least discourage residual votes. Because of the limited choices available on the machines, a voter cannot vote for more than one candidate in a given race. Furthermore, DRE machines provide a logical flow for the execution of the voting process that greatly reduces the chances for an undervote, especially on machines that provide a verification screen as the final display before the vote is cast.

Alvarez et al. (2013) shows that using vote-by-mail activities rather than voting in person results in much greater occurrences of residual votes. Although the vote-by-mail paradigm seems to solve certain problems such as accessibility and potentially greater participation, the likelihood of an erroneously cast ballot increases dramatically. Another study entitled “The Impact of Changing Voting Systems of Residual Votes” seeks to examine the implications of technology in relation to residual votes. The authors find that changing to an electronic voting system greatly reduced the amount of residual votes (Hammer, et al. 2010)

One important consideration of voting practices lies in the ability of the election officials to conduct a re-count. In the case of lever machines, there was no way to verify the intention of the voter after the actual voting had been accomplished. The term “Voter Verified Paper Trail”

(VVPT) refers to the idea that a voting machine would use some sort of mechanism that left a physical recorded marking on paper that could be referenced at a date post-election.

In response to the inability of lever machines to provide an outlet for a re-count of the vote, many states adopted punch card systems to record votes. In fact, punch card technology surpassed the lever machine as the most ubiquitously used type of voting machine by 1986 (Herrnson et al. 2008). The method of interacting with this technology required a voter to insert a pre-printed ballot into a device that allowed the voter to punch a hole into the location on the ballot that corresponded with a candidate. This system left a paper trail that could be re-counted and verified but in the 2000 Presidential election punch card systems were shown to have serious flaws because they led to many errors in the voting process, which will be discussed below.

The most common form of voting in the United States currently is the optical scan machine. This seems to provide a happy middle ground between an electronic form of voting and traditional paper ballots. Optical scan machines process pre-printed ballots on which the voter marks a preference. The ballot is then inserted into a machine, which reads the marks made by the voter. The machine is usually networked to a precinct server or even a statewide computer that gathers the totals of the machines. The optical scan machine streamlines the voting process because the ballots do not have to be counted by hand, but a paper trail is left behind that could be verified if a re-count is necessary.

One of the more recent advances in voting technology is the Direct Recording Electronic (DRE) machine. The DRE is very similar to an automatic teller machine used by the banking industry. It is a stand-alone device with a touch screen monitor that offers the voter an interactive experience. The benefits of a DRE machine is that it lessens the chances for erroneous voting and the computerized system quickly adds up vote totals. The risks associated

with DRE machines are that they are a “Black Box” system with software installed by a private company (Harris 2004). A great deal of trust is necessary to implement such a system. In the United States, DRE machines are mostly found at local voting precincts but other countries have experimented with wider distribution of the machines, placing them in common public areas like malls or markets to increase accessibility.

There are two basic types of DRE machines. The first type, typically older models, do not print out a voter verified paper trail (VVPT). The second type of DRE machine will allow the voter to cast a ballot electronically but then a receipt is printed for the voter to see that the vote was recorded correctly. While the use of machines that do not provide a VVPT is diminishing, their existence in elections in the United States is not a rarity.

In June of 2017, the Election Assistance Commission released the results of its biannual survey that asks each county in each state what type of equipment it used for the previous election. The report detailed exactly what model and what type of machine was utilized in the 2016 presidential election. The results showed a wide variety of machinery being implemented throughout the nation.

The DRE machines without VVPT is not necessarily common, but they certainly exist. Examples of counties that with DRE machines without VVPT in the 2016 election are: Collier County, Florida; Stark County, Indiana; Grayson County, Texas; and the entire state of Georgia which relies on the Accuvote TS-R6 which is a DRE machine that does not print out any sort of receipt (Election Assistance Commission 2017). Of course this can be problematic in the case of a recount and this sort of machine might erode the confidence a voter feels that the vote cast was recorded correctly by the machine.

Optical scan machines have become the favorite type of machine in the United States, according to the EAS survey. Twenty-one states have optical scan machines exclusively. Another twenty-five states have some combination of touch screen equipment in conjunction with optical scan machines. This means that forty-six states employed optical scan machines to cast a ballot in the 2016 presidential election.

Only Georgia and the District of Columbia exclusively used DRE machines that left no voter verified paper trail. Seventeen states in total, however, employed machines that left no paper trail whatsoever. This is a large number considering the possible negative ramifications of such machines. Two states, Hawaii and Vermont, held elections exclusively with touch screen machines that enabled a proof of voting via a paper trail. A total of sixteen states have DRE machines that provided a voter verified paper trail. (Election Assistance Commission 2017)

2.3 The 2000 Election

The presidential election of 2000 exposed a huge flaw in the voting technology in service at the time (Alvarez and Grofman 2014). Because of federalism in the United States, each state individually sets rules and laws that govern the execution of elections in that state. Some states delegate the decision-making power even further down to the county or district level. This creates incongruity in the way that elections are administered through the states and in some cases, the rules and equipment differ from one county to the next. This sort of structure existed in the case in Florida in 2000.

On election night in the November 2000 general election for president, it seemed that Vice President Al Gore would prevail over Texas Governor George W. Bush. The television networks originally declared Al Gore the winner of the election but they quickly rescinded that

projection when it became obvious that the margins in Florida proved simply too small to make a determination. The results of the first complete count of election totals showed Bush ahead of Gore by only 1,784 votes, leaving uncertainty about the 25 electoral votes allocated to Florida (Toobin 2001, 29). This close margin in votes triggered an automatic recount.

The rules regulating election equipment and administration in the state of Florida varied from county to county. Because of this, individual counties procured differing voting equipment. Some counties utilized state of the art optical scan machines, others had very outdated lever machines, and some relied upon punch-card voting machines. A punch-card voting machine creates perforated shapes on a piece of card stock (Saltman 2006). This card is then placed into a device that allows the voter to poke holes in the card with a stylus. The holes are aligned with markings on the machine that indicate which candidate the voter selects by punching out a particular hole.

This method of voting proved to be less than ideal. Voters often complained about confusion about placement of the card in the machine. In Palm Beach County, which had a specific type of punch-card ballot known as the “butterfly ballot,” this confusion led to uncertainty about exactly which candidate the voter selected. Many voters complained that they intended to vote for Al Gore, but may have mistakenly punched the hole that corresponded to Patrick Buchanan who was running under the Reform Party (Gillman 2001, 23).

Thomas Dee (2007) studied Votomatic punchcards used in a California Recall Election, the same technology used in many parts of Florida during the 2000 presidential election. The author explains that part of the reason for the errors is that the Votomatic punchcard system did not have a candidate’s name explicitly printed next to the hole that a voter needed to punch out in order to cast the ballot. Because the name was printed on a separate contraption, alignment

errors are the major contributing factor for misrepresented voting choices using the Votomatic punchcard system (Dee 2007).

In addition to alignment troubles, voters sometimes were not able to fully puncture the card to remove the portion of card that marked their candidates, known as a chad. Sometimes the stylus simply made an indentation, and sometimes the chad would stay attached on only one side. The system lacked any sort of consistency and accuracy when attempting to tally the vote.

Because the election was such a close contest, an automatic recount was ordered. In the case of counties that possessed punch-card systems, this meant that the election officials re-inserted cards into the machine to tally the votes, a process known as a machine re-count. This seems simple enough and if the voting technology behaved as the designers hoped, a recount should yield the exact same amount as the initial count. However, this was not the case. The second counting of the votes made the race even tighter. The results of the automatic recount left George W. Bush with a lead of only 327 votes (Toobin 2001, 36).

Voting officials and members of both the Bush and Gore teams suddenly became aware that a major problem existed (Alvarez, Atkeson and Hall 2012). Because of the way that the technology of punch card voting was designed, each time the cards were run through the machines there would be a different outcome. This is what created the difference between the original result of a 1784 vote gap to the recount gap of only 327 votes. Sometimes hanging chad would fall off in the machine making a vote count that did not count previously. The Gore team called for a manual re-count of the votes in several counties that used the punch-card system. The team wanted vote counters to attempt to determine the intent of the voters based upon the markings on the ballot, including partially punched chad and perhaps even chad that were simply dimpled because not enough pressure was applied to the stylus.

This sort of re-count and the very fact that it might be necessary both illustrate the imperfection of the voting technology ubiquitously utilized at the time. The intent of the voter should not be a subjective determination that provides differing results depending upon who is counting the vote. The machine design failed because no continuity existed that could accurately tally the votes in question. Eventually, after thirty-six days of uncertainty about who the next President of the United States might be, the United States Supreme Court ordered all hand recounts to halt. That meant that the machine tallies stood as the deciding factor and George W. Bush won the election in Florida. Part of the reason that the Supreme Court issued this ruling lies in the fact that these recounts were only being conducted in certain counties handpicked by the Gore campaign. This raises a serious question about the equal protection of the voters if voting practices differ from county to county, and perhaps that concern could be applied to the nation as a whole.

The technology to cast and count votes had a direct impact on the election, if not in actual outcome, definitely in the perception of the legitimacy of the voting practices in the United States. The presidential election of 2000 has been referred to as a “focusing event” (Liebschutz and Palazzolo 2005), which can be a cause for the adoption of new technologies. The nation faced a crisis because of uncertainty about voting practices and some voters doubted that the election results represented the true outcome of voter intent. The technology used for voting in 2000 proved that it lacked sufficiency in several aspects. Now the United States Congress needed to decide if it was going to change voting procedures, and if so what sort of changes should be implemented? According to Herbert Cihak of Pepperdine University School of Law, “Congress was left with no recourse but to act on election law reform legislation” (Cihak 2013,

680). Congress' answer to the crisis of deficiencies in voting technologies culminated in the Help America Vote Act (HAVA) of 2002.

