Click and vote: Citizenship on the Internet

The United States has one of the strongest democratic systems in the world. Voter turnout, however, remains low across the nation. In November 2000, Minnesota had the highest voter turnout in the country, but only 69.4 percent of eligible voters went to the polls. Nationwide only 51 percent of eligible voters participated.

In the 1998 general election, Minnesota had a voter turnout of 60 percent in a nonpresidential year. While this was also the highest turnout in the nation, a significant number of Minnesotans still did not exercise their right to vote. In fact, 1.4 million eligible voters of the state did not vote and 119 million people did not vote nationwide, a 36 percent participation rate.

It is not surprising, therefore, that states have been evaluating the ways people cast their votes, to encourage higher numbers of citizens to exercise their democratic privilege. In the general election of 2000, for example, Oregon conducted an all-mail ballot. Despite this, only 61 percent of their electorate voted.

As the electoral process continues to evolve, some are looking to the Internet to revolutionize voting. Click and Vote examines Internet voting and addresses the following questions:

- Will Internet voting encourage greater participation by citizens?
- Can a system of voting by Internet be fair, accurate and secure?
- What developments in technology are necessary to implement Internet voting effectively and economically?

At least 20 states have considered some form of Internet voting, according to a 1999 survey by the Council of State Governments Elections Task Force. This new voting option came to the attention of the American public in March 2000 when the Democratic Party of Arizona held the first binding online vote during the presidential primary.

Defining Internet voting

Although Internet voting is a common phrase, its meaning is somewhat ambiguous. It has often been compared to the process of e-commerce in which a business transaction occurs between a buyer and seller over the Internet. In this manner, people purchase books, flowers and other items with relative ease every day. In retail transactions, both parties are...
identified and the purchase is verified later through a credit card receipt or bank account statement. Internet voting, however, is not the same type of transaction. It requires a higher level of security and confidentiality for the voter’s choice.

Internet voting, also known as online voting, e-voting or i-voting, can refer to a variety of methods using technology to cast a vote. The California Internet Voting Task Force defines Internet voting as the “casting of a secure and secret electronic ballot that is transmitted to election officials using the Internet.” The task force, convened by California Secretary of State Bill Jones, brought together representatives of government, vendors of Internet voting systems, and others concerned about the integrity of the voting process.

Convenience may increase voter turnout

Many herald Internet voting as the solution to slow the growing trend of nonvoting. They predict it will engage young people, who tend to be Internet savvy but politically indifferent. Others see Internet voting as just one of many options, including all-mail voting, that will appeal to voters. Still others believe its impact will be slight and that it could have a negative effect on the culture of voting by turning a social duty into a solitary activity.

The benefit of Internet voting most often cited is convenience. Eventually, through Internet voting, voters will no longer be limited to casting their ballots at their local precinct. This would make it easier to vote on a lunch hour near work or by the children’s daycare center after dropping them off. As remote voting becomes a possibility, many envision themselves voting, wrapped in a bathrobe and drinking a cup of coffee. Such opportunities to vote would make it more difficult for voters to cite reasons like hectic schedules and bad weather for not voting. Internet voting would also benefit military personnel stationed overseas and other American citizens living abroad.

Internet voting may be especially appealing to disabled people, those in nursing homes and hospitals, and others with conditions that create difficulty getting to the polls. Currently, technological advances are making it possible for the blind and vision-impaired to vote with secrecy, without assistance. Internet voting could give blind people the opportunity to vote unassisted from their home computers with the use of screen reader software.

If the level of security suggested by the California Task Force is to be achieved, however, this convenience may not come quickly. To maintain the integrity of the system, voters may be asked to apply to vote electronically, similar to applying to vote by absentee ballot. This cautious step removes the spontaneity of Internet voting for the time being, but future advances in technology could change this.

There are other reasons why Internet voting may not increase turnout. These include the inconvenience of going to an Internet voting site during a busy day, the feeling that an individual vote will not affect the outcome and lack of information about the candidates and the process. Some researchers believe that nonvoters would vote if the process – registration and casting a ballot – was easier. Others disagree and believe that the rate of nonvoting reflects a greater disconnect between the people and the government chosen to represent them.
Immediate access to information about the candidates is also seen as a benefit to Internet voting. Voters would be able to be more readily informed about the candidates and issues on the ballot. There are concerns, however, about electioneering, soliciting voters for particular candidates. However, current law in Minnesota permits people to bring materials into the voting booth to help them cast their ballot. Although the statute specifies “sample ballots,” this has been interpreted as any written material a voter thinks is of use.

The use of the Internet to transmit votes could reduce the time it takes to tabulate election results and conduct recounts. Arizona Secretary of State Betsey Bayless states, “Using the Internet for voting is just one way government will provide accurate and timely results to the public.”

Who is responsible for elections?

The U.S. Constitution gives states the responsibility for conducting elections. The federal government does not have a direct role, but provides guidelines. In turn, the states delegate responsibility for elections to local governments. Each county and municipality chooses its own voting technology and usually provides the resources for equipment and staff. These smaller units of government often have the least resources to invest in election methods, so if major changes are deemed necessary, states and possibly the federal government may need to provide funding.

Standards in U.S. elections are monitored by the Federal Election Commission. It remains neutral on the issue of Internet voting, but is a strict proponent of standards that ensure the integrity of the voting process.

The FEC plans to issue voluntary voting system standards, regarding online voting, to the states in 2001. The standards will address security and access issues surrounding remote Internet voting, as well as voting within government-controlled polling sites. According to Peggy Sims at the FEC, nothing at the federal level prevents the states from using the Internet as a dynamic election medium.

Internet voting – the next stage in an evolutionary process

Over the years a variety of innovations have been introduced to improve the voting process and thus increase voter participation. Although these options have been implemented in a number of states, their benefits and disadvantages continue to be debated. Benefits include convenience, cost savings and increased turnout for some options. On the other hand, there are concerns about loss of secrecy, opportunities for fraud and potential detrimental impacts on the culture of voting.

