Style Guide for Voting System Documentation:
Why User-Centered Documentation Matters to Voting Security

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What’s wrong with this picture?

Nashville, TN Super Tuesday, 2008

A voting machine that would not function sits near a line of people waiting go vote.

Deborah Hastings, AP National Writer

Was it broken or were the poll workers confused?

AP Photo/Mark Humphrey, File

Washington, DC Super Tuesday, 2008

While folks in Washington were waiting hours to vote under record turnout Feb. 12, poll workers hid electronic voting machines because they didn't like the touch-screen devices.

Deborah Hastings, AP National Writer

Why didn’t the poll workers like the touch-screen devices? Was it because they couldn’t figure them out?

Rick Laferriere

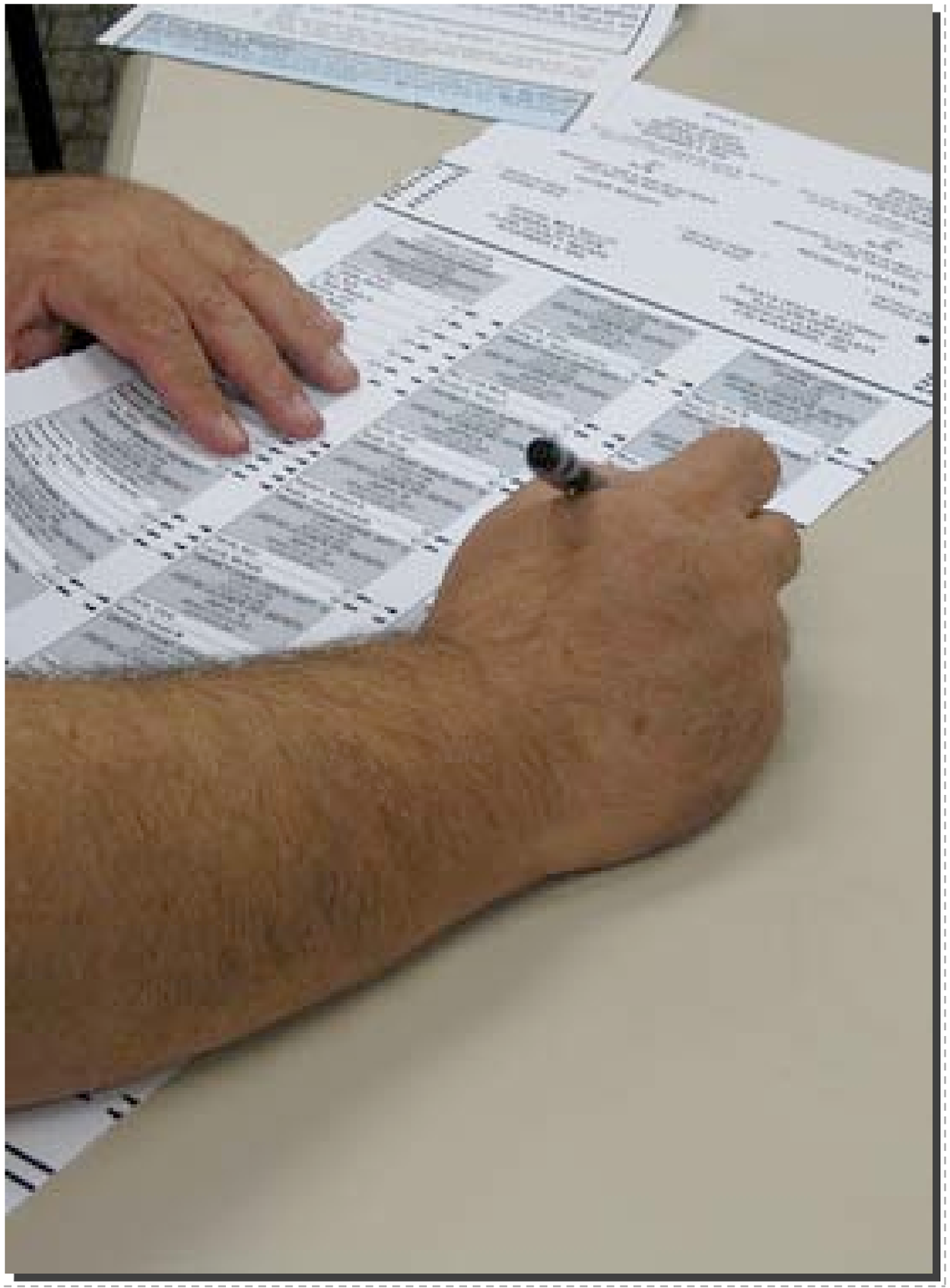
Chicago Super Tuesday, 2008

Poll workers passed out pens meant for e-voting machines.

When those instruments made no mark on paper ballots, election workers said they were full of invisible ink — an explanation that was upheld by onsite precinct judges.

Deborah Hastings, AP National Writer

Did anyone check the doc? Maybe it was full of invisible ink, too.