2.4 The Help America Vote Act

Legislation usually becomes law not quickly nor without controversy. Even after a focusing event like the election in Florida in 2000, many factions were at odds about how to move forward. At issue was the amount of power that the states should retain and what amount of power the federal government should assume in the administration of elections. Although a great consensus existed that something needed to change in the election laws of the United States, the legislators found themselves uncertain about which actual measures they should implement. Should the federal government control the administration of all national elections? If not, should the federal government assume the role of funding the election processes? Should the national government favor one specific type of voting machine or ban the machines that displayed shortcomings in the past?

The choices facing the United States Congress were many. Republicans expressed hesitance to give too much control to the federal government. They felt that the administration of elections should remain in the hands of the states (Weinstein-Tull 2016). They also pushed for a voter identification requirement. Early versions of the Help America Vote Act included a provision that required all voters to present photo identification at the polls when they went to vote (Palazzolo and McCarthy 2005). Democrats opposed that idea outright. It is that sort of contention that could totally derail a bill and stall any legislative momentum provided by the focusing event of the election of 2000.

Some academics and local election officials proposed that election machines should be leased from manufacturers rather than purchased (Fail 2006). This would move the cost of upgrading and implementing new technologies to the manufacturers of election technologies. Because the manufacturers would hold responsibility for the maintenance and upkeep of the voting machinery, the equipment would most likely be more up to date and in proper working condition. The problem with leasing rests in funding. Creating a leasing program for vendors of election technology requires an ongoing commitment to fund the administration of elections. Most state and local governments simply do not have access to the monies available for such an ongoing investment.

Many state and local groups lobbied Congress. They knew that election reform was imminent and there was a great desire to make changes in the way America voted, but states and local election officials did not want to bear the brunt of the costs of these reforms. In many cases states simply did not have the funds needed to make the changes necessary to provide elections in which the people could trust. This created a dilemma. Localities wanted to maintain control over their electoral systems, but they wanted help from the national government to make changes in updating their systems. As Palazzolo and McCarthy (2005, 519) pointed out, “The members were united in their desire for the maximum federal dollars with the least federal strings.”

The final version of the Help America Vote Act addressed the problems of federalism and shared control in very specific and innovative ways. Legislators found the types of reform that all sides acknowledged were necessary and moved forward on those, while leaving the more controversial aspects of electoral reform for another day. The act devised a plan that included aid from the federal government but left local governments in control of the administration of elections for the most part (Cihak 2013).

Title I of the Help America Vote Act provided an allocation of funds to the states to update their voting technology and other costs associated with updating election equipment (Help America Vote Act 2002). This portion of HAVA allowed for a total of \$3.8 billion to be distributed amongst the states partially based on the population of each state. There was a guaranteed minimum, but states with higher populations received more money than those with fewer citizens.

Title I also required the replacement of punch card and lever voting machines. This set a guideline that all voting equipment purchased with HAVA funds must meet some minimal requirements that are spelled out in Title III of the Act. The requirement was that no punch-card voting machines or lever voting machines would be in use for the general election that was to be held in November of 2004. Because the act provided monetary assistance for the replacement of these antiquated systems, the Help America Vote Act of 2002 solidified the idea of federalism while ensuring that necessary changes would take place.

Title II of the Help America Vote Act established an organization known as the Election Assistance Commission (EAC.) This commission would be a clearinghouse of data and information about voting and voting technology. The body would be responsible for creating a set of voluntary voting system guidelines. This commission, although helpful in decision making, was left with very little actual power. As Herbert E. Cihak put it, “This advisory only role for the EAC would soon make it apparent that the EAC was doomed to living the life of a paper tiger” (Cihak, 2013, 683). The act itself explicitly states, “The commission shall not have any authority to issue any rule, promulgate any regulation, or take any other action which imposes any requirement on any State or unit of local government.” (Help America Vote Act 2002)

The voluntary voting system guidelines set up by the EAC provides states with a concept of the effectiveness of individual types of voting technologies. The EAC oversees studies and certifies certain machines for federal elections. States are not bound to exclusively purchase certified machines and in fact many do not use officially certified machines. Robert S. Montjoy argues that having the Election Assistance Commission conduct studies for which types of voting technologies are best saves states money in the long run. He states, “Without the voluntary standards each state would have to conduct its own tests, a task that is repetitive and expensive” (Ceaser and Palazzolo 2005). This means that although the EAC has little actual power to make changes in policy, the commission does help states in decision-making power by conducting research on voting technologies.

Title III creates some basic requirements for voting equipment to be used by states. The first of which is the preventing of overvotes. Overvotes occur when a voter indicates that the voter desires to vote for more than one candidate for any given office. For example, if a voter marks next to both George W. Bush and Al Gore on the same ballot, that is an overvote. HAVA requires that any technology must notify the voter of an overvote. This commonly occurs in most advanced voting systems such as optical scan machines that will reject a vote if it contains an overvote. The second Title III requirement for voting equipment is that it has an auditing capacity. The technology should have some sort of paper trail that can be reviewed after the election. The law also requires that voting localities provide some sort of assistance for individuals with disabilities. Each voting station is mandated to have one direct recording equipment (DRE) machine or other system with an audio function in order to aid people with vision problems. The Help America Vote Act also mandates that a voting system meet the requirements of allowing for alternative languages. Under the Voting Rights Act of 1965, if a

local jurisdiction has a population where more than five percent that natively speak a language other than English, that jurisdiction must offer ballots in that language.

Title III of the Help America Vote Act includes a directive for precincts to create an opportunity for provisional ballots. Provisional ballots are used when a voter shows up to the polls but the name is not on the registry. If the voter believes this omission is in error, under the Help America Vote Act, the voter must be given a provisional ballot. The election officials then review the ballot to determine if the vote should be counted. In conjunction with the introduction of mandated provisional ballots, HAVA directed all states to create statewide voter registration lists. The actual mechanism to create such a list is left to the states. Some states created a list from a master statewide voter registration initiative while others simply compiled the lists of localities such as counties or precincts.

Title IV of the Help America Vote Act is entitled “Enforcement.” It gives the federal government the power to ensure that the requirements of title III are being met by the states. The bill reads, “The Attorney General may bring a civil action against any State or jurisdiction in an appropriate United States District Court... as may be necessary to carry out the uniform and nondiscriminatory election technology and administration requirements.” (Help America Vote Act 2002)

The Help America Vote Act carefully walked a tightrope of setting several mandates that states must follow while still allowing states and local jurisdictions to make decisions about their own voting procedures. The first action accomplished by HAVA was to give block grants to the states so that they could implement the changes needed in voting technology. This was very important because states undoubtedly wanted to change their voting procedures but as Daniel

Palazzolo states, “Presumably, gridlock at the state level was rooted in fiscal constraints.”
(Palazzolo and Moscardelli 2006, 6)

There are generally three tools the federal government can employ to get local government to take actions that would change policies and procedures. Those three tools are 1). grants, 2). regulations, and 3). information, also known as a). the carrot, b). the stick, and c). the sermon (Montjoy and Chapin 2005). The Help America Vote Act employed all three of these measures, thus demonstrating elements of cooperative federalism and coercive federalism. Because the grants given out by HAVA had few strings attached and left most decision-making power to the states, HAVA mostly represents cooperative federalism.

While the federal government debated which direction it should head, some states took the initiative and created new laws governing voting policies on their own. Other states waited for leadership from the national leaders before implementing the changes necessary. A few states waited until the very last minute, pushing deadlines for reform mandated in the Help America Vote Act.

Florida became the first state to take action for election reform. In the wake of the national embarrassment of the Presidential election of 2000, Florida passed sweeping reform legislation in 2001 that among other things outlawed punch-card machines for voting. (MacManus 2005) The law in Florida also clarified recount rules and procedures and further solidified the process for vote certification. Because Florida found itself in the middle of a nation wide controversy about the efficacy of its voting procedures, Florida became a model of how to move forward in the post 2000 election environment.

Other states led the charge in reforming their election technology and how elections were executed. The state of Georgia helped to spearhead some major policy changes in the execution

of elections. Georgia seemed very eager to make the necessary changes to its election process and more than one hundred bills were introduced into the state legislature in an attempt to streamline the process of voting (Strahan and Gunning 2005, 60). The first major reform that passed occurred in 2001 which established a statewide voting system that relied upon new electronic technologies. The funding came from the sale of state bonds in the amount of \$54 million. Many states simply did not have access to that sort of cash flow and that explains why Georgia became one of the leaders in election law reform.

Some states made incremental changes in election laws such as passing voter registration reform and voter assistance reform. These states exercised caution in making changes for several reasons beyond simple fiscal constraints. Some states simply believed that no change was necessary because they used different equipment and electoral practices than those in Florida. They were also hesitant to make a move to enact legislation that would be costly because there was a distinct possibility that the federal government would act. First, this led to uncertainty about the actions the federal government intended to provide regarding a revenue source for the replacement of outdated systems, or perhaps the federal government would mandate that a certain sort of technology must be utilized. In those cases if the state acted first the state would find itself making costly changes that might have to be undone when the federal government finally acted.

Other states lagged behind these visionaries of electoral reform. Most saw gridlock over financial constraints within their states. States, counties and localities often simply did not have the money necessary to make a major overhaul of voting technology. Even with the extreme example of the 2000 election in Florida, change was difficult and slow moving in the majority of the states. This is where the Help America Vote Act helped the most. In those states that lagged

behind the innovators, HAVA infused cash into the state's electoral system allowing those states and localities to make the necessary changes that ensured that future elections occurred without incidents like those that transpired in the 2000 presidential election.