REGISTRATION OPTIONS

Same-day registration has mixed outcomes

The most significant legislation on voting since the federal Voting Rights Act of 1965 gave African Americans the right to vote has been the National Voter Registration Act of 1993. Known as the “Motor Voter Law,” effective in 1995, this law requires states to offer to register people to vote when they get or renew driver licenses or when they apply for welfare and disability services. In addition, some states allow people to register to vote at their polling

As part of The Big Plan, Governor Jesse Ventura developed an initiative to increase voter turnout and rebuild trust between elected officials and citizens. His goal is, “at least 70 percent turnout in every election!” As part of the initiative the Governor devoted the eight Wednesdays between the September primary and Election Day 2000 to meeting with young people to encourage them to vote. Although the overall results were just short of 70 percent, statistics are not yet available to indicate if the proportion of young voters increased.
place on Election Day. Minnesota implemented same-day registration in 1975.

The impact of the Motor Voter Law is mixed – it has a positive effect on registration numbers but appears to have little effect on turnout in most cases. A 1997 report to Congress by the Federal Election Commission states that “the number of Americans actually voting in 1996 declined by over 5 percentage points from 1992 – the first presidential election since 1972, when the franchise was extended to 18-21 year olds, that voter registration rose while turnout declined.”

Same-day registration has had a more positive effect. Scholars estimate that if all states permitted same-day registration, turnout would increase 5 to 10 percent. Twenty percent of voters registered on Election Day in Minnesota in 2000, the highest same-day registration in two decades. It is believed that same-day registration rose while turnout declined.”

Online registration is underused
Another way to increase registration is to make registration forms available on the Internet. Many Web sites for get-out-the-vote campaigns have promoted online access to state forms and the National Mail Voter Registration Form. Although the form is online, the voter must send a printed and signed copy. Twenty-six states, including Minnesota, accept the national form. Minnesota receives only a few hundred registrations each year in this way, usually from college students out of state, service personnel or persons residing overseas. Approximately six million Americans live abroad and, in 1996, 47 percent of them voted.

VOTING OPTIONS
California and Washington pioneer no-fault absentee voting
Absentee voting is an option usually offered to voters under a specific set of circumstances, such as when illness or travel prevents them from going to the polling place. It allows voters to cast their ballot without being present at a polling place on Election Day.

Some states, such as California, have a no-fault absentee voting option. Voters may apply to vote in person with the county auditor or city clerk prior to Election Day. They may also vote by mail. Voters do not have to state a particular reason for choosing to vote absentee.

Washington state promotes permanent absentee voting. One-third of the state’s registered voters are signed up as “permanent absentee voters,” which means they automatically receive a ballot in the mail before each election.

Currently in Minnesota people can apply to vote by absentee ballot if away from home, ill or disabled, serving as an election judge in another precinct or if unable to go to the polling place due to a religious holiday or belief. Voting can also occur in person with the county auditor or city clerk prior to Election Day or by mail.

The general election of 2000 had the highest use of absentee ballots in Minnesota’s history. About 6.7 percent of voters used this method.

Early voting extends the voting window
Another option is early voting, opening the polls prior to Election Day. In this option voting is required in person but the time frame is increased from the traditional Election Day model. Unlike absentee voting, no restrictions apply, and voters are generally encouraged to take advantage of the longer time frame. Texas adopted early voting in 1991 and in 1994 Tennessee mandated a two-week early voting period within the 20 days prior to any election. Fourteen states, including Nevada and Colorado, also permit some form of early voting.

The study, Implementation of Early Voting, by Lilliard Richardson and Grant Neeley looked at early voting in Tennessee during the 1994 election. There were two U.S. Senate seats and the gubernatorial election on the ballot. Their research concluded that costs can be as high as $1 to $3 per vote, due to increased staffing costs and the ballot type involved, but the extra effort did appear to have a positive impact on participation. The exact impact is undetermined due to the difficulty of comparing the hotly contested races of 1994 to previous elections. A. McGeehan, director of elections, state of Texas, commented at a Brookings Institution symposium that early voting is popular in Texas but could not say that it has actually increased turnout.

VOTER TURNOUT NATIONWIDE VARIES ACCORDING TO AGE AND RACE

<table>
<thead>
<tr>
<th>Percentage of age groups who voted</th>
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<td>61%</td>
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Source: Federal Election Commission, 1998 election
Voting by mail benefits citizens living overseas

Mail balloting eliminates the need to visit a polling place to cast a vote and can extend the voting window. In Minnesota anyone who qualifies for absentee voting can vote by mail. The option is mostly chosen by military personnel and people living overseas. The vote is based on the last place of residence in the state. Minnesota permits municipalities with fewer than 400 registered voters to conduct vote-by-mail elections for state primary and general elections.

Some states, notably Oregon, Washington, Nevada and California, have gone further and conducted statewide elections by mail. In 1998, Oregon voters passed Proposition 60, abolishing the traditional polling place in all statewide elections in favor of mail ballots. In 2000 the state conducted the nation’s first all-mail primary and general elections. Oregon Secretary of State Bill Bradbury has stated that turnout has increased by about 6 percentage points since Oregon switched to all-mail balloting.

Research shows that all-mail balloting increases turnout but groups that typically do not vote in large numbers do not participate in this process either. In addition to increased turnout, there can also be a cost savings to government. In 1998, Oregon estimated $3 million savings over use of polling places.

In Oregon, ballots are mailed to registered voters 14 to 20 days prior to the election. Voters complete their ballot and place it in a secrecy envelope, which in turn goes into an identification envelope which the voter signs. Voters pay the postage. The ballots must arrive at county election offices by Election Day. The signatures on the envelopes are compared to registration cards. On Election Day, the ballot is removed from the identification envelope and placed in a bin for counting.

In November 2000, Oregon conducted the first presidential election entirely by mail. A significant factor in this election was more than 20 constitutional amendments or ballot initiatives. Ballots had to be in the hands of election officials by 8 p.m. on November 7. Delay-causing glitches were reported prior to Election Day, including incomplete ballot packets mailed to voters and insufficient postage. A flood of last-minute ballots on Election Day and a thorough yet time-consuming process delayed the results. Nonetheless, the all-mail vote increased the opportunity for informed voting and the state recorded an 80 percent turnout for the election.

**BALLOT OPTIONS**

Common ballot types range in sophistication from paper ballots, punch cards and mechanical lever machines to ballots read by optical scanners and Direct Recording Electronic systems. The DRE system uses computerized machines to store voters’ choices electronically. They include touch screen computers, similar to ATM cash machines. Although this system appears similar to e-voting, it differs because information is not transmitted via the Internet. According to the Federal Election Commission, only 7.7 percent of the electorate used DRE systems in 1996. After the controversial 2000 presidential election, the advantages and disadvantages of various ballot types are likely to receive serious examination.

