

Chapter 1

WHAT THIS BOOK IS ABOUT

Before the 2004 election, there was a blizzard of media coverage about the potential problems associated with electronic voting. Claims were made that the machines would lose your votes or would be hacked. Democrats and Republicans alike used these potential problems as a mechanism for mobilizing voters. For example, the Florida Republican Party sent out fliers in 2004 that said: “The liberal Democrats have already begun their attacks and the new electronic voting machines do not have a paper ballot to verify your vote in case of a recount. Make sure your vote counts. Order your absentee ballot today.” Likewise, Democratic candidate Steve Henley was quoted on the campaign trail saying “By voting absentee, you make sure your vote gets counted. And in the event there is a close election, they have a physical copy of your vote.”¹

In 2004 voters in Broward County, Florida, were similarly encouraged to vote using absentee ballots so that they would not have to vote using the county’s direct recording equipment (DRE) voting machines. By voting absentee, the voters were told that a paper record would exist of their vote and that it would be counted. Unfortunately, in the month preceding the November 2004 general election, as many as 58,000 absentee ballots in Broward County were lost after leaving the county election office.² Many voters there did not receive their ballot and could not easily vote any other way because their names were on the list of voters who had voted absentee. Moreover, it was expected that many of these voters would not receive the replacement absentee ballot in time for it to be returned and counted in the election. In an effort to use the debate over electronic voting to mobilize voters, thousands of voters may have been disenfranchised because the complexities of absentee voting had not been considered fully.

This story from the 2004 election illustrates a simple fact: life is full of risks, and all alternatives, including the choice not to act, carries with it inherent risks. This truism holds for elections as well, where all forms of voting carry inherent risks of problems, as a single procedural misstep can create an array of potential issues for voters. For example, the later the voters received the absentee ballots in Florida, the greater the likelihood that voters would return their ballot to the election office so late it would not be counted. Because these voters were now listed as absentee voters, they could not vote in a polling place or in early voting

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without bringing in their absentee ballot; otherwise, they would have to cast a provisional ballot. In any event, casting an absentee ballot carried its own potential problems. Even in the best of circumstances, in any election some percentage of absentee ballots are rejected because of voter errors either in completing the information on the absentee envelope or in missing the deadline for returning absentee ballots.³ Also, absentee ballots may be more likely to contain overvotes or undervotes compared to precinct-cast ballots, because absentee voters do not have access to the same convenient error-checking technologies that precinct voters can use today.

This book is about the risks and trade-offs associated with electronic voting. We consider how the media have framed the debate over electronic voting and how the public perceives this debate. Election reform is rarely considered through the lens of risk analysis and trade-off. Instead, reforms are attacked by various interest groups, who typically make claims about the risks of some method of voting. This is true not only in the area of voting technology, where debates rage between those who are concerned primarily with accessibility and those who are concerned about security. Reforms such as no-excuse absentee voting, early voting, vote centers, and even reforms to voter registration systems have all come under intense scrutiny, with claims made that such reforms will somehow negatively affect the electoral process or otherwise harm our democracy.

It has become common to consider election reform, and electronic voting, very critically and as a high-risk activity. In a provocative book about risk analysis, the legal scholar Cass Sunstein (2005) notes that much of the world is currently interested in a form of risk management known as the precautionary principle. This principle is based on the idea that the decision to mitigate a potential risk should not require the existence of absolute proof that it will come to fruition. Stronger versions of the principle have been expressed primarily in the context of environmental and health policy. According to the president of Friends of the Earth, for example, “the precautionary principle mandates that when there is a risk of significant health or environmental damage to others or to future generations, and when there is scientific uncertainty as to the nature of that damage or the likelihood of the risk, then decisions should be made so as to prevent such activities from being conducted unless and until scientific evidence shows that the damage *will not occur*” (Sunstein 2005, 193 emphasis added). As Sunstein notes, however, it would be difficult to meet such a high standard.

Sunstein also makes an important yet basic critique of the precautionary principle: it does not consider the risks posed by the status quo. To illustrate the point, he reports the advances that scientists have identified

that would have been prohibited by the precautionary principle, including most vaccinations, open-heart surgery, x-rays, and antibiotics. One scientist identified “pasteurization, immunization; the use of chemicals and irradiation in crop variety development” as examples of items that would be banned by the precautionary principle. One could argue that AIDS research should be terminated because we do not know the risks, but because we know that the status quo is inherently dangerous (people die), we know that doing nothing will also cause, or continue, certain risks. Quite simply, while risks can produce failures, it can also produce great rewards.