The state of Oklahoma is a good example of an innovator when it comes to voting technology. Oklahoma adopted a policy that machines will be uniformly adopted throughout the state and adopted optical scan machines as early as 1992. Subsequently, in preparation for the 2012 presidential election, Oklahoma took the initiative to revamp their voting equipment statewide. Oklahoma decided to replace their Optech machines and replace them with optical scan machines from Hart Interactive that provided added accessibility to the disabled, specifically to the blind. (Ogrocki 2011)

The Help America Vote Act provided a provision that allowed states that innovated in election reform to apply the federal funds offered by HAVA to monies that had already been spent to upgrade equipment. This meant that a state was not punished for acting quickly to change its method of voting. This bill set a perfect example of the way that states and the federal government can cooperate in changing the status quo.

Eventually, all fifty states implemented procedures that complied with the Help America Vote Act. Although some states lagged behind others, no state still uses either punch-card voting systems or lever machines. All states individually have formed statewide registries of voters and they have met all other commitments mandated by HAVA.

2.5 Confidence in Voting Technology

A voter must feel like a vote is going to be counted in a manner that reflects the desired selections of the voter. Hammer et al. (2010, 130) stated it perfectly when they said, "it is widely believed that problems with voting systems reduce confidence." The dramatic shift in

technology after the 2000 election shows just how much importance local, state, and national officials placed on the issue. Rarely does legislation of the magnitude of HAVA pass so swiftly, which proves the importance of the matter.

Without trust and confidence in the voting mechanism, people tend to become disparaged in the very functioning of democratic institutions. One study, entitled “Are Americans Confident Their Ballots Are Counted,” shows that if voters have a lack of confidence in an election that occurred in the past, they are less willing to vote in future elections. The authors write, “We present data supporting the hypothesis that voter confidence has a significant effect upon political participation.” (Alvarez et al. 2008, 756) Other academic works study the relationship between the type of machinery and voter turnout. Allers and Kooreman (2009) indicate that there is a small but temporary effect that lowers voter participation when electronic technology is introduced to the voting public. A decrease in political participation as a result of the choices of local election officials in regards to which equipment records votes is a situation that should be avoided whenever possible. The electorate needs to trust that the machinery for casting a ballot is both trustworthy and reliable.

In a 2006 case brought before the Supreme Court of the United States, confidence in accuracy of voting was brought into question. The court stated that the perception of fraudulent activity on a large scale can impact voter confidence and ultimately erode citizen’s engagement and even voter turnout. The court stated in the decision, “Confidence in the integrity of our electoral processes is essential to the functioning of our participatory democracy” (Purcell v Gonzalez 2006).

Several high profile instances have occurred in the recent past that served to denigrate the amount of confidence voters feel toward their voting equipment. This chapter discusses past

deficiencies in voting technologies that might play a part in the skepticism that some members of the voting public have about certain types of voting machines. Some news about the shortcomings of election procedures might be thought of as alarmist journalism, but it plays a part in the amount of confidence a voter has about the functioning of the electoral system.

Aviel D. Rubin, Ph.D. published a book entitled *Brave New Ballot: The Battle to Safeguard Democracy in the Age of Electronic Voting*. The book explained that the author, a computer scientist, gained access to the source code of the Accuvote TSx. The Accuvote TSx machine was present in 37 states in 2002 (Rubin 2006, 23). This machine was a proprietary DRE machine with no VVPT produced by a company known as Diebold.

When Rubin examined the source code of the voting technology used by many states after the passage of HAVA, the author found that the code was written in a sloppy manner that provided the voting machine with little security. Rubin points out that the potential of a Trojan horse attack on this particular model of voting machine could be very high. The author adds that the proprietary nature of the code created a situation that would not allow auditors or election officials to detect any sort of tampering with the code or the election results.

The most dangerous portion of the code was known as the *ballot definition file*. If an outside entity was able to alter the code in this file, the election results could be modified in a way that no one could notice. After the voter completes the voting process using the Accuvote TSx machine, a confirmation screen appears that allows the voter to review voting choices. The author explains that if the ballot definition file was corrupted, the confirmation screen might appear that the correct choices were recorded but the actual vote being recorded by the machine could be different than the choices made by the voter.

This book is important to the study of confidence in voting technology because the author details the very public aftermath of the announcement of these findings. The public became very aware of the problems with the machines being studied when CNN and then the New York Times interviewed the authors. The New York Times displayed the report about the failures of the TSx machines on the front page of its website. This sort of negative press regarding voting machines is not isolated and it serves to erode the confidence voters feel about the very foundation of the voting process.

2.6 POST HAVA

Immediately after the passage of the Help America Vote Act, election officials were exuberant about the use of new computerized technology. This led to widespread reform of voting mechanisms including the adoption of more DRE (Direct Recording Electronic) machines and OS (Optical Scan) machines. One study found that “fifty four percent of jurisdictions reported using electronic systems for the 2006 election” (Moynihan and Lavertu, 69). The earliest adopters of DRE machines made the mistake of purchasing equipment that did not print out a receipt of any kind. The DRE machines did not provide a VVPT (Voter Verified Paper Trail) that is necessary to instill confidence in the electorate in the case of a re-count.

Later iterations of the DRE, such as the ES&S iVotronic, provided not only an electronic record of the vote, but also a paper print out that could be evaluated at a later date. Post election accountability is of utmost importance when it comes to the amount of confidence a voter might feel about the reliability of his or her vote. A machine that does not leave behind a VVPT might be tampered with or be subject to malfunction that would leave the election in peril of illegitimacy due to the inability for a recount.

In 2004, one example of a machine causing concern in the electorate was written about in a USA Today article that explains how a DRE machine that did not provide a VVPT failed in a way that lost more than 4,000 votes. Because there was no paper trail to examine after the election, there was no way to discover what the voters intended. The article explains that the machine was designed with a limit on the amount of votes that could be stored. When the amount of votes exceeded the amount of votes the equipment could store, voters continued to cast ballots that were not recorded (USA Today, 2004). The machine in question is no longer in use, but the negative publicity surrounding this machine played a part in the narrative that electronic machines are untrustworthy.

Another similar instance occurred in Tarrant County, Texas in 2006. This time the problem stemmed from bad programming. The code was designed to add early voting totals to the voting total on election day. Because of a mistake in coding, the early voting totals were compounded, leading to greatly inflated voting totals. One candidate in the race for State Representative noticed the problem, Robert Higgins stated, “We expected about 8,000 in our race and got about 21,000” (Spangler and Tinsley 2006, b1). This instance shows how machinery can be susceptible to sloppy programming which is especially challenging since voting machine companies are very protective of their codes. They do not share their codes with the public, which creates a problematic scenario in regards to voter confidence.

The Brennan Center For Justice published an article that explained how votes were lost en masse in several elections including the 2010 New York Gubernatorial race. In this case machines rejected the votes because voters selected more than one candidate. The machine was designed to reject these votes but the error message in this case led to confusion. Instead of recasting their ballots, voters simply left the polling place meaning that the ballots were considered

spoiled (Iyer and Norden 2011). The safeguard provided by the machine that was designed to prevent over-voting ended up causing votes to go unrecorded.

Publications that point out these discrepancies in voting technology usually use headlines that sensationalize and oversimplify the issue. Based on the Brennan Center article previously mentioned, the headline of the press release was titled “Tens of Thousands of Votes Lost Due to Poor Design in 2008 and 2010” (Iyer and Norden 2011, 5). This is just one example of many sensational headlines that serve to make the public weary of voting technology and contributes to a possible decline in confidence that their votes will be recorded correctly.

2.7 CONFIDENCE IN THE 2016 ELECTION

Leading up to the 2016 presidential election, many were concerned that voting equipment might be compromised. One of those concerned parties was the Secretary of the Department of Homeland Security Jeh Johnson. Prior to the election Secretary Johnson seriously considered designating the nation’s voting machinery as “critical infrastructure.” By designating this equipment as “critical infrastructure,” the United States Federal Government would be able to devote more attention to the cyber security matters that might endanger these systems.

According to Secretary Johnson, the issue of federalism became a very important component of any decision labeling election technologies as “critical infrastructure.” The Secretary claimed that states did not wish to divest themselves of the power to control their technology. Secretary Johnson explained in his testimony before the U.S. House Committee on Intelligence on June 21, 2017 that “To my disappointment, the reaction to a critical infrastructure designation, at least from those who spoke up, ranged from neutral to negative. Those who expressed negative views stated that running elections in this country was the sovereign and

exclusive responsibility of the states, and they did not want federal intrusion, a federal takeover, or federal regulation of that process” (Johnson 2017).

This statement shows the problems leading up to the 2016 presidential election. First, it shows that the Department of Homeland Security was concerned about the security of voting technology and felt that something should be done on a national level that would shore up the security of voting machines. The second issue shown is that localities are very hesitant to give up control when it comes to the decision making power they possess in regards to voting mechanisms. Because of the negative reaction received by Secretary Jeh Johnson, he ultimately decided not to pursue the designation of “critical infrastructure.”

In January of 2017 the National Intelligence Council released an Intelligence Community Assessment entitled “Assessing Russian Activities and Intentions in Recent US Elections.” This document, released very shortly after the election, mostly focused on the propaganda aspect of Russian interference with the United States presidential election. In fact it states in no uncertain terms that the intelligence community does not believe that vote tallies were altered. It does state that the motivation behind meddling in the electoral process went beyond simply changing the vote count, but instead was an operation designed to affect the confidence of voters. The report states “Vladimir Putin ordered and influence campaign in 2016 aimed at the US presidential election, the consistent goals of which were to undermine public faith in US democratic process” (National Intelligence Council 2017, 6).