**Internet voting should be introduced incrementally**

A four stage model for phased implementation of Internet voting was suggested by the California Internet Voting Task Force. While others advocate a faster process to implement Internet voting, this measured approach has received much praise and is seen as a good model for governments to use. The stages are:

1. Internet voting at voter’s polling place
2. Internet voting at any polling place
3. Remote Internet voting from county computers or kiosks
4. Remote Internet voting from any Internet connection

When voters cast an Internet vote at their own precinct, election officials have the continued responsibility of verifying the voter’s registration in person, in addition to providing secure Internet access. This first stage is seen as an opportunity to test the new system and to increase voters’ comfort level.

Step two permits voters to cast their ballot from a computer with Internet access at any polling place within their county. Voters would still be verified in person by election officials, but they would require access to the entire county’s voting roster, ideally through the Internet, to prevent duplicate voting. Voters would have the option of going to a polling place located near work or other activities instead of the precinct nearest their residence. The system would provide voters with the ballot appropriate for their own precinct.

The third option permits voters to cast their ballots at any unattended Internet voting machine maintained by the county. This is referred to as “remote” Internet voting since it does not occur at a traditional polling place. The set-up is similar to the ATM banking system. Voters would use an authentication code provided by the county to access the system. This stage permits voting 24-hours per day and reduces the number of election staff necessary to monitor voting. In-person verification of voters is replaced by the electronic code. In this instance, voters would have to plan ahead to request the code prior to voting online. The California report states that “the process is more complex than most common Internet commerce transactions and may not be viewed as much more convenient for voters than current voting options.” The lack of convenience is due to the need for greater security at this stage.

The final stage, according to the California Task Force, is allowing voters to cast a ballot from their own home or office computer. This step is more similar to Internet commerce transactions because of its greater convenience. But it still requires voters to request an authentication code and possibly even to download software to complete the
HOW TO VOTE USING THE INTERNET

The voter logs on to the election system with a unique password that was assigned during the election official’s authentication of the voter. This authentication is completed either in person at county polling places or prior to the election through a paper-based application process similar to absentee voting.

- After the password is provided, the appropriate ballot from the county election server appears on the screen.
- Once the ballot is available on the voter’s screen, the voter should be able to easily mark his or her preferences and review the voted ballot before it is transmitted to the county election official via the Internet.
- When the voter is satisfied that the ballot is marked as intended, it is submitted via the Internet.
- The ballot is encrypted as it travels over the Internet to protect the secrecy and integrity of each vote.
- The ballot is received by the county election system which authenticates the validity of the vote, ensures that the vote has not been altered in transit and automatically and immediately sends a receipt back to the voter. This receipt indicates that the ballot has been received, but does not indicate the voter’s choices.
- Once received, the ballot is stripped of voter identification and stored for counting at the end of the election period.
- The ballot is archived for potential recount and auditing purposes.

Source: California Internet Voting Task Force, January 2000

 transaction. Since the computer used to cast the ballot is completely out of the county’s control, security measures must be increased and opportunities for fraud grow. The report warns that computers owned by third parties, such as businesses, are more difficult to secure than home or county-owned systems.

While the Internet voting concept is similar to no-fault absentee voting, the following key questions will need to be answered before any form of Internet voting is introduced. Where will the ballot be cast? Who will maintain the computer? How will voters be authenticated?

Digital signatures show potential for identifying voters

A voter seeking to cast a ballot online could be identified as an eligible, registered voter in a number of ways.

- By providing a personal identification number given by election officials

Personal identification numbers are in daily use for banking transactions. Biometric identification is not likely to be a practical option in the near future. Digital signatures, mathematical formulae unique to the holder, may have the greatest potential for identifying online voters securely. They are considered secure because the signer has to appear in person and prove who they are to get a digital signature certificate.

Digital signatures make it practically impossible to alter a document without the changes being detectable. They rely on encrypted instructions that must be used with a single password to identify an individual. The password uses special software to lock, or encrypt, the signature, which a freely given public key – or second password – can open.

Digital signatures are already being used in business transactions for the secure transfer and authentication of electronic documents. On June 30, 2000, President Clinton signed the Electronic Signatures Act, effective October 1, 2000. The law gives the same legal authority to electronic signatures as those signed by hand, although it does not specify the type of technology that must be used to submit electronic signatures.

In Minnesota, where Governor Ventura proclaimed October 13, 1999, “Digital Signature Day,” they may be used for private, business and government transactions. Use of the signatures is voluntary. The Secretary of State’s Office serves as the certification authority for government employees and licenses other certification authorities who provide digital signature certificates for private citizens. Minnesota was the first state to have digital signature certificates available to government employees from a government official. Currently, digital signatures are not available for voting in Minnesota; it would require a change in state law to permit their use for voting.

Concerns about Internet voting are widespread

The interest in online voting continues to grow but concerns accompany the excitement. These issues fall into several categories: technological issues, election integrity, access, effect on civic culture, cost and the role played by vendors. Most can be overcome with more information and an implementation strategy that addresses voter concerns. Some reflect problems associated with the current voting system that have been debated in the past and are likely to be argued into the future.
There are technological issues to be overcome

Internet voting has several unique technological issues. The biggest issue is related to the encryption of cast ballots as they travel over the Internet between the voter and the election official. The ballot must remain secret to maintain personal voting privacy, it must be secure to prevent fraud and it must be accurate to provide trustworthy results. This presents a challenge to computer programmers and election officials.

Digital signatures are seen as a solution to this problem by ensuring that the ballot remains effectively sealed from the time it is sent to the point the election official “opens” the ballot with the corresponding code. These signatures, however, can be expensive and currently it is not practical to provide digital signatures to all voters.

Voter verification is another issue that must be addressed. In the current system, voters are identified as eligible by precinct workers who check voter registries or register voters directly at the polls. When people choose to vote with an absentee ballot, the signature on their application is matched against their voter registration information. If voters cast ballots online at unstaffed sites or from remote sites, such as home or work, a process must be created to ensure that the voter is eligible to vote in the election and that they cast only one ballot. The Arizona Democratic Party used personal identification numbers plus birth dates or part of Social Security numbers to verify voters. The California Task Force recommends voters apply for online voting status with a printed application. This allows their signature to be compared to their voter registration card.

After assuring that accurate ballots cast by eligible voters are received by the election officials, the process must be tamper-proof so votes cannot be changed after they have been cast. Reliable recount methods must also be in place. The voting system must have a reliable audit trail that keeps an accurate record of votes but does not compromise the voter’s anonymity.