In this book, we consider the risk of electronic voting in light of what we know about the status quo. We begin by examining various frames that have been used to express the risks associated with the election process.

THREE FRAMES FOR CONSIDERING ELECTIONS

For thirty-seven days in November and December 2000, while America waited to learn who would be the next president of the United States, election officials were the butt of late-night television monologues and were vilified in the media. The spotlight shown brightly on this one aspect of our political system, and people around the world learned about what had previously been an esoteric subject—American election administration. During this period, people also developed very distinct impressions about the conduct of elections, and three divergent views of the election took hold. These views reflect the nature of how people frame events for political and social purposes and how such framings are then used to discuss the risk of similar problems occurring in the future.

The first frame was that the election was a failure of administration across the electoral process. Various problems occurred in the election—from registration problems to voting system failures to improper poll worker actions—but they occurred because elections historically have been neglected. Fortunately, failures of administration are something we know how to deal with in America: we create commissions! And create them we did. There was a National Commission on Federal Election Reform that was chaired by former presidents Jimmy Carter and Gerald Ford and supported by scholars from several elite universities. An academic commission—the Caltech/MIT Voting Technology Project—provided an intellectual basis for election reform. Many states set up committees or commissioned reports to study election processes in their own states; for example, in Florida Governor Jeb Bush appointed a twenty-one-member Governor’s Select Task Force on

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Elections Procedures, Standards and Technology immediately in the wake of the *Bush v. Gore* ruling by the U.S. Supreme Court.⁴ Every relevant interest group—from the secretaries of states to the House Democratic caucus—also created a commission or task force and issued a report. The culmination of this work was the passage of the Help America Vote Act (HAVA) in 2002, which injected several billion dollars into the electoral process and is now reshaping the way in which elections are conducted.

A second frame was that the election illustrated that voting is a civil right, and on this score the election failed large segments of the population. Especially since the passage of the Voting Rights Act in 1965, which sought to strengthen Section 1 of the Constitution's Fifteenth Amendment ("The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude"), the ability of citizens to vote has been viewed as an important civil right. And while administrative failures lead to commissions and lawmaking, civil rights failures often lead to lawsuits and administrative remedies. Not surprisingly, then, numerous lawsuits were filed after the 2000 election challenging various aspects of election administration, but especially the voting equipment used in 2000 and the civil rights failures some of this equipment caused.

In California, the American Civil Liberties Union sued the state over the use of punch cards, while in Georgia it sued over the use of punch cards and optical scan equipment, as both types of equipment were argued to produce racial disparities. In several cities, organizations representing people with disabilities sued over any systems that did not provide an interface that would allow people with disabilities—especially the blind and people with very limited motor skills—to cast ballots without assistance. This view of voting as a civil right also is important to social scientists and many in politics, but in a slightly broader manner. Specifically, voting is a key part of citizenship and, as such, should be strongly encouraged. As both President Carter and President Clinton said after the 2000 election, it should be easy to register, easy to vote, and easy to count the votes. Making it easy for people who have historically been marginalized in the voting process benefits everyone. As we write this book, litigation over voting machines and election practices has become common in the United States.

The third frame is that the 2000 election was a fraud; the election was stolen. People on both sides of the political spectrum still hold this view. People on the left believe that Republicans stole the election in Florida, while people on the right point to places like St. Louis, Missouri, as an example of fraud in the works. This view that fraud is rampant—or

potentially rampant—is not new. The very existence of voter registration laws, including requirements that voters register as much as thirty days before an election, are but one example of a policy designed to deter fraud. In general, those who view the electoral process with a strong concern about fraud are likely to have a view contrary to that held by presidents Carter and Clinton: elections should be designed to thwart fraud, even if it makes it difficult for some people to vote.

These three frames can determine the way in which policy makers and the public view the risk that a future election crisis will occur. After the 2000 election, the election reform debate centered primarily on the first two frames. Election reform required improving election administration and ensuring that all citizens were provided with the opportunity to participate in a meaningful way in the electoral process. In fact, most election reform commissions in 2001 specifically avoided the topic of fraud and who was responsible for the problems in the 2000 election. Instead, the focus was on improving the electoral system and making the system work well for every person in America. HAVA addressed the concerns raised by the reform commissions and created a process for moving election reform forward in the states. HAVA also opened the door for the federal government to provide substantial funding to states for the purchase of new voting equipment.