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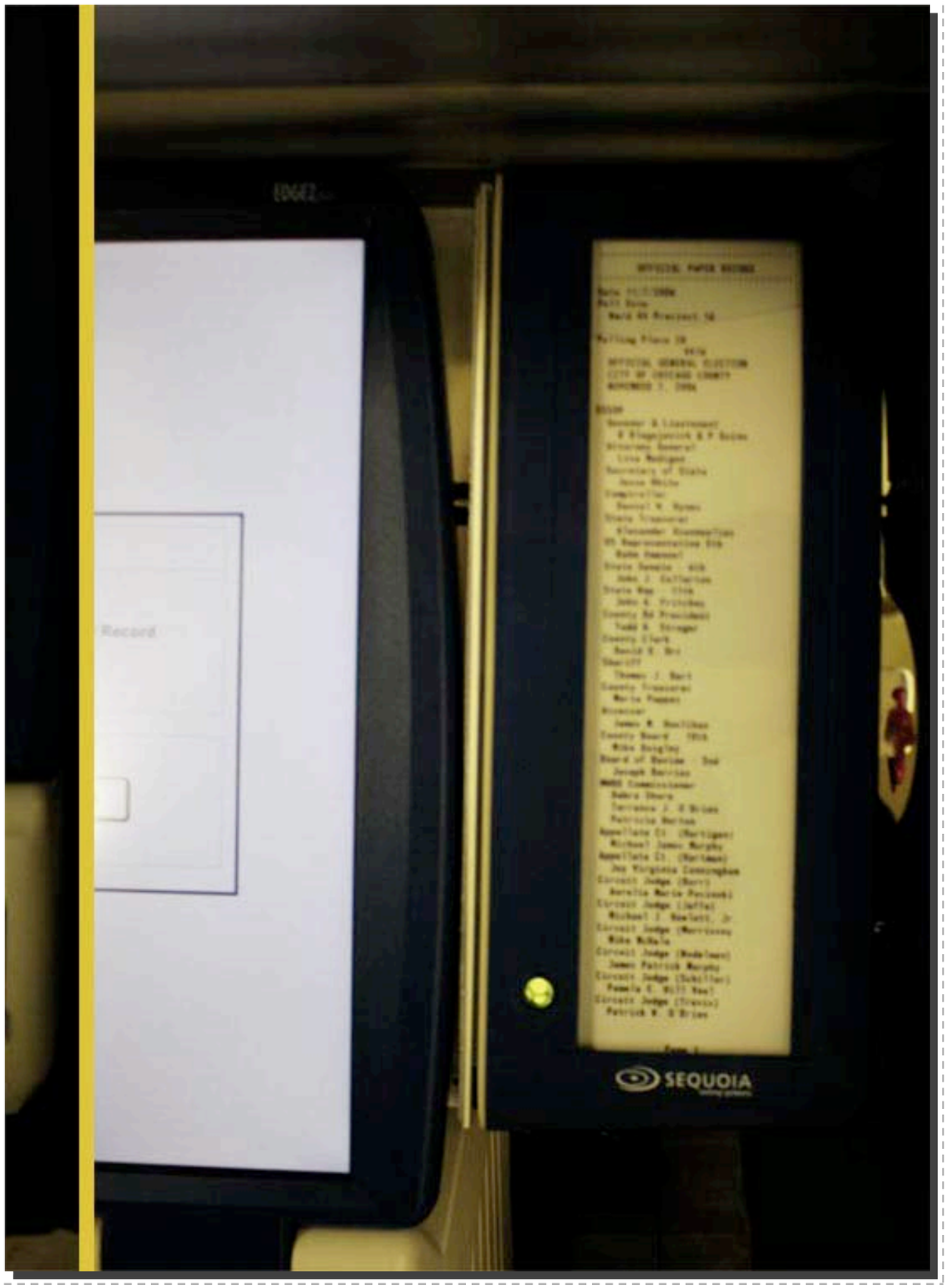
Cuyahoga County, OH
November, 2006

In at least one case in the 2006 mid-term election, a thermal paper roll had been installed backward, so nothing printed out onto it. In other locations, there were reports of paper jamming so that votes printed over one another.

National Public Radio



Unattributed - Polling Place Photo Project

Washington, DC
November, 2008

Data cartridges that store votes were unreadable at one precinct. The voting system manufacturer suggested two possible causes: static discharge or election workers mishandling the cartridges.

Washington Post

Unattributed voting system documentation

What's *wrong* with this picture?