Secrecy of the ballot, prior to it being sent to the election official is also of concern when others can access the voter’s computer, such as in a work setting. Since information about the ballot is held in the computer system as a person goes through the voting process, network administrators and unauthorized hackers could potentially learn which candidates were selected. Voting software that voters download from the Internet or receive after applying to vote online is being developed to prevent this problem.

Voters may feel more comfortable with Internet voting if they could verify that their ballot was received as cast by getting a receipt, similar to a consumer purchase. But such a system would compromise the integrity of the election. If voters were able to show proof of how they voted, it could lead to coercion or purchase of votes. Some systems have proposed sending a receipt that the ballot reached its destination, but not how it was counted.

After recent attacks on commercial Web sites and the spread of computer viruses, the fear of tampering with the online voting system is very real. There are also concerns about denial of service caused by attacks by hackers who bombard the system by sending fraudulent ballots until the system overloads and prevents authorized voters from sending their ballots. Another danger is “Trojan horse attacks.” These are programs which execute computer functions without the user’s knowledge. They can install themselves on computers in numerous ways, including through browser “plug-ins” and Web page scripts.

Vendors of Internet voting systems are developing ways to address these problems and hope to prove their systems’ worthiness through the use of Internet voting trials such as those conducted in 2000 in California and Arizona.

Contingency plans must be made so voters have every opportunity to cast their ballot even if the system is inaccessible due to attack, system problems or power failures. Until such problems can effectively be ruled out, Internet voting will likely remain a voting option rather than the only means to cast a ballot.

In addition to technical problems which election officials and vendors must resolve, Internet voters may have to work to set up the system on their end. With the proliferation of computer manufacturers and different brands of Internet browsers, network servers and software programs, compatibility of the election system and its components with the equipment used by voters is not always guaranteed. To resolve these conflicts, voters may have to download special voting software and be computer savvy enough to configure their systems to meet the requirements of the official election Web site.

A final issue about the technology of online voting relates to the status of the Internet as an unowned, uncontrolled medium. “The Internet itself is not a secure environment, nor is it an American environment,” comments Deborah Phillips, chair of the Voting Integrity Project, a non-profit, nonpartisan voters’ rights group. There are concerns that using the Internet for government elections creates a situation that can never be fully secured and that could compromise national security.

Election integrity must be preserved

Every voting system has potential for error, human or mechanical. The risk of fraud is also inherent in the current system. Internet voting, however, increases the potential for tampering. Even with deterrents in place, a sophisticated hacker could conceivably send millions of unauthorized ballots into the system. If such an effort went undetected, election results would be manipulated.

Phillips stresses that time-honored methods of fraud such as duplicate registrations, registering unqualified voters and voting using registrations and identifications of those who have moved or died, could be incorporated into Internet voting. Paul Craft, manager of the voter system at the Florida Division of Elections counters, “All those possibilities are there
and are real, but the fact that risk exists does not mean Internet voting is impossible; it simply means you have to address the risk.”

In 1986, the Kansas State Supreme Court ruled in Sawyer vs. Chapman that “the compelling state interest in increased voter participation outweighs the added potential for fraud and loss of secrecy presented by mail ballot elections.” The rationale for this verdict could be applied to Internet voting as well. The current systems in use at the polls and by absentee voters are by no means foolproof. While Internet voting should not compound these problems, it cannot be expected to completely resolve them.

Internet voting brings many new concerns to light, but it also provides the opportunity to prevent many common problems with the current system of paper ballots. Often voters will incorrectly mark their ballots and vote for more candidates than permitted or inadvertently skip contests in which they are eligible to vote. Internet systems can prevent these errors by alerting the voter prior to sending the ballot.

**All voters do not have Internet access**

If voting moves away from the polls and into homes and offices, how will that affect voters without access to computers? The “digital divide” – the gap between those with computer access and those without, often based on income, education, age, race and skill level – provides a twist on the impact of the voting process on turnout.

The U.S. Department of Commerce has been conducting regular studies, *Falling Through the Net*, to provide up-to-date figures on digital inclusion. Although the share of households with Internet access is soaring, in October 2000, 58.5 percent of households in the United States did not have access at home. Based on 48,000 interviews, it has been determined that whites are more likely to have Internet access at home than most racial and ethnic minorities have from any location.

A new study released in October 2000, *Surveying the Digital Future*, by the University of California at Los Angeles surveyed 2,096 U.S. households, including both Internet users and nonusers. It concluded that the gap was narrowing. "The digital divide seems to be correcting itself," said Jeffrey Cole, UCLA. "People who have been on the Internet four years or more tend to be white, highly educated and male. Among people who have been on less than a year, it's more African-American, Latino and female."

Based on a few of the recent Internet voting trials, it appears that the access gap can be overcome. Although the Voting Integrity Project filed a lawsuit on behalf of minorities to prevent Internet voting during the Arizona Democratic Presidential Primary, minority participation rates in the primary were higher than 1996 rates. Although this comparison is skewed because of the differences in the 1996 and 2000 contests, it still represents a positive result for Internet voting.

With regard to age, many believe that older voters will not be comfortable using computers and the Internet to cast their ballots. A recent trial at several Iowa county polling places demonstrated that older voters are just as curious about Internet voting as young people.

Income levels affect the number of people with computers and Internet access in their homes, although the UCLA study found that cost was not a significant factor in Internet access. If Internet voting is implemented at polling places or access is provided at libraries, schools and other public places, it can be argued that those without home access will not be severely disadvantaged. In addition, some online voting companies are addressing this issue by installing kiosks in community centers and other public locations to promote the system.

**Voting is a social activity**

Not only will Internet voting impact how ballots are cast, it may impact why people vote or whether they vote at all. Some political scientists who study voting behavior believe that Internet voting might push the nation farther from the polls and have a detrimental impact on the voting culture. There is a strongly held belief that...
voting is a social activity. At the polls, the importance of voting is reinforced by seeing others from the community participating also. If voting is done from home or work, voters may lose this connection to the greater community and feel that their vote matters less.

"Internet voting is like voting alone, isolated. There’s a lot to be said for the collective nature of voting. Voting should be a civic ritual." Rick Valelly, professor of political science at Swarthmore College.