Since the passage of HAVA and in the wake of the recent 2004 election, however, this view of elections as a civil right to be well administered has been overtaken by a view that the potential for fraud or glitches has become rampant. This view is especially held by some computer scientists and others who oppose electronic voting. Specifically, they argue that a potential for fraud exists because of the use of computers in elections for voting. According to these critics, direct recording electronic voting equipment, which has become popular because of its ability to enfranchise historically disenfranchised voters, are “black boxes” that are likely to contain malicious code that steal votes and steal elections. In essence, because hacking a DRE may be theoretically possible, it is inevitable that such hacking will occur. These critics are pushing efforts in Congress and states across the country to stop the deployment of DREs—with lawsuits and legislative initiatives—and to force states either to move back to paper systems or to outfit DREs with printers that will print a paper “receipt.” Some even oppose efforts to create electronic audit trails, using state-of-the-art cryptographics.

This book concerns the ongoing debate about how Americans will cast ballots in future elections. We have had this debate throughout the history of the United States. Consider the evolution of voting rights since the nation’s founding. Most people assume that the history of the United States is one where the franchise has been systematically

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enlarged. First nonlandowning males were granted the right to vote. Then the Fifteenth Amendment gave African Americans de jure voting rights—with de facto rights coming only with the passage of the Voting Rights Act—and the Nineteenth Amendment gave women voting rights. Finally, the Twenty-sixth Amendment gave individuals between the ages of eighteen and twenty-one the right to vote, making America a more fully democratic society. As many scholars have noted, however, this history is incomplete. During our nation's history, we have had periods of legal expansions of voting rights, but also periods where the law has been used—intentionally or unintentionally—to disenfranchise.

Many of these periods of marked disenfranchisement have occurred because of concerns about election fraud. For example, Keyssar (2000) notes that literacy tests, poll taxes, and voter registration were all designed to limit election fraud. Although we typically associate some of these tactics with efforts to disenfranchise African Americans, they did have “progressive” proponents who did not think it appropriate for those with limited educations or who owed debts to the state to be able to participate in elections. For example, the *New York Times* (1923) referred to that state's literacy test as “a wholesome law” and supported the legislation creating the law. Progressive “good government” groups argued that voters who could not pass the literacy test could be easily swayed, have their votes purchased, or make uneducated choices. Even efforts that seem reasonable today, such as voter registration, were originally quite onerous because of the way it was implemented. A voter typically had to register in person during office hours (between nine and five o' clock) at some central government office, and do so annually. This effort kept the voting rolls fresh and limited the ability of fraudulent voters from being on the rolls. The fact that it made it difficult for many otherwise eligible citizens to stay registered, thus effectively disenfranchising them, was the price of stopping fraud.

Today, the conflict over the efficacy of electronic voting machines has put two of the visions of elections—as public administration and as a civil right—in direct conflict with the third vision, a strong concern about fraud or glitches. Unfortunately, this conflict has real implications for real people. Because newer versions of electronic voting machines can help voters minimize simple errors, like overvoting or the unintentional skipping of races on the ballot, these newer voting machines might be significantly more accurate than their exclusively paper-based predecessors. Electronic voting machines can also take some of the subjectivity out of vote tabulation; again, by making it easier for voters to avoid simple mistakes, electronic voting machines could make it easier to assume that the ballot choices are consistent with the voter's intentions.

Without electronic voting, many people with disabilities and voters with limited English proficiency are effectively disenfranchised because they literally cannot cast a ballot using a paper-based technology. They can ask someone to vote for them, but they can never be sure their vote was cast correctly and consistent with their intentions. Likewise, data from Georgia and other states show that paper-based voting also can result in disparate results between white and African American voters. A recent study of Georgia's transition to statewide electronic voting found that voters in predominantly white communities were more likely to have their votes counted when using paper-based voting technologies compared to voters in minority communities but that these disparities were reduced when the state shifted to electronic voting machines.⁵

But, electronic voting machines have potential drawbacks. Because these computer-based systems are modern and complex devices, their electronic designs make it more difficult to spot simple glitches in the hundreds of thousands of lines of computer code that run these machines, let alone deliberate attempts to insert nefarious computer code into their innards. In the current marketplace, electronic voting systems are expensive, sometimes costing thousands of dollars per voting unit. Even if cost is not an issue, the transition from existing "legacy" systems to the new electronic voting systems requires that election officials juggle a complicated integration of modern computerized voting machines with more traditional election administration systems, unless they replace these other election administration systems completely. Finally, a lack of transparency associated with many aspects of the testing, certification, and use of these electronic voting devices continues to fuel questions and concerns about how electronic voting machines "really" work.