The NIC report was very early in the information gathering process. Although the intelligence community did not use that report to confirm that election machines were vulnerable, it made clear the intentions of the Russian government to undermine the electoral

process. It was just a few months later that information was revealed indicating that many states and localities had, in fact, become targets in regards to their election infrastructure.

In a redacted top-secret report, the National Security Agency affirmed that voting equipment had been the target of a cyber intrusion operation during the 2016 presidential election. An unnamed company that produces election equipment was the subject of a phishing campaign designed to gather information or alter outcomes of elections. Phishing is when an actor creates a fake email account that looks similar to a trusted email source with the hopes that the recipient will correspond with that account in a way that compromises the security of the victim. The report reads, “Actors were probably trying to obtain information associated with election-related hardware and software applications. It is unknown whether the aforementioned spear-phishing deployment successfully compromised all the intended victims, and what potential data from the victim could have been infiltrated. However, based upon subsequent targeting, it was likely that at least one account was compromised” (National Security Agency 2017).

Based on the National Security Agency report, it is obvious that someone or even a country tried to gain access to voting equipment via software in the months leading up to the 2016 presidential election. The NSA states the attacks occurred between August and November 2016. The extent of damage or information gathering is unknown but that could in fact be the objective. Even if voter roles are not changed or tallies go unchanged, attacks like this serve to alter the amount of confidence voters feel about the electoral process. This report shows that someone is actively trying to undermine the proceedings of an election in the United States. The possible infiltration of networks related to voting infrastructure serves to diminish trust in the electorate that votes are recorded accurately and consistently.

Since the election of 2016 a litany of articles have been produced with headlines that probably serve to raise concerns and alarm voters about the vulnerability of their voting machines. The articles have titles like: “America’s Electronic Voting Machines are Scarily Easy Targets” (Barrett 2016) and “How to Hack an Election in Seven Minutes” (Wofford 2016). These sorts of eye-catching headlines play a part in eroding public confidence in voting technology.

2.8 Online Voting

Some people contend that the United States should ready itself for a system of voting conducted online from remote locations. Others argue that current technology simply cannot provide the security needed for trustworthy elections through the Internet and the risks involved represent too great of an endangerment on the outcomes of our elections. This section discusses the advantages and perils of online voting.

Electronic voting is nothing new in the United States; in fact it is rather ubiquitous. Some states have optical image scanners to count votes and upload the results to local precincts. Other states employ electronic voting machines similar to the Automatic Teller Machines used by banks to distribute money, known as Direct Recording Electronic (DRE) machines. Internet voting takes this basic principle and moves it one step forward. What if the voter doesn’t have to leave home to cast a ballot?

Currently, countries other than the United States of America provide their citizens an avenue for casting ballots from the comfort of their homes via the Internet, which will be discussed below. American election officials could implement online voting in order to allow greater access to the ballot and encourage a higher degree of voter participation. One must,

however, consider the immense risks associated with online voting and implement a system that mitigates these risks as much as possible.

It seems difficult to imagine a future that does not involve electronic devices to cast a ballot in the United States. The pace of technological expansion increases as years go by and it seems only logical that this would grow to envelop the mechanisms that drive our democratic process. Thomas Misa (1998) offers two distinct definitions for technological determinism. In one sense technological determinism means that “technological change determines social change” (Misa 1998, 308). The second definition for technological determinism states that technology grows in a fairly predictable manner, and using this definition makes the inclusion of voting via the Internet appear imminent. Alvarez and Hall (2004, 27) in their book *Point, Click, & Vote, The Future of Internet Voting* state clearly, “The question is not whether the internet should be used for elections, but when. It seems to us inevitable: Internet voting is the future of voting in the United States.”

The terms electronic voting and internet voting can be defined in many ways. Electronic voting includes all voting systems based on any sort of digital technology at all. This can be the optical scanning machines and Direct Recording Electronic (DRE) machines that are used today as well as any sort of Internet voting. Here I focus on the possibilities and limitations of remote Internet voting, which means voting that takes place in a location separate from the collection of votes and the voting process itself is unmonitored by election officials. Many of the concerns associated with electronic voting in general apply to remote Internet voting as well as many more.

Implementing a system of digital democracy promises a great deal of positive possibilities for the American electorate. The relative ease of casting a ballot from home

increases the opportunity for many people to participate in the electoral process. The costs associated with voting could drop immensely, providing a much larger incentive for engaging in the practice of voting. The primary benefit to remote online voting, however, is the potential to increase voter turnout. Participation in elections in the United States is meager when compared to other nations that hold elections (IDEA 2008). The United States holds its elections on Tuesdays, while other countries hold their elections on the weekends to encourage participation. In the United States, most states and precincts require that the individual physically travel to a polling station to cast a ballot. This creates a cost for the individual voter and it might diminish the ability or desire to participate in the election. A remote online voting system spanning multiple days would reduce these costs and increase the willingness of the voter to engage.

Voter turnout is extremely important in a representative democracy. If certain groups fail to attend to their voting duties, politicians might begin to ignore their political wants and needs. Richard Fenno (1978) argues that there are four different audiences to which a representative must react: The geographic constituency, which includes everybody in the geographic district; the reelection constituency, which are those people who might vote for that representative; the primary constituency, those voters who are in the same party as the representative and might support the candidate in a primary election; and the personal constituency, including family members and personal friends (Fenno 1978). In order for a representative to be responsive to a voter's needs, that voter must be a part of a constituency to which the representative is more likely to devote attention. Simply being in the geographic constituency is not enough. Representatives are much more likely to pay attention to the needs of people who are in at least their reelection constituencies. Therefore voters must seek to maximize the amount of citizens

who participate in elections for their representatives. Online voting provides an outlet for individuals to change the constituencies in which they belong.

Four specific groups of people would benefit from the increased access provided by a remote online voting system. The first of these is a person who is physically handicapped or otherwise unable to travel to a polling station to cast a ballot. Internet voting could provide an avenue for people with all sorts of disabilities to participate who would otherwise not participate.

The second group consists of enlisted United States soldiers who serve overseas at the time of the election. This is a significant group not just because of the important job they do for our country, but because the voting practices in place for them today fall short of optimal. Individual states implement different rules for absentee voting and this creates a disparate set of circumstances for individual soldiers. In addition, mail is frequently lost or delayed often beyond the date of the election (Yasinsac 2012).

Members of the United States' military and federal workers fall under the purview of the Uniformed and Overseas Citizens Absentee Voting Act of 1986 (UOCAVA). This act set up a system for these voters to vote via absentee ballot. The ballots can be mailed or even transmitted electronically, but must be mailed back in time for the election to occur. Because of the complexity of the system only about 30% of those eligible to vote via this method do so, which is especially troubling considering that members of the military have a greater motivation to vote than the general population (Heufner 2013).

The third is the person who travels frequently for business or other reasons. The fourth group of people who might benefit from a remote online voting system is the youth of the United States. Those people between of the age of 18 and 25 typically refrain from voting in large numbers in American elections. These people are typically very familiar with Internet

technology and well versed in the uses of digital applications. Most likely, providing them with a platform they understand and can relate to would encourage those people to vote more regularly and in larger numbers.

Another added benefit of an online voting system is delivering voting results more reliably and quickly. Internet voting offers a great deal of promise to the potential voter. The ease of access and precision of indicating a voter's decision makes it a very compelling form of voting. Increasing participation and enabling citizens to vote in an expedient manner makes Internet voting seem like the most intuitive step forward.

When discussing the idea of technological determinism, one must remember that it does not take into account the idea that technological change is formed partially based upon societal pressures. In respect to Internet voting, one of the ways to address the societal dimension is to use a Technological Acceptance Model (Choi and Kim 2012). This is the propensity for society to embrace a given technology and several studies address the willingness for people to accept the idea of voting on the Internet.

Trust in the Internet plays a key role in the intention of someone who is considering the option of voting online. A 2012 study by Carter and Belanger surveyed a group of people to find out the level of acceptance they might have for an online voting program. Important factors included convenience, accessibility and political interest, but in order for people to embrace online voting they must trust that their votes will count and that the votes they cast will be kept anonymous. The study found that a majority of the respondents were willing to accept the idea of voting on the Internet, but there were some lingering concerns. The authors state "Doubts about the secrecy and anonymity of one's vote could have profound social impacts, for example tempting the voter to cast a more politically correct vote" (Belanger and Carter 2010, 36).

In 2004 the Swiss government conducted a small-scale test of Internet voting. A study of this experiment found some interesting contradictions to the assumptions previously discussed. The experiment happened in the Canton of Zurich, which includes 870,000 eligible, voting citizens. The experiment was conducted by sending out mailers to voters that offered the voters several choices. The first option was to fill out the ballot mailed to them and subsequently simply mail it back to the election office. The second option was to log onto a website and enter a specific code found on the mailer to cast their ballots. Voters could also go to their traditional polling place and cast their ballots in person. The findings of the study show that in the Canton on Zurich experiment, only 20 percent of the voters chose to use the Internet to register their ballots. The majority of voters simply filled out their ballots from the mailers and returned them to the voting office. This skewed result might be reflected of the simplicity involved with simply filling out the mailed ballot and returning it via mail rather than taking the extra effort that is demanded from logging into the Internet to cast a vote (Beroggi 2014).