The tradition of Election Day - being able to cast ballots on only one day to impact a political race - has already been changed by absentee voting, mail balloting and limited cases of early voting. Internet voting could impact it even further by widening the window of opportunity for voters to participate in elections. If voters are allowed more time to cast their ballots, candidates will have to change their strategies for campaigning. While this extra time may aid voters, it could be detrimental in cases where new information is revealed about a candidate in the final days of the campaign because once a vote is cast, it cannot be changed.

Bill Taylor, senior vice president at Election.com who managed the online Arizona Democratic Primary, says "Internet voting could give rise to a sort of New Age, laid-back democracy." After the election, he and colleagues recounted stories about families who voted at home together and a couple who invited friends in "to share a cup of coffee and cast their vote online."

Source: “Can the Net Revive the Vote?” William Matthews, FWC Technology Group, September 2000

Cost has not been assessed

Long-term cost savings may result when Internet voting is fully established, but in the short-run, expenses for equipment needs and voting services could be high. After the system has been implemented, costs are predicted to go down because fewer persons will be needed to monitor election sites. If Internet voting is provided only as an additional option, however, ballot printing costs will not decrease greatly.

No estimates of total cost have been made public. The California task force did not address costs because they were not considering specific system designs. It is difficult to correctly estimate the costs of holding an Internet election because equipment and services for recent trials have been provided free-of-charge by vendors in order to promote their product and increase awareness of Internet voting.

Vendors have a key role

Counties and municipalities will not be able to administer Internet voting themselves. They will have to rely on vendors of online voting systems, who are pushing the development of Internet voting. As commercial enterprises, their priority is making a profit. R. Michael Alvarez, associate professor of political science at the California Institute of Technology says, "This [Internet voting] will be a very profitable area for commercial firms. And these firms have clear incentives to prod reluctant governmental agencies to move quickly on Internet voting ... [It’s] clear to me that Internet voting will probably happen faster than anyone predicted and will happen faster than is good for our political system."

Governments remain responsible for the accuracy and integrity of elections and must ensure their own checks and balances are in place before they move forward.

Vote online instead of in line

The key question is whether Internet voting will improve voter turnout.

Will it attract those who usually do not participate in elections? While we will not truly know the answers until Internet voting is conducted on a greater scale, experts in the field have expressed opinions about whether or not Internet voting will encourage more people to participate in elections.

In the September 2000 report, The Likely Consequences of Internet Voting for Political Representation, R. Michael Alvarez and Jonathan Nagler discuss the theory that any reform which increases turnout is likely to help the representation of people of lower socioeconomic status, since this group includes the largest proportion of nonvoters. This theory does not hold true if the reform is directed at helping prosperous people who can afford their own computers and Internet connections because it will not increase representation among other groups. They state that "if voting is made easier, it is those who already tend to vote who will take advantage of the easier voting." On the other hand, "while the rate at which persons take advantage of the easier voting is higher among the better educated, because the pool of uneducated nonvoters is so much larger – the effect of the reform is still to narrow the turnout gap between the education groups."

Based on an analysis of voter turnout for the Arizona Democratic Primary conducted after the 2000 online vote, Alvarez and Nagler concluded that the elderly, the nonwhite, the unemployed and those living in rural areas were all statistically less likely to engage in Internet voting.

The issue of voting culture

Focusing on the culture of voting, the impact of Internet voting on turnout could be detrimental, according to Swarthmore political science professor Rick Valelly. In his article, Voting Alone, he states, “Not only will e-voting fail to reverse electoral
apathy, it will actually lead us in the wrong direction. Voting is ... a vital public ritual that increases social solidarity and binds citizens together. The history of voting in America clearly shows that the physical mechanics of voting have a huge impact on the quality of our public life."

Curtis Gans, Center for the Study of the American Electorate, reminds us that Internet voting affects the process of voting, not the motivation behind it. Gans states, “The Internet idea suggests that problems with turnout are mechanical rather than motivational. We need to work on things like civic education, values, the nature of political campaigns and the way the news media cover them.”

A recent study supports Gans’ position. In their 1999 book *Nonvoters: America’s No-Show*, Jack Doppelt and Ellen Shearer say it is a misconception that nonvoters would vote if only the process were easier. When they surveyed 1,001 likely nonvoters in 1996, “the impediments to registration and voting became shorthand for a palpable disconnect.” They write that “the nonvoting phenomenon that encompassed 100 million Americans in 1996 and 119 million in 1998 is not about a busy America. It is about an evolution in the fabric of American society that has made voting neither a duty nor a habit nor a ritual for a growing majority of the nation’s people.”

Although James Brent, associate professor of political science at San Jose State University, agrees that motivation is important, he did conclude in a 2000 study that Internet voting will raise voter turnout.

Others see online voting’s effect as minimal, especially for national elections. Eve Lewis, the Sonoma County, California, registrar of voters, believes that while it may cause an immediate increase in turnout, it will not be sustained. She comments, “when absentee and mail ballotng became readily available, it was followed by a drop-off in the number of people going to the regular polling places.”

In December 1999 the White House directed the National Science Foundation to conduct a study on Internet voting. The National Science Foundation in turn funded the Internet Policy Institute to conduct a workshop and produce a report that would assess the feasibility of Internet voting and define a research agenda. The workshop was conducted in October 2000 and the report prepared by a group comprised of National Science Foundation researchers, experts from the Washington-based Policy Institute, academics and election officials. It was published in March 2001.

The key findings of the study are:

- **Poll site Internet voting systems offer some benefits and could be responsibly fielded within the next several election cycles.**
- **Remote Internet voting systems pose significant risk to the integrity of the voting process and should not be fielded for use in public elections until substantial technical and social science issues are addressed.**
- **Internet-based voter registration poses a significant risk to the integrity of the voting process and should not be implemented until an adequate authentication infrastructure is available and adopted.**

Source: Report of the National Workshop on Internet Voting, March 2001

David Brady, senior fellow at the Hoover Institution and also board member of Election.com, believes that Internet voting will not have a large effect on turnout for national elections. He does think it will be both popular and effective in local or union elections where detailed information can be supplied on the Internet.

Jim Adler, president of VoteHere.net, believes that young voters will be motivated by Internet voting to participate in the electoral process. “Younger voters are completely disenfranchised. There are not many political institutions that resonate with their lifestyles. They may get involved in the process, and they are the future of the electorate and the leadership … We’re trading off that poll-site experience for a more enfranchised voting group – that’s a reasonable tradeoff to make.” Warren Slocum, chief elections officer in San Mateo County, California, supports Adler’s comments. “There’s a whole, untapped constituency of wired workers out there. Those same people tend to be 18-35 and aren’t engaged in voting. Perhaps by offering them a system that mimics their lifestyle more, we’ll get them to vote.”