In this book, we examine whether the United States should transition to electronic voting and what forms of electronic voting should be allowed. Readers should understand that both sides in this debate have strong arguments and claims that merit attention, a point we make repeatedly in the early chapters of this book. But our thesis is that these claims can and should be subjected to scientific analysis and that this debate about how our democracy should conduct elections must be settled by testable hypotheses, real facts, and empirical analysis—not political rhetoric. The latter part of this book provides a framework that can be used for just this type of scientific study of electronic voting systems and presents a variety of studies of different applications of electronic voting, both in the United States and abroad. These studies provide helpful data that will assist in public deliberations about the ways in which electronic voting can be adopted in the United States.

WHAT DO WE MEAN BY ELECTRONIC VOTING?

Before delving any further into our argument, we need to be clear on terminology. We have found in recent years that there is substantial confusion over the exact nature of the technology of elections in the United States, as many otherwise well-informed people (including many supposed experts on election administration) are sometimes surprised to learn the extent to which electronic technologies have come to dominate the overall process of American election administration.

First, although most of the public scrutiny of the election process occurs in the days before and after major national elections, substantial work must be done in the months—even years—before and after an election, even in what might appear to be relatively simple municipal contests. In major national elections, the preparation and logistic enterprises required are very much like a major military mobilization. The process of election administration includes the geographical division of the jurisdiction into registration and voting precincts; the acquisition, maintenance, and storage of devices used by voters to cast their ballots; the development and testing of ballot definitions and designs; the development and distribution of voter educational materials and outreach campaigns; the designation of locations for early and election day voting stations; the recruitment and training of workers for early, election day, and postelection canvass activities; voter registration updating and purging; planning of absentee voter applications, authentication of voters, distribution and receipt of absentee materials; early and election day voting activities; election night auditing and receipt of ballots and voting materials; initial tabulation of results; resolution of disputed and problematic ballots; postelection canvassing and final reporting; mandatory or discretionary recounts; and other postelection administrative actions. Today, many—if not most—of these election administration tasks, in many places, are conducted using electronic devices and computerized technologies.

But our analysis in this book concentrates mainly on the technologies used by voters to cast their ballots—typically in precincts on election day, but increasingly before election day through early or absentee voting. Thus, when we say “electronic voting,” we really do mean to concentrate attention on the act of “voting”; although new technologies are increasingly being used for many of the activities of election administration, those are not our concern here. This distinction is critical and often lost in the debate over electronic voting. For example, a recent article in the *Tampa Tribune* discusses “the need for a strong examination of Florida’s electronic voting system”; however, the system in question is an

electronic voter registration system, not a direct recording electronic voting machine.⁶

Second, what do we mean by “electronic”? A century ago, many citizens cast their vote using paper ballots, which were then counted by hand. Others used what were then called “voting machines,” mechanical devices that we now tend to call “lever machines.” Votes cast on those mechanical devices were recorded through some type of mechanical device, sometime like an odometer in a car, and vote tallies were then read from the mechanical tally device by election workers at the close of voting. We briefly cover the history of voting systems in chapter 2.

While some Americans still cast votes using hand-counted paper ballots or mechanical voting machines, the number of ballots cast in recent elections using these old technologies has diminished dramatically. In their place are two conceptually distinct voting technologies. One of these voting technologies involves marking a paper ballot, which is then tabulated by an electronic device. This technology has two categories: the punch card ballot in which voter preference is indicated by making a hole in the ballot; and the increasingly common optical scan ballot in which voter preference is indicated by filling in the circle next to a candidate’s name or completing an arrow pointing to a candidate’s name. Both punch card and optical scan ballots are then tabulated by an electronic device, though they can also be (and sometimes are) counted by hand.⁷

