

A Study of Voting Systems and Ballot Designs

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Acknowledgments

- National Science Foundation grant 0306698
- Carnegie Corporation grant D05008
- Voting System Manufacturers and Developers
 - Avante
 - Diebold
 - ES&S
 - Hart InterCivic
 - Nedap
 - MIT Media Lab
 - Scytl
 - VoteHere
- Selected Government Agencies
 - Federal Election Commission
 - U.S. Election Assistance Commission
 - Boards of Elections in Maryland, Michigan, and New York

Importance of Voting Systems and Ballot Designs

- Enable voters to register their voting intentions accurately
- Influence candidates selected
 - Order effects
 - Straight-party device
- Completion of the ballot
- Outcomes of some close elections
- Trust, confidence, and satisfaction with elections
- Opinions about the legitimacy of government

Requirements of Voting Systems

- Accurately register voting intentions
- Accurately record votes
- Accurately count votes
- Prevent coercion or vote tampering
- Instill confidence in elections

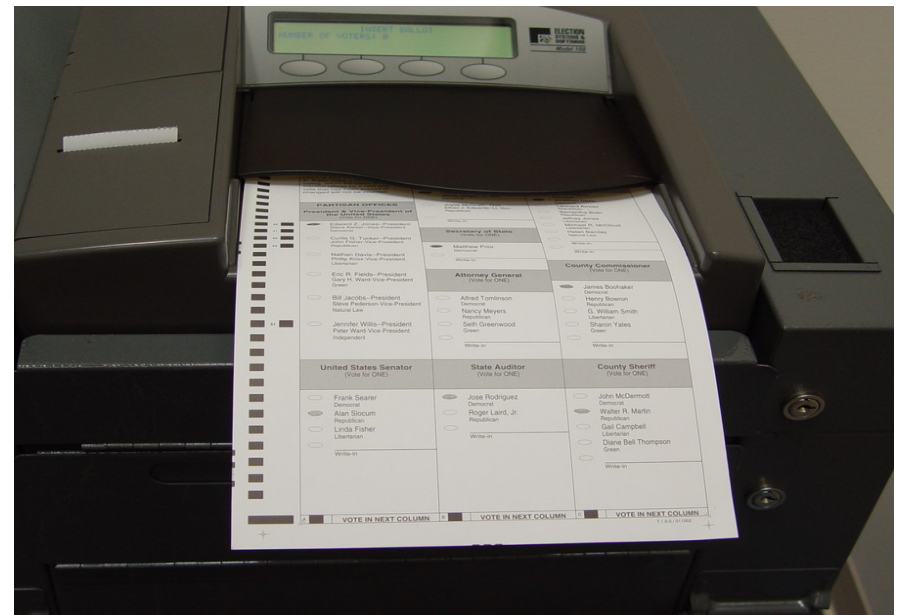
Voting Systems discussed today

- Tested six systems that illustrate specific design principles
- Types
 - 1 Optical scan
 - 5 Direct recording electronic

ES&S Model 100

System Type:

- Paper ballot/optical scan
- Intake similar to a fax machine
- Warnings for overvotes
- No warning for undervotes
- Can cast a flawed ballot



Diebold AccuVote-TS

System Type:

- Touch screen
- Smart card activation
- Manual navigation
- Ballot review
- Impossible to overvote
- Highlights undervotes



Avante Vote Trakker

System Type:

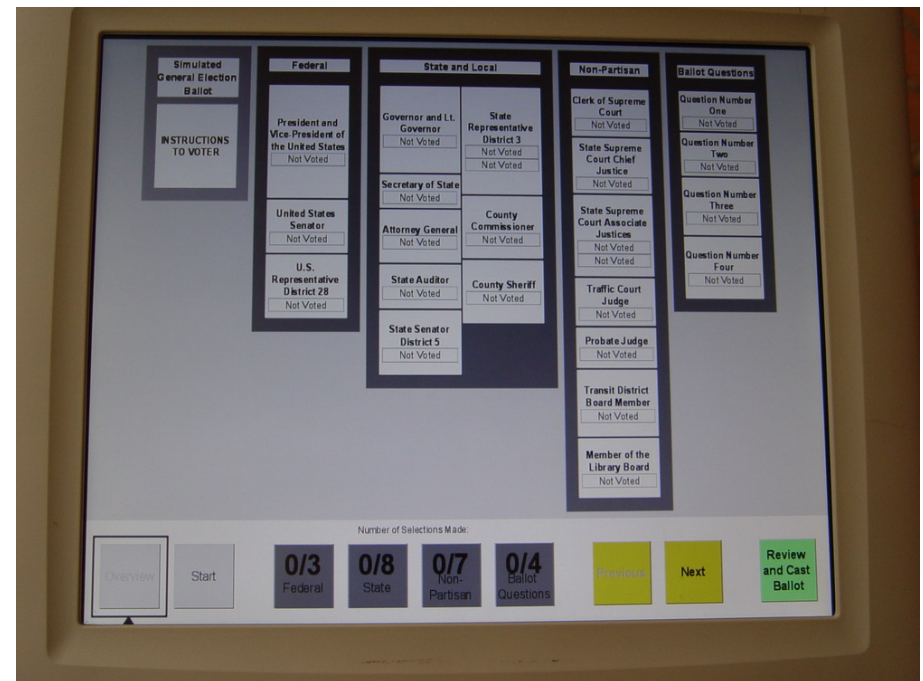
- Touch screen
- Automatic advance navigation
- Paper printout for verification
- Impossible to overvote
- Highlights undervotes