According to the CBS Marketwatch.com Internet Poll conducted in early 1999, the Internet user population is skewed toward younger age groups. Those considered to be both politically active and Internet
Internet voting trials abound

Although much of the publicity about Internet voting is focusing on implementation by government, the private sector really began the trend by using the technology to count shareholder votes and determine union elections.

Twenty-four states and one territory, Puerto Rico, have made Internet voting legal for the private sector and it is allowed by the U.S. Securities and Exchange Commission. The states are Arizona, California, Delaware, Georgia, Illinois, Indiana, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nevada, New York, North Carolina, North Dakota, Oklahoma, Ohio, Pennsylvania, Rhode Island, Tennessee, Virginia, Wisconsin and Wyoming.

Governments face different challenges because of voter numbers and the need to protect the democratic voting process from fraud. Government trials have occurred in Washington, Iowa, California and Arizona. Political parties in Arizona and Alaska have used the technology.

The Department of Defense’s Federal Voting Assistance Program screened and selected approximately 350 military personnel posted overseas to participate in an Internet voting pilot program for the 2000 election. The volunteer participants had legal voting residence in select counties in Utah, Florida, Texas and South Carolina. The number of voters from each county was kept small to avoid the possibility of the Internet voting influencing the overall outcome of the election. Software was provided for work or home computers. The votes cast over the Internet counted but participants were expected to mail absentee ballots as a backup.

If this test is determined a success, there are plans to expand Internet voting to include all U.S. citizens abroad, approximately six million potential voters: private citizens, military, federal personnel and families. While many have touted the military trial as a positive example of Internet use, others declared the test to be unlawful because it violated the voter’s ability to cast an anonymous ballot.

PILOT PROJECTS IN OTHER STATES

Arizona

Arizona has claimed credit for the first binding Internet vote. In March 2000, Arizona’s Democratic Party conducted its presidential primary online. About 36,000 of 86,000 votes cast were sent to election officials via the Internet. Arizona Democratic Party executive director, Cortland Coleman, credits the Internet with helping to increase the overall Democratic primary turnout six times over the 1996 results, when only 12,000 participated. It must be noted that voters’ motivation to participate in the two contests is not comparable and even with the large turnout increase, only 10 percent of the state’s registered Democrats voted.

Since this was a primary election, only members of the party participated and it was run not by the state, but by the party. Votes were cast over a four-day period from homes, work, libraries, schools, community centers, Indian reservations and polling places. The election used a two-tiered authentication system, requiring voters to provide both a PIN number sent to them by the party and some personal information such as their date of birth or the final four digits in their Social Security number.

While the Arizona primary was touted as a success, several criticisms have been made about the process. Problems included incompatibility between Macintosh computers and some older personal computers with limited access to the voting site. Many questioned the security of the online process. Although voters were required to verify their identities by providing a personal identification number, the party sent PIN numbers to all registered Democrats. Identification numbers could have easily reached someone other than the registered voter. Services and equipment were donated free to conduct the Democratic primary and the company has not provided any cost estimates or details of its online security system. In addition, the voters’ rights group, Voting Integrity Project, mounted a legal challenge to the online election on grounds that Internet voting discriminated against those who lack access.

In November 2000, Arizona was once again at the forefront of Internet voting. An online pilot was conducted on November 7, 2000, in Maricopa County, Arizona. The trial was coordinated with the Arizona Secretary of State’s office and county election officials. Fern precinct, with 932 registered voters near Phoenix, offered the opportunity to cast a ballot on the Internet. The pilot was open to any Arizona voter because the Internet votes were nonbinding. Voters received an identification number to vote and got a receipt once their vote was accepted. Results of the test were available election night. Two hundred and fifty votes were cast.

In addition to voting for candidates, online voters were asked several questions about their perception of Internet voting. They were asked, “If Internet voting was available in your area as a voting option, would you choose to vote this way?” Ninety percent said they would.
Voting Integrity Project filed a lawsuit on January 21, 2000, to block the use of Internet voting for the Arizona Democratic Primary. The organization alleged the Arizona election violated the Voting Rights Act of 1965 because minorities and poor citizens do not have equal access to the Internet. Deborah Phillips declared, “by making voting more convenient for voters who have ready access – predominantly white – a bias is set up that boosts the potential turnout for connected voters while diluting the power of individual minority voters’ ballots.”

Attorney General Janet Reno declared the Arizona primary in compliance with the 1965 Voting Rights Act, but lawyers for Voting Integrity Project argued that remote online voting constitutes a “version of the literacy test” once used to keep black voters from the polls. VIP failed to win a temporary injunction to stop the primary from taking place although the U.S. District Court judge recognized that Internet voting could result in racial discrimination.

Some believe the lawsuit did not work to open up the process of voting by attracting new voters. If successful, the result would be to maintain a more closed system in which voters must make a considerable effort to participate.

Ninety-three percent were moderately or very comfortable with the security of the Internet voting system. And when asked, “How would you compare the ease of use of this Internet voting system to your current method of voting?” 74 percent said Internet voting was easier, 24 percent said about the same, only 1.3 percent said their current method is easier.

California

California has taken a more cautious approach than Arizona and is a leader in examining the pros and cons of Internet voting. The California Task Force on Internet Voting issued a report in January 2000, discussing how Internet voting could be implemented and the concerns and benefits associated with its use.

In November 2000, four counties put theory into practice by conducting tests of Internet voting systems. San Mateo, Contra Costa, Sacramento and San Diego counties allowed voters to cast nonbinding simulated ballots October 9 through November 3 on laptop computers at courthouses, city halls and community centers. It was referred to as the “2000 Internet Voting Shadow Election.”

California Secretary of State Bill Jones stated, “The goal is not necessarily to prove the technology side of the system, but to introduce people to the concept – whether people will adapt to it, whether they’ll like it.” Since the ballots did not count, any person could participate in the trial, even if they were not a registered voter.

The Secretary of State is required to certify new voting systems and coordinated the shadow election with the counties to see whether the new models worked. In San Mateo County, all four test sites were linked to the county’s network. Voters’ addresses were called up at the site and a customized “ballot” was provided after voters provided a 10-digit security code.