In our definition, an electronic voting device is one in which the voter inputs preferences electronically—either flipping some mechanical levers that record a vote into the electronic voting device (the so-called direct recording electronic device), tapping selections on a “touch screen” voting system, or using some other input method to indicate a vote to an electronic voting device. When using electronic voting technologies, the voter is interacting with a computerized system that translates the voter’s input into an electronic stream of information that is then somehow recorded and preserved for later tabulation. The electronic voting machine might simply record the voter’s input into some type of electronic storage device or devices (involving nonremovable or removable media), it might translate the voter’s input onto a paper ballot that is printed for the voter to verify and deposit in a ballot box, or it might store the voter’s input electronically and provide a printed ballot that the voter can verify. As long as the voter’s preferences are being recorded, by the voter, into some initial stream of electronic information, we consider that to be electronic voting. Later, in some places where the details are relevant to our discussion, we sometimes differentiate between different types of electronic voting machines.

The electronic voting device can stand by itself, be networked to other voting devices in a precinct or early voting station (local-area network

[LAN]), or be attached to a wide-area network ([WAN], like the Internet). In the present discussion, we maintain the distinction between WAN electronic voting, which we will call “Internet voting” (and which we have discussed extensively in our 2004 book on the topic), and stand-alone and LAN electronic voting.⁸ The distinction follows the typical parameters of public debate about WAN versus non-WAN electronic voting.

OVERVIEW OF OUR ARGUMENT

In analyzing the political and policy implications of the current debate over electronic voting, we focus especially on the issue of risk assessment, the regulatory framework under which voting technologies operate, and the need to hold all voting systems—both electronic and paper—to high standards. The book can be divided into three parts. We begin by examining the arguments and data supporting both sides of the debate so that readers can understand their competing arguments and claims. In chapter 2 we trace the evolution of voting technology in the United States in order to provide readers with a brief historical context in which to understand the current debate over electronic voting. The second half of this chapter focuses on how electronic voting could revolutionize participation among voting populations that have historically been disenfranchised. In chapter 3 we examine the claims of critics of electronic voting. We start by putting the concerns of these critics into the theoretical context of the risk society. We then examine the explicit claims of these critics regarding the security risks associated with electronic voting.

Next, we examine the politics of the debate over electronic voting, presenting data on the political framing of the debate, and how this framing compares with the data from elections across the country and the perceptions of the general public. In chapter 4 we examine the role of interest groups and the media in the framing of the electronic voting debate. After the 2000 election, the general view of electronic voting was positive, with the media expressing concerns about the paper-based systems that failed in Florida. Starting in mid-2003, the media story shifted, with electronic voting viewed as being a key potential source of fraud and bias in the electoral process. In chapter 5 we review how the debate on electronic voting spilled over into the ongoing efforts to experiment with Internet voting. This spillover resulted in the termination of the Department of Defense’s SERVE project (Secure Electronic Registration and Voting Experiment), although there was a successful Internet voting trial conducted in the Michigan Democratic caucus. In chapter 6 we

review the research on the successes and failures of electronic and paper-based voting from 2000 to 2006. This chapter provides a foundation for understanding what science shows to be factual—not merely rhetorical—in this debate. In chapter 7 we present unique data on the public’s acceptance of electronic voting. Two national surveys are presented—one conducted before the 2004 election, one conducted after—to determine how voters view this new technology.

Finally, we present a risk assessment framework that can be used for the scientific study of electronic voting systems, a regulatory framework that can be used to move electronic voting forward, and an implementation framework for successfully moving to electronic voting in jurisdictions across the nation. In chapter 8 we develop a process for implementing these various risk assessment models, which includes identification and analysis of threats through a threat-risk assessment, mitigation of threats through procedures and design, implementation of a system within the context of the model, collection of forensic data on implementation, and updating of threat-risk assessment on the basis of the forensics and changes in the implementation environment. Finally, in the conclusion we provide ten recommendations that we think can move the debate over electronic voting forward.

Throughout this book, we stress that the claims on both sides of the debate can and should be subjected to scientific analysis, and that this debate must be settled by resort to facts and evidence, not political rhetoric. Our goal is to let the data, not any preconceived set of views or biases, speak. In chapter 4 we discuss how electoral politics has become absurdly caricatured through the simplistic view that there are “red” and “blue” states or “red” and “blue” Americans. Likewise, the debate over electronic voting has been caricatured as a battle between parties, ideologies, ethics, and values. This debate needs to become more rational, and this book is our attempt to move the debate in that direction.