Much evidence shows that the current technologies in existence today do not allow for the possibility of a completely secure online voting system. In fact, many argue that our very democracy would be in jeopardy because of the security risks involved in Internet voting. For democracy to thrive citizens must know that the system to cast ballots counts them properly and record those votes correctly. Ulle Madise and Tarvi Martens (2006, 17) list three potential dangers that could be associated with online voting: incorrectness or untrustworthiness, breach of the voter's anonymity, and annulment of the elections.

Complete security is not possible with an online voting mechanism, but Alvarez and Hall (2004) point out that all voting schemes have security issues. They point out that even hand-counted-paper-ballots have security issues. That is why ballots are securely transported to the

voting precinct in a sealed container. The voter takes one of those ballots and secretly fills it out and turns it in to some form of secured box. The authors claim that democracy has faced security threats while voting in the past and Americans have found ways to overcome those threats. Alvarez and Hall (2004) contend that although there are risks associated with online voting, there are risks associated with any sort of voting and society simply needs to decide how much risk it is willing to tolerate.

Voting on the Internet is vastly more complicated than any sort of voting method seen in the past and this creates a scenario that could lead to catastrophic results. It is easy to imagine worst-case scenarios that undermine our democracy when contemplating the possibility of Internet voting. Some of these scenarios have even been played out on small-scale tests of Internet voting.

A mainstream argument against online voting is the very real threat of viruses, intrusions and other digital malfeasance being used to compromise the results of an election. As an example, a lone hacker might initiate a distributed denial of service (DDOS) attack on an individual computer as the person prepares to vote. A DDOS attack overwhelms the voter's computer to the point that it is rendered ineffective. This sort of attack is relatively easy to perform on an unprotected computer.

On a larger scale a DDOS attack could not only hinder individuals from casting their votes, but the attack could actually alter the outcome of an election. If the attack is targeted toward a particular community or group of voters who tend to vote in a predictable manner, then shutting down accessibility to the voting system could alter the results. For example if the attack is centered in an urban area that votes heavily for Democratic candidates, the DDOS could essentially hand the win to the Republican Party candidate.

One of the basic ideals of American democracy is the secret ballot, the ability to cast a vote without external players knowing which decisions the voters are making when marking ballots. Having knowledge of voting behavior created problems in the early days of our democracy and it can be even more problematic in our digitally connected world. (Alvarez and Hall, 2008) When a party knows the voting behavior of the individual, that voter might be compelled to vote in a particular way. Under a secret ballot system, paying people to vote for a particular candidate is not a rational action because the payer cannot verify that the voter cast their ballot in the manner desired. Removal of anonymity reinstates the incentive for paying for votes. Breaches of security might allow a third party the ability to view the votes made by individual voters. This could allow bribery for votes or hackers could simply publish the names of individuals who voted for specific candidates.

In 2010 the District of Columbia announced that it would begin an online voting program. Prior to the actual opening of the election, the DC election board conducted a pilot project. The company selected to oversee the online voting procedure was very confident that its system was secure. In fact, the company was so confident that it planned a public review period before the primary election and encouraged the public to attempt to attack the system. It only took a matter of hours for someone to find a vulnerability in the District of Columbia's proposed online voting system. System testers began hearing the University of Michigan fight song upon submission of their ballots. It seems that a team from that university had made its way into the system and it was able to gain near complete control of the programs that ran the voting apparatus (Simons and Jones 2012). The team was able to change ballots at will and the infiltration might have gone unnoticed had it not inserted the fight song into the computer

network. The District of Columbia decided not to integrate an online voting option for the election as it had intended.

Another problem facing the idea of Internet voting is known as the “Digital Divide.” Not all members of society have ready access to the Internet and implementing a form of voting that completely depends on Internet access could leave some members of the voting population disenfranchised (Belanger and Carter 2010). This digital divide makes it imperative that any execution of an Internet voting system exist in conjunction with a traditional voting system in order to ensure that all eligible citizens maintain the ability to express their will in the election at hand.

Cost effectiveness cannot be the deciding factor when considering an online voting system. It seems on face value that an online voting component would allow the election offices the chance to save money by streamlining the process. Technology typically reduces costs of labor-intensive endeavors. A study of test programs in Great Britain show that the costs associated with Internet voting greatly exceeded the costs of conventional ballot casting (Wilks-Heeg 2009, 105). This could be explained away by reasoning that a substantial initial investment is required for an online voting scheme and that the costs will subside over time.

In the case of online voting, the electronic system must be in addition to, not replacing the traditional system of casting ballots. The goal is to increase voter turnout and voter participation. If the physical precinct voting booths are completely eradicated, a whole new group of voters could end up disenfranchised, particularly voters who do not have the means to purchase electronic devices for voting.

The nation of Estonia implemented the largest-scale use of Internet voting globally to date. Beginning in 2005 Estonian voters could cast ballots using the Internet in addition to the

traditional outlets for voting in that country. To this day, there have been no verifiable attacks on its voting system and the Estonian experience with online voting seems to be a positive one.

The Estonian model for voting contains 7 separate steps (Chaeikar, et al. 2013). Those steps are:

1. To open voting web page by presenting the ID card into e-voting card reader device
2. To verify identity of the voter by presenting PIN 1
3. To verify eligibility of voter to cast a vote through searching in population register database
4. To present list of electoral district candidates to voter
5. To choose the candidate(s) and cast an encrypted vote
6. To sign the encrypted votes digitally by using PIN 2
7. To count the anonymous votes after removing digital signatures

In Estonia, remote online voting is successful partly because it has re-defined the notion of secrecy in casting ballots. Secret ballots are very important in an open democracy because they protect against buying people's votes among other negative repercussions. The Estonian version of online voting creates a two-part document when the vote is sent to the vote counting server. The first part of this document is known as the "outer envelope" and this contains the identity of the voter. The second part is known as the "inner envelope" and that contains the actual choice that the voter made.

It is imperative that these two files are kept separate for the vote to be kept secret. Estonia does not consider it of importance to keep secret the fact that one voted. The secrecy only lies in the actual decision made when the voter submitted the ballot. This new definition of secrecy allows for a higher degree of oversight over the online electoral process. A voter can verify

online that a vote has been placed, and with a digital signature, the voter can re-vote as many times as the voter pleases until the election is over.

There are four features of the Estonian society that enabled an easy and smooth transition to the acceptance of an online voting model. The first is widespread Internet penetration in the country. A large percentage of the Estonian population has access to the Internet and that number is growing rapidly. There are also public computers with card readers available for citizens who wish to vote online but have no access at their homes. The second factor is a legal structure that employs provisions for the governance of Internet voting. The third factor is an identification system that provides satisfactory verification of the identity of the person voting. The importance of the identification card established by the Estonian government cannot be understated. Each citizen who intends to vote online must obtain a national ID card and then purchase a very inexpensive card reader for the computer. The fourth factor is a political culture that accepts and promotes innovations such as Internet voting (Alvarez, Hall, and Trechsel 2009).

The voters who participated in Internet voting in Estonia seemed to be pleased with the experience. A study found that about 11% of the voters who cast a ballot online stated that they probably would not have voted if the option of Internet voting had not been available. Also, there is a very high degree of faithfulness in people who used the online voting system. The authors of the study say, "Our data show that without any exception all e-voters who declared having voted over the Internet in 2005 (and who were again among those surveyed in 2007) voted over the Internet again in 2007" (Alvarez, Hall, and Trechsel 2009, 6).

One of the primary objectives for developing a system of online voting involves the increase of voter participation in elections. The case of Estonia certainly proves that the addition

of Internet voting leads to more people casting ballots, but initially, it is not as much of a marked improvement as one might expect. The parliamentary elections in 2007 showed a turnout of 61.9%, in 2011 it was 63.5% and in 2015 it was 64.3% of eligible voters (Vabariigi 2015). Those numbers show that adoption of Internet voting does what it is intended to do; it allows for more voter participation. Voter's participation levels continue to grow over time and the number of people engaging in Internet voting in Estonia grows larger every year.

These numbers also show that it takes time for the population to embrace the new technology and the use of Internet voting seems to be trending upward over time. The very first instance of online voting by Estonia in 2005 was for local elections and only 9317 people voted via the new technology. 133,662 citizens cast their vote on the internet in the most recent comparable local elections in 2013 (Vabariigi 2015). Estonia shows that Internet voting offers a great deal of promise. Increasing accessibility and participation could change the way the electorate interacts with their democratic instruments. The Internet could offer people a chance to voice an opinion that would not otherwise be willing or able to cast a vote.

On the other hand, voting on the Internet introduces a great deal of risk into the voting process. The opportunity and possibility to alter the outcomes of elections abound. Individual actors or nation-states could plant computer viruses on local computers as well as on vote counting servers to change the results of an election. Denial of service attacks could prevent voters from casting ballots or shut down entire voting systems. The worst-case scenarios that can be painted in regard to Internet voting should at least give us pause to consider the possible implications.

CHAPTER 3. METHODS

This thesis studies the relationship between the voting method used and the confidence of the voter that the vote was recorded correctly. The primary method for data in this paper is a short questionnaire that asked members of the public several questions. This survey can be found at the end of this thesis in the Appendix. The short survey began by ascertaining demographic information, party affiliation and where respondents fit on the ideological spectrum. The participants were then queried about their opinions regarding their confidence in the voting machines they used in the 2016 presidential election. They were also asked about their level of concern regarding the possibility of voting machines being hacked. The final question asked about the confidence they might have in an online voting mechanism.

The main goal of the survey was to ascertain the amount of confidence voters have in their current voting machinery. Confidence is a difficult subject to measure. This survey directly asks participants about the level of confidence felt in the accuracy of the voting machine to record the vote correctly. The primary hypothesis that will be examined is:

H1: There is a relationship between the type of voting machine used by the voter and the amount of confidence they feel in the fact that their vote was recorded correctly.