San Mateo County tested touchscreen technology in November 2000, with voters casting their ballots by touching the candidate’s name. Ballots were provided in English, Spanish and Chinese. Headsets and raised keypads were made available for sight-impaired voters. Bill Jackson, the election division manager for San Mateo County, reports the test went well but “Internet voting hasn’t proven whether it can be utilized in a live election.”

Governor Gray Davis vetoed a bill in September 2000 to test Internet voting in three counties in the 2000 general election. Concerns about security and fraud were the governor’s reasons for vetoing the legislation that would have allowed online votes to count in the election. The bill proposed the use of Internet voting as a supplementary method of voting in local elections, any regularly scheduled or special county, municipal or district primary or general election in up to three participating counties selected by the secretary of state. The legislative author plans to reintroduce the bill for debate in 2001.

Iowa

In November 1999, Iowans in Woodbury and Johnson counties participated in a pilot program conducted by the Iowa Secretary of State’s office. Voters could cast nonbinding Internet votes at their polling places. Secretary of State Chet Culver stated that the test was “designed to test the viability of the system and the willingness of voters to participate through the Internet.” Over 1,200 voters tested the system and 83 percent said they would be willing to vote by Internet again. Although Internet voting is geared toward attracting younger voters, older Iowans participated and felt comfortable with the process.

Washington

In April 1999, residents of Shelton, Washington, cast e-votes for a special school district vote, which featured mostly questions about school policy. On a larger scale, Thurston County, Washington, which includes Tacoma and Olympia, tested Internet voting in February 2000 with a non-binding Internet election held in conjunction with the state’s February primary. The county’s focus was on voter convenience and increasing turnout. The county has also experimented with voting by mail since 1993. For the test, the county issued 10-digit personal identification numbers. Voters could use the Internet to vote over an 18-day period ending Election Day and could vote from home, work and traditional polling places. Over 3,000 people voted online and 90 percent approved of the method and security.
Online voting is used by non-government bodies

Vendors are also marketing their voting systems to schools and colleges. In September 2000, Cornell University in Ithaca, New York conducted an online election for the freshman class, with about 1,200 participants voting via the Internet. The school is planning another Internet election in March 2001 with 19,000 students expected to participate. Other schools have also experimented with online voting.

A recent large-scale test of Internet voting was Youth-e-Vote 2000, a national mock election for students to cast Internet votes for president, senate, house and governor. This is considered by many to be the first national online vote in the U.S.

Students registered through their school and were given identification numbers so each student could only vote once. Voting began on October 23 and results were made available on November 2, so student choices would not get lost in election night coverage. Over 1.3 million students in over 9,000 schools participated. "Youth-e-Vote is an effort to use the young's own medium to turn today's students into tomorrow's voters – and to facilitate the teaching and learning of more civics in the schools," according to Youth-e-Vote founder Doug Bailey.

A youth vote was also held in the United Kingdom, which allowed students to vote for candidates in the U.S. presidential election.

The Internet Corporation for Assigned Names and Numbers, the technical coordination body for the Internet, conducted an online election for its board of directors, regarded as the "first international cyberelection." Voting was allowed from October 1 to October 10, 2000. Over 75,000 members worldwide were mailed unique voting PIN numbers. Approximately 25,000 cast ballots online but the process had several glitches that hampered the election process.

IMPACT OF ELECTION 2000

Experts are agreed that the events in Florida during the 2000 presidential election will impact how elections are conducted in the future. It is expected that Congress will urge changes on the states, who will urge them on local governments. As they look to upgrade their voting systems, many jurisdictions may consider Internet voting, but whatever improvements are made, it is anticipated that the road to change will not be a smooth one.

"This election ... demonstrates the potential value of Internet voting at a number of levels. It would facilitate vote counting and make recounting a thing of the past."
John Pavlik, journalism professor at Columbia University

"This year's presidential election woes promise to boost the sales of companies that provide computer-based systems." David Jefferson, technical committee chair for the California Internet Voting Task Force and senior staff at Compaq

"If a county has to choose between a variety of jails, hospitals and fire protection, it's easy to delay upgrading their whole election system because it's not a life-or-death issue."
Larry Naake, of the Association of Counties

"One of the problems with a hurried move to Internet voting is that people don't understand computers any better than poorly designed punch-card ballots."
Lorrie Faith Cranor, AT&T Labs

National political parties also test Internet voting

At the 2000 Democratic Party National Convention, delegates cast their votes for presidential nominee via computer kiosks located on the convention floor. Republicans had the opportunity to be the first to use online voting but decided not to use it for their convention.

The Reform Party gave delegates an opportunity to cast their ballots for the party’s presidential nominee online August 7 through 9, 2000. Over the three days, 5,437 delegates voted online. In July, personal identification and voter registration numbers were mailed to over 870,000 delegates. According to Sharon Gilpin, eBallot.net, the voting window was kept small to "ensure a secure process, despite party officials' willingness to keep it open longer." The voting was considered successful although the outcome was affected by a fight over party control.

What is happening in Minnesota?

Minnesota is moving forward with new options in technology and voting systems, but is currently not involved in Internet voting. According to the Secretary of State’s election division director, current state law does not permit Internet voting and the office is not pursuing legislative action. The Secretary of State, Mary Kiffmeyer, is concerned about the security of the system and prefers to wait for the technology to develop further. She is also concerned about the culture and integrity of the process, believing that voting should occur only on Election Day.

Minnesota Senator John Marty, former chair of the Minnesota Senate Election Laws Committee, believes the state should encourage Internet voting as another option for voters. Over the years, Marty has pursued expanding Minnesota’s absentee voting process to a no-fault system and permitting voting by fax, another issue related to putting the voting system in sync with technology innovations.
Minnesota Senator Steve Kelley believes the state should be studying the issue, although previous trials, such as those done in Washington state, show the need for caution. Kelley has advocated that Minnesota should be up-to-date on the issues surrounding Internet voting and should develop the in-house capacity to use the technology. In 1999, Kelley introduced a bill requesting the Secretary of State to study Internet voting and its potential implementation in Minnesota. A similar measure was introduced in the Minnesota House. Neither bill got out of committee due to lack of support.