Zoomable Prototype

System Type:

- Zooming navigation
- Overview of full ballot
- Voting decisions replace names of offices
- Impossible to overvote
- Highlights undervotes
- Developed at the University of Maryland



Hart InterCivic eSlate

System Type:

- Mechanical buttons and dial for navigation and candidate selection
- Impossible to overvote
- Highlights undervotes



Nedap LibertyVote

System Type:

- Full-face voting system
- Membrane buttons to select candidates
- Blue lights indicate selections
- Impossible to overvote
- Warning for undervotes



Overview of Ballots

- **Selected to illustrate specific design principles**

Office Bloc Ballot

<p>INSTRUCTIONS TO VOTER</p> <p>1. To vote, completely blacken the CIRCLE (?) to the LEFT of the candidate. Do not vote for more than the authorized number of candidates.</p> <p>2. Use only the #2 pencil provided.</p> <p>3. To vote for a person whose name is not on the ballot, write in the candidate's name on the Write-In line AND completely blacken the CIRCLE (?) to the LEFT of your choice.</p> <p>4. If you make a mistake while voting, return the ballot to the election official for a new one. A vote that has been erased or changed will not be counted.</p>	<p>United States Senator (Vote for ONE.)</p> <p><input type="radio"/> Frank Searer Democrat</p> <p><input type="radio"/> Alan Slocum Republican</p> <p><input type="radio"/> Linda Fisher Libertarian</p> <p><input type="radio"/> _____ Write-In</p>	<p>State Auditor (Vote for ONE.)</p> <p><input type="radio"/> Jose Rodriguez Democrat</p> <p><input type="radio"/> Roger Laird, Jr. Republican</p> <p><input type="radio"/> _____ Write-In</p>	
	<p>U. S. Representative District 28 (Vote for ONE.)</p> <p><input type="radio"/> Larry Herman Democrat</p> <p><input type="radio"/> Rebecca Rehberg Republican</p> <p><input type="radio"/> William Petelos Natural Law</p> <p><input type="radio"/> _____ Write-In</p>	<p>State Senator District 5 (Vote for ONE.)</p> <p><input type="radio"/> Bill Forbes Democrat</p> <p><input type="radio"/> Victoria Snyder Republican</p> <p><input type="radio"/> Joseph A. Jackson Libertarian</p> <p><input type="radio"/> _____ Write-In</p>	
	<p>Governor & Lt. Governor (Vote for ONE.)</p> <p><input type="radio"/> Conrad Schweitzer--Gov. James Milligan--Lt. Gov. Democrat</p> <p><input type="radio"/> Joyce McGrath--Gov. Ethan J. Edwards--Lt. Gov. Republican</p>	<p>State Representative District 3 (Vote for no more than TWO.)</p> <p><input type="radio"/> Cheryl Adams Democrat</p> <p><input type="radio"/> Jonathan Davic Democrat</p> <p><input type="radio"/> Leonard Arnold Republican</p> <p><input type="radio"/> Samantha Bolin Republican</p>	
	<p>PARTISAN OFFICES</p> <p>President & Vice-President of the United States (Vote for ONE.)</p> <p><input type="radio"/> Edward Z. Jones--President Steve Kaiser--Vice-President Democrat</p> <p><input type="radio"/> Curtis G. Tucker--President John Fisher--Vice-President Republican</p> <p><input type="radio"/> Nathan Davis--President Phillip Knox--Vice-President Libertarian</p>	<p>Secretary of State (Vote for ONE.)</p> <p><input type="radio"/> Matthew Prior Democrat</p> <p><input type="radio"/> _____ Write-In</p>	<p><input type="radio"/> Jeffrey Jones Libertarian</p> <p><input type="radio"/> Michael R. McCloud Libertarian</p> <p><input type="radio"/> Helen Barclay Natural Law</p> <p><input type="radio"/> _____ Write-In</p>
		<p>Attorney General</p> <p><input type="radio"/> _____</p>	