The null hypothesis would show:

H0: There is no relationship between the variables of voting machine and voter confidence.

Prior to conducting any surveys, I requested permission from the Institutional Review Board at the University of Central Oklahoma. Its charge to ensure that all research involving human subjects remains safe for those studied. I was given an exempt review status for my surveys. This means that because of the way the questions were asked and the information gathered in no way contained data that would allow the subjects to be identified personally. The Institutional Review Board approval number for this project is 17002.

The surveys were conducted on the National Mall in Washington, DC. People were approached at several rallies and gatherings over the course of approximately one month. The first occasion for gathering information was the day of inauguration of Donald J. Trump, when he officially became the President of the United States of America on January 20, 2017. The second large gathering occurred the following day for the “Women’s March on Washington.” I followed up that rally with the “Right to Life” rally on the January 27, 2017. The rest of the surveys were conducted at various times on the grounds of the National Mall.

Participants were approached at the site of the National Mall and it was explained to them that the survey takes less than 2 minutes to complete. The nature of the selection of participants led to a wide variety of responses and a diverse demographic landscape. People from all over the nation, all age groups, and a wide scale of ideological leanings were represented in the sample. The 422 surveys collected included participants from 41 states and the District of Columbia, and over 200 counties throughout the nation. This sample of citizens was taken from a group of willing participants who happened to congregate in a public setting. This means that the sample is not purely random. A true random sample must begin with a list of eligible participants who

are chosen from the list in a random manner. (Nardi 2016) This sample of participants began with no such list, so this is considered a convenience sample.

This paper is not generalizable to a larger population. “Convenience sampling” does not statistically allow the results of this research to be applied to the general population of the United States. Even though hundreds of people were surveyed, the results of those opinions cannot be assumed to reflect the opinions held by the entirety of the nation. (Bowen, Krosnick and Bowen 1996) Because of the place and times the survey was conducted, this sort of survey can describe the attitudes of those with the means and desire to attend large rallies. People who attend large rallies are more likely to have believe that their opinion matters, and could play a part in the amount of confidence they feel that votes are recorded correctly. Because of the manner in which this survey was taken, it is likely that the participants are more engaged in political endeavors than the general population.

Even though the surveys conducted cannot properly measure the mood of the entire nation after the 2016 presidential election, that doesn’t mean we can’t learn from the results of these surveys. This survey can be used to measure those who attended rallies to get a glimpse into the idea that the type of voting machinery encountered by the voter might indeed affect the attitudes voters feel about the confidence they have in the electoral process. The results of these surveys are limited only by use of convenience sampling because, as Peter M. Nardi stated, (2016, 124) “Sometimes it is just not practical, cost- or time-efficient, or necessary to do a true random sampling.”

The surveys themselves asked the participants the state of voter registration, and the specific county in which they are registered. Then they were questioned about which age group they belong: 18-25, 26-35, 36-45, 46-45, or 56 and over. This question was asked because I

hypothesize a relationship between age of the voter and confidence in voting technology.

Specifically, Hypothesis 2 is:

H2: There is a relationship between the voter's ages and the amount of confidence they feel about the different types of voting technology.

The next question addresses party affiliation by asking with which party the respondent identifies.

H3: There is a relationship between party affiliation and confidence about the different types of voting technology.

All of those questions were asked to ascertain if there are any demographic differences between the opinions held about confidence in specific voting machines. Are older people more skeptical of advanced technology? Do party lines delineate a rift in the amount of confidence a voter might feel for the voting process being used?

The questionnaire then asked participants what type of voting machine they interfaced with on election day. The vast majority interacted with either touch screen DRE machines or the scantron-like optical scan machines. If the voter's experience was with a DRE machine, he or she was asked if the machine provided a voter verified paper trail (VVPT) that confirmed the accuracy of the vote. The important question of confidence followed the type of machine they used. Respondents were inquired about the level of confidence they had that their vote was

recorded correctly on a scale of 1 to 5. 1 represented the least amount of confidence while 5 indicated a great amount of confidence.

H4: There is a relationship between the amount of voter confidence and whether or not the voter was provided a voter verified paper trail.

The next question was, “How concerned are you that voting machines might be hacked?” This question allowed those surveyed to again respond on a scale of 1 to 5. Then they were asked if they believe voting machines had already been hacked with a simple yes or no answer. They were then asked if they think that a hack influenced the 2016 presidential election and given the choice of either yes or no. The final question addressed the potential of online voting. The question asked “How confident would you be in an online voting mechanism?” The respondents were given the opportunity to address this question with a response on a scale of 1 to 5, with 1 being the least confident and 5 being the most confident.

There have been several studies along these lines, none of which was executed in exactly the same manner. The results typically show a relationship between voting technology and voter confidence. The most similar study to this thesis was conducted by Classen, et al. (2013) which took exit polls in two Ohio counties and asked questions similar to the questions addressed in this paper. This study finds that “When one compares voters with similar experiences, optical scan voters express greater confidence the election will produce fair outcomes” (Classen, et al. 2013). The biggest difference between the techniques employed in that work and my own is that my method yields results from a broad section of the electorate in regards to geographical location rather than surveying voters from two similar locations.

Some studies show that there is no association between voter confidence and voting technology. Emily Beaulieu (2016) found no such link between the two variables of voter confidence and voting technology. Beaulieu (2016) did find that older people were less confident in voting technology in general.

The analysis for the data received through surveys is performed by running a regression on the variables. The dependent variable of voter confidence is compared with independent variables of voting equipment, age of voter, party affiliation and if voters were provided with a voter verified paper trail. To make the data simple to examine I also produced graphs based on pivot tables generated in Microsoft Excel.

CHAPTER 4. RESULTS

The surveys conducted for this study primarily aimed to measure the amount of confidence a voter feels that the vote was recorded correctly. The variable of confidence is then compared with other variables such as which type of machine was used to vote and in what demographic subset of the population the voter belongs. The results of these surveys show a marked difference in some of these aspects. Specifically, the type of voting machine matters when it comes to the amount of confidence felt by a voter.

Using regression analysis, the table 1 below explains the interaction between voter confidence and the independent variables of voter verified paper trail, age category, party affiliation and the type of machine. The table shows that all variables are display statistical significance.

Table 1. The impact of type of machine, age, party affiliation and VVPT on confidence in voting technology

	<u>Voter confidence</u>		
	b	p	SE
Voter Verified Paper Trail	.85	**	.23
Age category	.11	**	.04
Party affiliation	-.17	**	.08
Type of machine	.43	**	.18

**=p<.05 r square=0.145 N=422

The following data is produced using pivot tables generated in Microsoft Excel. The first measure to examine is the general amount of confidence that votes are counted correctly. When taken as an individual variable, in general people are trusting of their voting machines. When

asked about how much confidence participants have and given a scale of 1 to 5, the results were mostly positive. Fifty-five percent of those responding to this question answered that they were very confident that their votes were recorded correctly. Only nine percent indicated a 1 on the scale, expressing that they were not very confident.

The results separate themselves out some when the answers are compared about confidence with participants who relied upon DRE machines as opposed to scan machines. It seems that the people who had the most negative responses skewed heavily from the group who had the DRE machines. Of the respondents with DRE machines, thirty-six percent answered with either a 1 or a 2 on the 1 to 5 scale. This can be compared with the participants who voted on scan machines, where only six percent indicated a 1 or a 2 on the survey. This shows a substantial difference in the amount of confidence felt between those who voted with DRE machines and those who had scan machines. These results indicate that my main hypothesis that there is a relationship between the amount of confidence a voter feels and the specific voting equipment being used is plausible.

The following chart (figure 1) shows the percentage of respondents who answered the question of confidence on the scale of 1 to 5 and how that related to the type of machine on which they recorded their votes. The chart reveals that those who were least confident in the technology they voted with tended to be those who with DRE machines. Those who had scan machines to cast their ballots felt more confident that their vote was recorded correctly. In fact, people who used a DRE machine responded with either a 1 or a 2 twenty six percent of the time. Those who use Optical Scan machines only responded with a 1 or a 2 just over 6 percent of the time. The vast majority of people who show lack of confidence are those who voted on DRE machines. This indicates that my first hypothesis (H1) is correct in these circumstances. This is

the most important hypothesis because it is the fundamental argument of this paper that there is a relationship between voter confidence and the machinery of casting ballots.

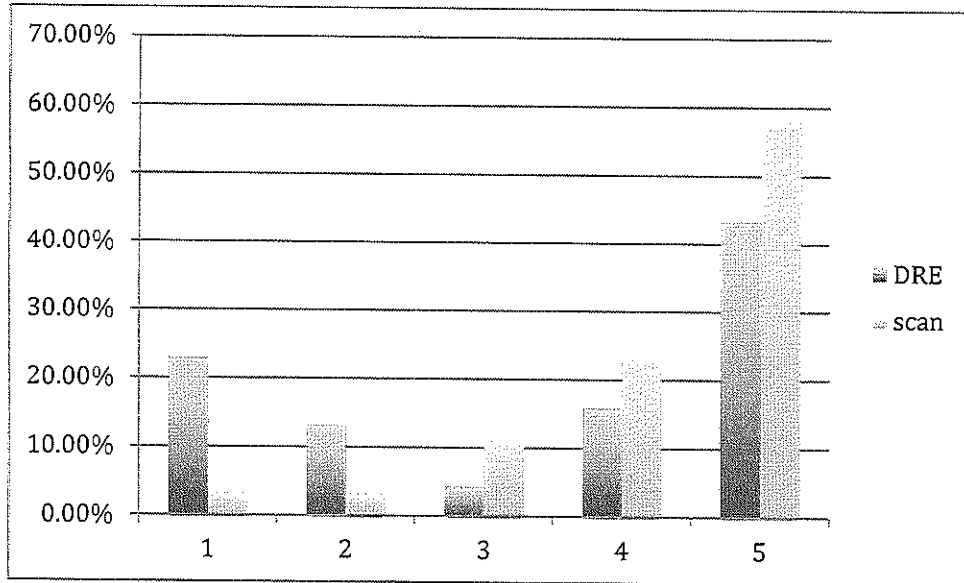


Figure 1: The percentage of people who responded 1-5 (1 representing least confident, 5 representing most confident) on the survey, separated by the type of voting equipment.