Although the Secretary of State’s office is cautious about voting online, the foundation is being laid. Minnesota is pursuing technology to aid blind and sight-impaired voters at the polls. In 2000, Minnesota launched the nation’s first precinct-level Web-based reporting system. Results were provided for Minnesota’s races for U.S. Senator, U.S. Representative, State Senate, State House of Representatives, state judiciary and others. Starting at 8:00 p.m. Election Night, the system provided regularly updated numbers at the Secretary of State’s Web page – www.sos.state.mn.us.

**When will Internet voting become commonplace?**

While there is some expectation that Internet voting will be a key element in the electoral process in the future, opinion is mixed on how quickly this might happen. There is, however, a strong body of opinion that the 2004 election is a critical one for the implementation of online voting.

According to Christopher Baum with the Gartner Group, a Connecticut-based technology research firm, states will be experimenting with online voting by the next presidential election. “It’s not going to be universal by 2004, and it will never be truly universal because some people will still choose to go to the polling place, and they should be able to,” he says.

Steve Clift, the Minneapolis-based editor of Democracies Online Newswire, says it won’t be embraced by all states by 2004. Debate may take until 2010 because state legislatures have to examine how to fund online initiatives. Clift also reminds that commercial goals are driving the development of Internet voting systems.

In 2001, the vendor Election.com is scheduled to conduct about 40 elections for public sector jurisdictions. CEO Jim Mohen predicts “the nation will be e-voting within five years, substantially raising turnout among minority and low-income groups.”

In January 2000, the Brookings Institution and Cisco Systems, Inc., an Internet voting vendor, sponsored a symposium “The Future of Internet Voting.” At the symposium, New York Governor George Pataki stated that instituting Internet voting by 2004 is the “private sector attitude.” He is “not quite as optimistic [from a government viewpoint] but we’re going to try to make sure that Internet voting does become a reality,” once questions of integrity and access are addressed. California Governor Gray Davis stated that he believes Americans will be Internet voting within five to seven years.

Other countries are examining the potential of Internet voting but are also in the pilot project stage. In Britain, legislation is in place to allow for online voting using digital signatures, so that each voter can be identified. This has not yet been tested at a general election. Croatians were permitted to cast online votes even though only a small percentage are connected to the Internet. They cast their first online votes in Croatia in January 2000 and then again in their runoff election in February. In February 1999, the world’s first national electronic voting trial was held in New Zealand. Twenty-one thousand volunteers, approximately 1 percent of the voting population, were given the opportunity to try Internet voting for fictitious candidates.

In the United States and in other countries, many election officials are taking a wait-and-see approach to Internet voting because of concerns about the integrity of elections conducted online. They worry that the new system may be compromised and such a situation would cause all voters to lose faith in the election process. Kansas Secretary of State Ron Thornburgh expresses the opinion of many election officials: “We’re not going to be the last, but we’re not going to be the first, either. On elections, you get one shot at it. I want somebody else to work out the kinks.”

**Technology needs are fundamental**

In order for Internet voting to be implemented, technology concerns relating to security and integrity of the system must be addressed.

The California Internet Voting Task Force states that additional technical innovations are necessary before voting from home or office computers can be considered. But current technology may be good enough to permit Internet voting from polling places.

Avi Rubin, computer scientist at AT&T Labs, states in *Security Considerations for Remote Electronic Voting over the Internet*, “Given the current state of insecurity of hosts and the vulnerability of the Internet to manipulation and denial of service attacks, there is no way that a public election of any significance involving remote electronic voting could be carried out securely.” He believes we need to wait for the next generation of personal computers that can secure the link between the voter and the election server.

Lorrie Faith Cranor, researcher at AT&T Labs supports Rubin’s position. She states that pure online elections which voters could participate in from work or from the comfort of their own living room may
never materialize, in part because of the inherent instability and insecurity of personal computers. “I think it’s going to be a number of years before people in the security community feel comfortable endorsing online voting, because most are going to wait until secure computer platforms are in widespread use.” But even with problems, she expects some states and local governments to use some form of online voting within the next four years.

What does the public think?

Regardless of what the voting experts and the vendors think, the public must be willing to accept Internet voting before it is implemented on a large scale. A multitude of surveys have been conducted to determine if American voters are ready to cast their ballots online. Some show support for Internet voting; others do not.

A survey by Andersen Consulting conducted in July 2000 showed that a majority of those responding would be comfortable casting their votes online. Of the 300 registered voters surveyed nationwide, 71 percent would be “comfortable” with online voting in general. If it were possible to vote for president online, 61 percent said they would use it.

In September 2000, the Council for Excellence in Government, a nonpartisan research group, released a survey that found that three in five Americans surveyed oppose online voting due to concerns about security.

_Wired_ magazine conducted a survey of 815 adults in February 2000 and learned that people are interested in online voting but have concerns about privacy of the process. Sixty-seven percent of those considered “very wired,” by their use of four or more of the following technologies - the Internet, cellular or wireless phone, a computer, a fax, e-mail, online banking and shopping - would try voting online if given the opportunity. Of those using one of the technologies, 42 percent would always vote online as would 26 percent of people surveyed who were “not wired.”

Although Internet voting enjoys some public support, according to Alvarez’s research it is barely at the 45 to 50 percent level in public opinion polls at a time where there has been no strong effort to oppose it. The public appears to be at least somewhat interested in online voting, but some believe that the recent promotion of Internet voting has been driven, not by voters, but by vendors of online voting services and software.

Bill Kimberling, deputy director of the Office of Elections for the Federal Election Commission says, “The bottom line behind this push is money. The noise being made to begin Internet voting is vendor-generated because a lot of new software and hardware will be needed to make it happen.”

The report of the National Workshop on Internet Voting contends that an important result of the 2000 general election is that it has brought about about a rare opportunity for election reform. As a result there is likely to be substantial public and political pressure to adopt remote Internet voting in the near future. In these circumstances the writers believe that extensive research is essential so that policy makers will have the requisite information to make responsible decisions regarding the deployment of Internet voting systems. The report stresses the importance of achieving balance between security, convenience and cost and the need for any research to be conducted in an interdisciplinary manner, involving election officials, social scientists and information technologists.

For Minnesota voting information, contact your city or county clerk’s office or the Minnesota Secretary of State at www.sos.state.mn.us or 651-296-2803
**Source**


Gerck, Ed, Ph.D. *Would you vote naked?* The Bell, June 2000.


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*Click and Vote: Citizenship on the Internet* was prepared by Becky Buhler and Sandra Stalker and is available on the Minnesota Planning Internet site at www.mnplan.state.mn.us.

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