Office Bloc Ballot with Straight-Party Voting Device

Straight-party device →

<p>INSTRUCTIONS TO VOTER</p> <p>1. To vote, completely blacken the CIRCLE (●) to the LEFT of the candidate. Do not vote for more than the authorized number of candidates.</p> <p>2. Use only the #2 pencil provided.</p> <p>3. To vote for a person whose name is not on the ballot, write in the candidate's name on the Write-In line AND completely blacken the CIRCLE (●) to the LEFT of your choice.</p> <p>4. If you make a mistake while voting, return the ballot to the election official for a new one. A vote that has been erased or changed will not be counted.</p> <p>5. To vote for every candidate of one party, blacken the CIRCLE (●) to the LEFT of the name of the party for which you wish to vote. To vote for non-partisan offices, blacken the CIRCLE (●) to the LEFT of the candidate for whom you wish to vote.</p>	<p>United States Senator (Vote for ONE.)</p> <p><input type="radio"/> Frank Searer Democrat</p> <p><input type="radio"/> Alan Slocum Republican</p> <p><input type="radio"/> Linda Fisher Libertarian</p> <p><input type="radio"/> _____ Write-In</p>	<p>State Auditor (Vote for ONE.)</p> <p><input type="radio"/> Jose Rodriguez Democrat</p> <p><input type="radio"/> Roger Laird, Jr. Republican</p> <p><input type="radio"/> _____ Write-In</p>	
	<p>U. S. Representative District 28 (Vote for ONE.)</p> <p><input type="radio"/> Larry Herman Democrat</p> <p><input type="radio"/> Rebecca Rehberg Republican</p> <p><input type="radio"/> William Petelos Natural Law</p> <p><input type="radio"/> _____ Write-In</p>	<p>State Senator District 5 (Vote for ONE.)</p> <p><input type="radio"/> Bill Forbes Democrat</p> <p><input type="radio"/> Victoria Snyder Republican</p> <p><input type="radio"/> Joseph A. Jackson Libertarian</p> <p><input type="radio"/> _____ Write-In</p>	
	<p>STRAIGHT PARTY VOTING</p> <p><input type="radio"/> Democratic Party</p> <p><input type="radio"/> Republican Party</p> <p><input type="radio"/> Libertarian Party</p> <p><input type="radio"/> Green Party</p> <p><input type="radio"/> Natural Law Party</p>	<p>Governor & Lt. Governor (Vote for ONE.)</p> <p><input type="radio"/> Conrad Schweitzer--Gov. James Milligan--Lt. Gov. Democrat</p> <p><input type="radio"/> Joyce McGrath--Gov. Ethan J. Edwards--Lt. Gov. Republican</p> <p><input type="radio"/> _____ Write-In</p>	<p>State Representative District 3 (Vote for no more than TWO.)</p> <p><input type="radio"/> Cheryl Adams Democrat</p> <p><input type="radio"/> Jonathan Davic Democrat</p> <p><input type="radio"/> Leonard Arnold Republican</p> <p><input type="radio"/> Samantha Bolin Republican</p> <p><input type="radio"/> Jeffrey Jones Libertarian</p> <p><input type="radio"/> Michael R. McCloud Libertarian</p>
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Party Column Ballot

INSTRUCTIONS TO VOTER

1. To vote, completely blacken the CIRCLE (●) to the LEFT of the candidate.
Do not vote for more than the authorized number of candidates.
2. Use only the #2 pencil provided.
3. To vote for a person whose name is not on the ballot,
write in the candidate's name on the Write-In line
AND completely blacken the CIRCLE (●) to the LEFT of your choice.
4. If you make a mistake while voting, return the ballot
to the election official for a new one.
A vote that has been erased or changed will not be counted.

PARTISAN OFFICES

President & Vice-President of The United States (Vote for ONE.)

<input type="radio"/> Edward Z. Jones -- President Steve Kaiser -- Vice-President Democrat	<input type="radio"/> Curtis G. Tucker -- President John Fisher -- Vice-President Republican	<input type="radio"/> Nathan Davis -- President Phillip Knox -- Vice-President Libertarian
--	--	--

United States Senator (Vote for ONE.)

<input type="radio"/> Frank Searer Democrat	<input type="radio"/> Alan Slocum Republican	<input type="radio"/> Linda Fisher Libertarian
--	---	---

United States Representative District 28 (Vote for ONE.)

<input type="radio"/> Larry Herman Democrat	<input type="radio"/> Rebecca Rehberg Republican	
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Research Approaches

- Review by computer-human interaction experts
- Laboratory experiment
- Field experiments
- Natural experiments

Voting Technology

The Not-So-Simple
Act of Casting
a Ballot



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- Questions?
 - For more information

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Thank you