The differences in the amount of confidence decreases when the variable being compared is the age of the respondent. The chart below (figure 2) shows that there is no reason to think that the age of the respondents to the survey plays a part in the amount of confidence they feel that their votes were recorded correctly. Across all age groups, trends in confidence seem to hold steady. This shows that my second hypothesis did not come to fruition. There is no relationship between the respondent's age and the amount of confidence he or she felt about the vote cast. This shows that my second hypothesis (H2) is not true in these circumstances.

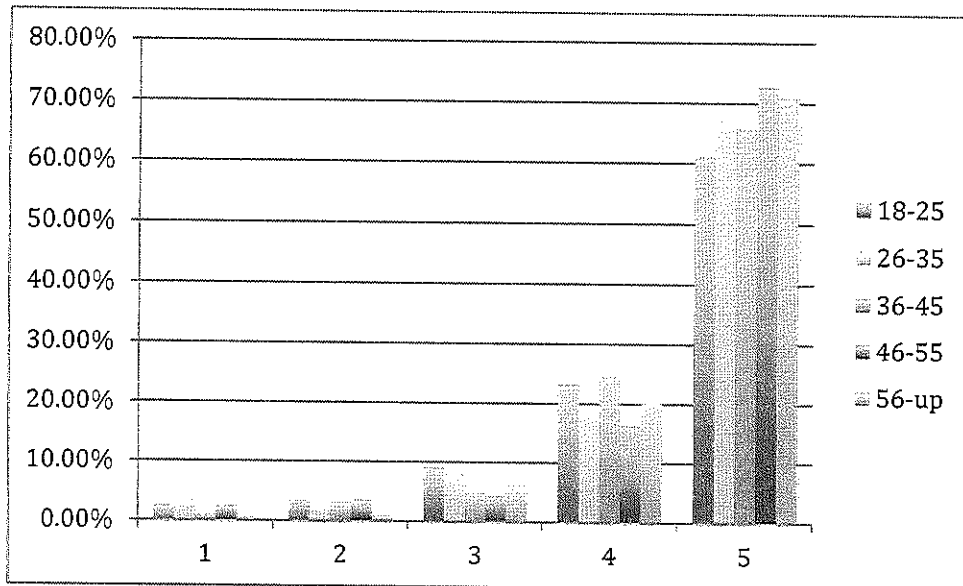


Figure 2: The percentage of people who responded 1-5 (1 representing least confident, 5 representing most confident) on the survey, separated by age brackets.

Another variable that shows little to no difference in the amount of confidence felt is party affiliation. When conducting the survey, I initially had a disproportionate amount of Democrats participating in the survey. To ensure a more even distribution, I conducted surveys at a “Right to Life” rally. In the end, 50% of respondents identified themselves as Democrats, 30% as Republicans and 20% as Independents. Democrats, Republicans and Independents hold similar positions about voter confidence. Figure 3 below shows that Democrats are no less skeptical of voting technology than their Independent or Republican counterparts. The results of my surveys show that the amount of confidence felt by a voter cannot be explained by party affiliation. The third hypothesis is also shown to be false. These surveys show no predilection for party affiliation to affect the amount of confidence in regards to voting equipment. These results disprove my third hypothesis (H3).

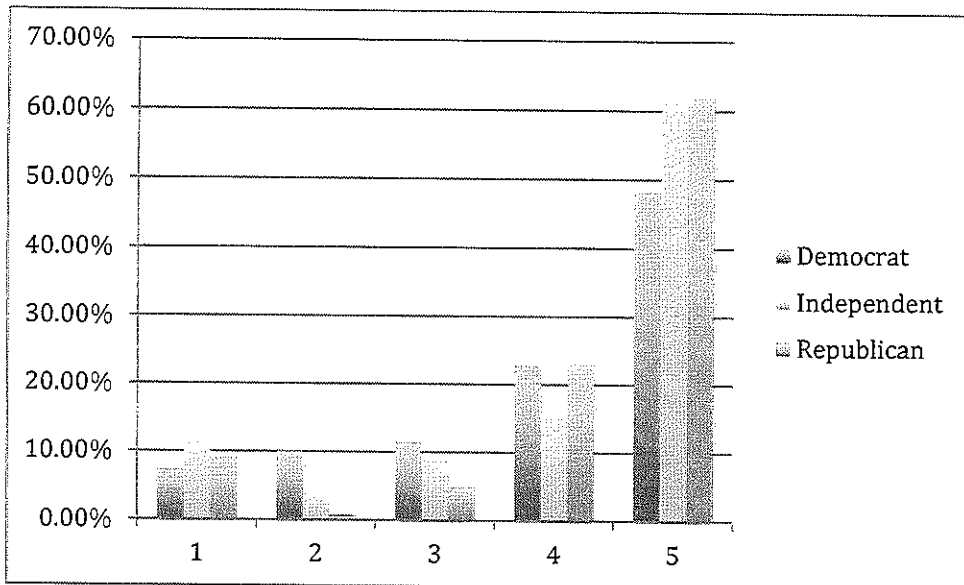


Figure 3: The percentage of people who responded 1-5 (1 representing least confident, 5 representing most confident) on the survey, separated by party affiliation.

A variable that is demonstrably different from the previous two is whether there was a Voter Verified Paper Trail (VVPT) provided when the vote was cast. All scan machines leave a VVPT but only a portion of DRE machines provide a VVPT. The survey asked participants if the voting machine printed a VVPT, and the results show that when people are given a VVPT the voter is more confident. The chart below (figure 4) shows the percentage of people who responded to the survey about confidence from the scale of 1 to 5. The first column depicts people who did not vote in a manner that left a VVPT, while the second column represents those who did have a VVPT. The machines with a VVPT got many more positive responses while those that did not leave a paper trail represent the vast majority of negative responses when it comes to confidence that votes were recorded correctly. This affirms hypothesis four, (H4) in that

there is a relationship between voters interacting with machines that print voter verified paper trails and the amount of confidence a voter feels about the accuracy of the vote.

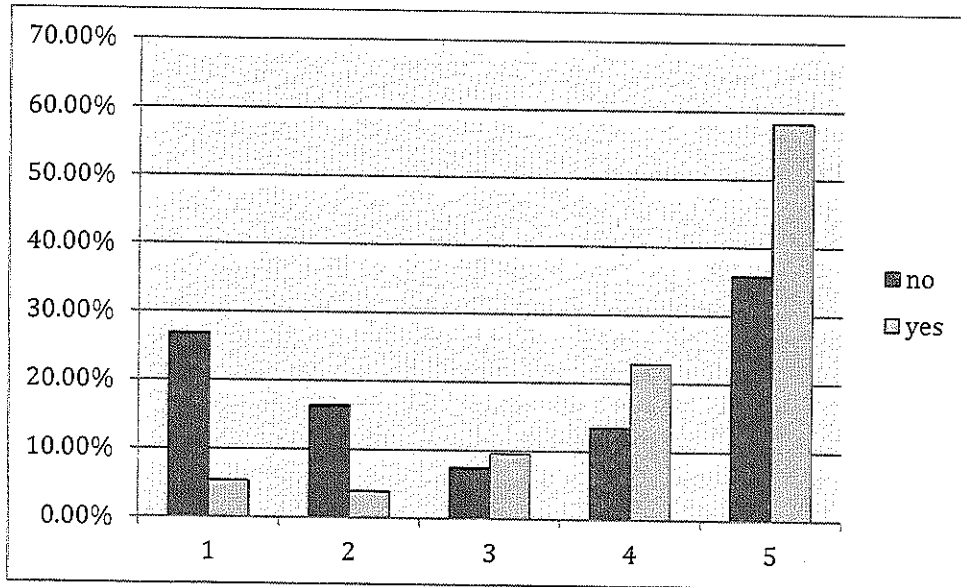


Figure 4: The percentage of people who responded 1-5 on the survey, separated by if their voting machine had a VVPT.

One of the questions on the survey was designed to see just how accepting people would be of an online voting mechanism. Without the general support of the population there is no need to move forward toward an online voting system. Even if such a system solved problems like voter turnout or greater accessibility, a lack of confidence in the technology leads to a level of doubt about the legitimacy of results of an election held online.

The answers received during the survey process do not show much promise for acceptance of Internet voting. On the scale of 1 to 5 most people chose lower numbers, indicating a lack of confidence in the idea of an online voting mechanism. 42% responded with an answer of 1, showing the lowest level of confidence that online voting is the solution at the

present time. When adding the number of people who were either not at all confident or somewhat confident, the total is 59%. This means that well over half of the responses indicated a level of distrust for a system of voting that incorporates remote Internet voting.

Breaking down the results further, there are little differences in the type of people who expressed confidence or lack of confidence in the matter. It seems intuitive that there would be a difference in responses in this matter from different age groups. This does not seem to be the case. Age groups were separated into 5 brackets: 18-25, 26-35, 36-45, 46-55, and 56 and older. Comparing the numbers of answers that indicated 1, meaning not at all confident, there seems to be a distinct delineation between age groups. Those who were 18-25 answered least confident 37% of the time, with the percentage rising throughout the age groups until those 56 and over showed a response rate in that category as 45%. However, these initial results might be misleading because when the categories of the people who responded either with either a 1 or a 2 on the survey are added the tallies are almost exactly the same. Those 18-25 showed a lack of confidence by responding in this manner 57% of the time. Fifty-eight percent of those 56 and over indicated the same opinions with the middle age range showing similar results.

The homogeneity of responses continues when comparing party affiliation and the level of confidence expressed in online voting as can be seen in figure 5 below. Adding the total number of responses indicating either 1 or 2, Democrats and Republicans answered almost exactly the same. Democrats answered in this manner 59% of the time while Republicans did so in 60% of the cases. Those that identified themselves as Independents showed a more receptive attitude toward online voting. Independents answered with a 1 or a 2 in only 51% of the instances recorded. This displays a difference between partisans and independents but the difference is not huge and across the board people are skeptical of integrating the Internet into voting practices.

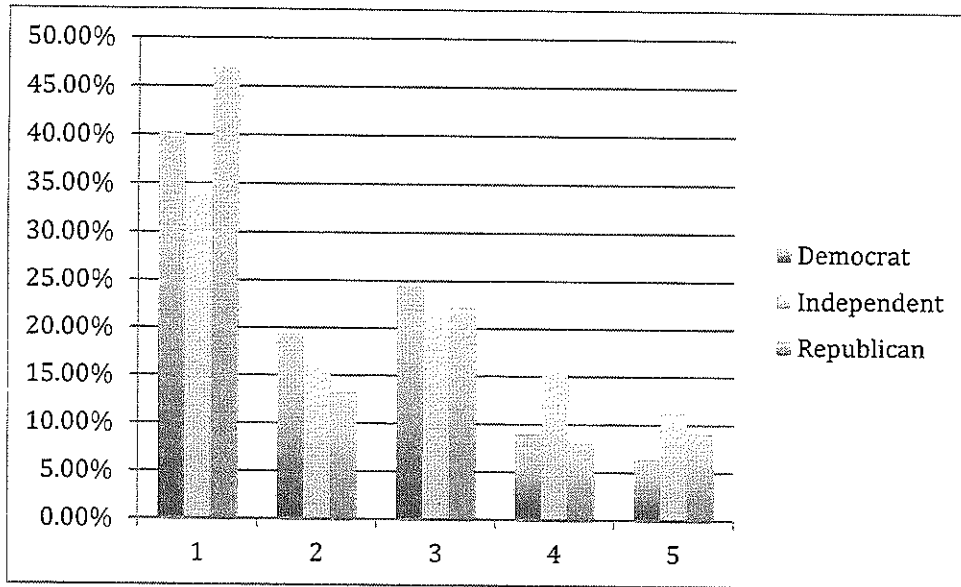


Figure 5. Percentage of respondents who answered 1 to 5 in response to confidence in online voting delineated by party affiliation.

The final comparison of responses showed just a little more separation between the groups studied. The question was asked: “Do you believe that a hack influenced the 2016 presidential election?” Those who believed that hacking occurred were more skeptical of the idea of allowing votes to be transmitted and recorded over the Internet. Sixty-three percent of those that believe a hack had influence in 2016 indicated an answer of 1 or 2 on the question of confidence in a potential online voting system. Those who did not believe in hacking responded this way at a rate of 56%. This means that those who indicated a belief in a hack influencing the 2016 presidential election were more skeptical and less likely to support online voting.

Future research might include a study that included a true random sampling of the voting electorate. This thesis used a convenience survey, but a true random sample survey conducted over the phone that explores the relationship between voter confidence and voter technology

could provide a true representative sample of the electorate. Beyond that, an in depth study of the demographic and economic information of states that have certain types of equipment would add to the conversation about voting technology. A study might seek to discover if there is a divide between states with lower average incomes when it comes to voting equipment, or even perhaps a racial divide in what type of voting machines are used by locality.

CHAPTER 5. CONCLUSION AND DISCUSSION

When signing the Help America Vote Act of 2002, then President George W. Bush stated, "Every registered voter deserves to have confidence that the system is fair and elections are honest, that every vote is recorded, and that the rules are consistently applied. The Legislation I sign today will add to the nation's confidence" (Bush 2002). The Help America Vote Act was a step in the right direction. It provided much needed money for upgrading a crippled voting infrastructure. Some say that the Help America Vote act did not go far enough. R. Bradley Griffin (2004, 510) agrees, "It allows the state to retain too much control over the administration of federal elections. So long as the states continue to exercise control over the administration of federal elections, the problems with the voting system will persist."

In its hesitance to interfere with the purview of the state's administration of election activities, the United States Congress fell short of actually solving the problems associated with voting technology. Congress was able to rid the country of the worst offenders of the time by removing punch-card systems from voting locations. But technology continues to develop and the older technology is degrading rapidly. The machines that were bought in the aftermath of the 2000 election aided by the funds from the Help America Vote Act are now rapidly aging.

Machines bought in this time period have proprietary parts that are difficult to find in case they need to be maintained. Some simply have outdated components that are necessary for the machine to operate. In some cases, manufacturers no longer make the paper needed to print off the voting tally because the machine is so old. Some machines use digital storage that is stored on Zip disc which is very difficult to find in the modern era. The machines that were state of the art when states were spending the money they received from the Help America Vote Act

are now quickly becoming obsolete or at least aging rapidly. A study by the Brennan Center for Justice explains that, “the expected lifespan for the core components of electronic voting machines is between 10 and 20 years, and for most systems it is probably closer to 10 than 20” (Norden and Famighetti 2015, 4). This means that the lifespan of the equipment bought in 2002 has either expired or is coming close to expiring. Try to imagine using a personal computer that is ten to twenty years old.

The proper functioning of a democracy demands that voters feel confident that their votes will be recorded correctly. This study shows that confidence is increased when machines are used to vote that provide a Voter Verified Paper Trail (VVPT). It is time for states and localities to phase out the machines that do not produce a paper trail that can be used for recount. Scan machines seem to be the most stable way to cast a ballot, especially when one considers how much more confidence people express in that voting method over DRE machines. The problem is that states and localities have already invested heavily in the equipment they already have. They lack the funding to move forward on purchasing new equipment.

The United States could quickly find itself in another voting crisis as its machines age. This puts us in the same position the nation found itself in during the 2000 fiasco. The citizens of the United States might end up asking the same questions about intervention from the federal government. A long-term solution to the problem of voting technology seems crucial. The question is what kind of solution would solve the long-term voting procedure problems.

One solution would be for states or localities to lease the equipment they use to vote instead of buying the equipment. This would serve to ensure that as equipment needs change through time, the voting equipment would be the most up to date. Of course the problem with

this approach is that it requires a continuous stream of funding throughout the years instead of a one-time investment.

Another approach to solve the problem of aging voting equipment would be a complete shift of responsibility in the execution of voting to the federal government. Taking the power away from the states would serve to ensure that all voters nationwide have the same access to voting. All voters in the United States relying on the same equipment leads to a certain amount of equality in representation. The problem with this approach is that it is in direct opposition to the constitution of the United States, which delegates this power to the individual states.

The problem with the Help America Vote act rests in that it only provided a single influx of cash into the election technology market. For a long-term solution to be effective, a continuous stream of funding proves necessary. The Help America Vote Act became simply a Band-Aid meant to fix an immediate problem. Legislators who wrote the act assumed that states would take up the responsibility of funding election improvements in the future and they did not intend to provide a steady stream of funding.

Instead of a single influx of cash to the states, Congress needs to begin a program of funding for the states on a long-term basis. Annual appropriations to states for the execution of elections would be a critical step forward in alleviating the ailing voting systems in the United States. Having a system based upon annual appropriations would ensure that the states have the funds available when upgrades to equipment are required, whether that equipment is bought or leased. Leadership on the national level is needed to compel states to stay current with the most effective voting technology.

Security is important when it comes to voting technology. If the states wish to maintain control of these machines, they need at least grants to help them keep up with changing

technology. This is especially true when possibility of online voting is considered. Individual states and counties simply could not afford to maintain the level of security needed to ensure confidence in the voting public.

This does not mean a total federal takeover of the voting procedure. The states could retain their autonomy and remain laboratories of democracy. By allowing individual states to make decisions about which voting procedures they will use, federalism is preserved and even strengthened. The idea of giving states money on an annual basis should not mean that states will lose any power, but simply gain a revenue stream that enables them to make the best choices for the type of voting technology that works for that state.

The Help America Vote Act of 2002 was a stopgap measure that helped alleviate the worst problems facing the nation's voting procedure. It did not go far enough in ensuring that the problems faced in the 2000 presidential election do not repeat themselves. Although it outlawed certain voting practices like the punch-card voting system, it left in place a system based upon state governance of election execution without any sort of long term funding solution for the states.

In order for the United States to be the bastion of democracy that the world expects it to be, it must maintain excellence in the execution of elections. The voting technology being used today can become antiquated and moving into the future, there is no plan to fix this problem. America needs new legislation that would provide funding for states while maintaining the foundation of federalism for voting procedures. The Help America Vote Act was a good example of federal and state cooperation and it set a standard for how the federal government can assist states in the process of voting. It should be extended further for a more continuous policy that allows the federal government to annually appropriate money to states for the specific

purpose of conducting elections in order to instill more confidence in the voting process. An increase in regulation and funding would increase the amount of confidence individual voters have in voting machinery to properly record votes. A yearly appropriation should be provided to states for the continuation of the upgrading and upkeep of voting equipment.

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