Missing:

Clear information

Design for typical poll workers

NIST, The Help America Vote Act (HAVA), and Voting System Standards

- HAVA calls out the need for improved standards for voting systems
- NIST provides the technical support to develop these **standards** and **test methods** through the Election Assistance Commission and its Technical Guidelines Development Committee
- VVSG (Voluntary Voting System Guidelines) Section 3
  - Comprehensive usability and accessibility for voting systems
  - Design and performance standards based on best practice and research
  - Includes usability for poll workers
  - See: http://vote.nist.gov and http://www.eac.gov

Reflecting poll workers need for clear documentation and easy procedures in the VVSG

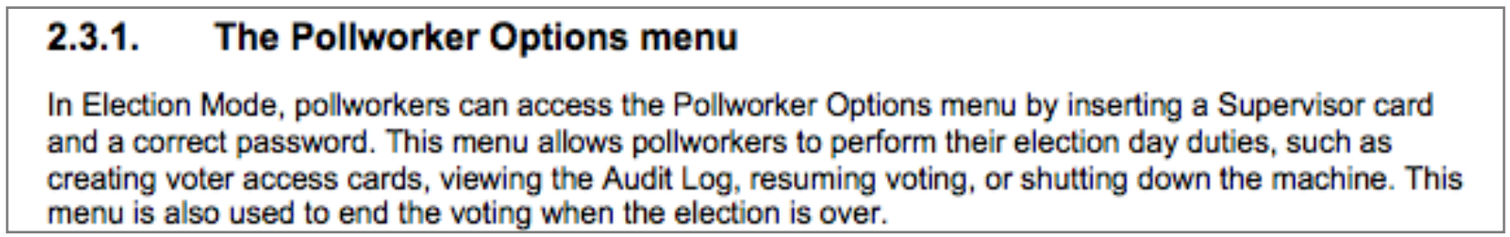
- “The procedures for system setup, polling, and shutdown, as documented by the manufacturer, ***shall*** be reasonably easy for the typical poll worker to learn, understand, and perform.”
- “The system ***shall*** include clear, complete, and detailed instructions and messages for setup, polling, and shutdown.”
- EAC-accredited voting system test laboratories will certify that systems meet the requirements
- How do you test such requirements?

Developing a style guide for voting system documentation

- Literature on technical communication and information design is extensive
  - ➢ We examined over 70 resources on technical communication, document design, information architecture, and plain language
- Current voting system poll worker guides
  - ➢ We reviewed over 750 pages in 9 documents; Included all major manufacturers
- Voting system documentation does not always follow best practice
- We developed specific guidelines for voting system documentation
  - ➢ Team has experience as technical communicators, usability researchers, information architects, teachers, and writers

Low points in the review of existing documentation

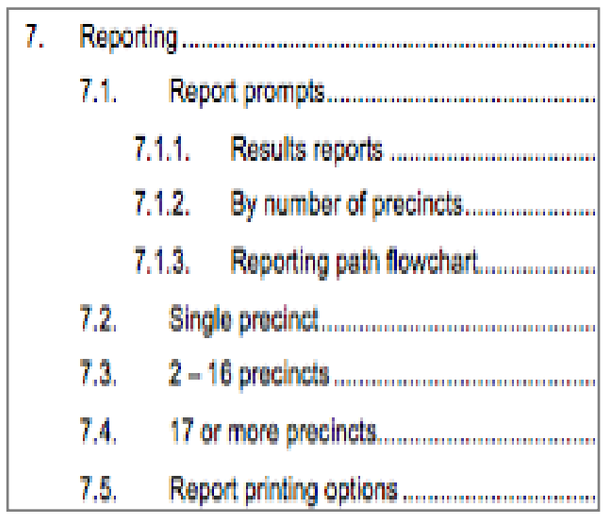
Instructions describe the interface, not poll workers' tasks



2.3.1. The Pollworker Options menu

In Election Mode, pollworkers can access the Pollworker Options menu by inserting a Supervisor card and a correct password. This menu allows pollworkers to perform their election day duties, such as creating voter access cards, viewing the Audit Log, resuming voting, or shutting down the machine. This menu is also used to end the voting when the election is over.

Headings are cryptic or ambiguous



Manuals don't have headers or footers

More low points

Warnings come after consequences

4. Press the ▶ next to **Print.** The [redacted] prints a slip of paper with the ACCESS CODE.

Only print an ACCESS CODE if there is an open booth.

Several steps are included in one instruction

1. If not already connected, connect the [redacted] battery key. A "[redacted] Initialized" report prints. Leave the report on the [redacted]; it will be filed at the end of Opening Polls.

Tasks are not illustrated

Voting system documentation guideline categories

- Write for specific users
- Organize to meet your users' needs
- Use simple words your users understand
- Write directly to your users
- Keep instructions short and simple
- Design for easy scanning and reading
- Use graphics effectively
- Test the documentation

Example:
Use familiar, common words

Before

1. Insert the scanner key and turn it to the Open/Close Poll position.

It will take approximately two minutes for the scanner to load the election definition from the card into its operating system. The scanner will display “S-Mode” in the upper left corner of the LCD screen and the message “Open polls now?”

2. Press Yes.

After

1. Insert the scanner key and turn it to Open/Close Poll.

Wait until this message appears (in about two minutes):
Open polls now?

2. Press YES.

Example:
Understand your users' tasks

Before

1. Inspect the power cord for damage.

   If the cord is damaged, discard it and contact the manufacturer for a new cord.

After

1. Inspect the power cord for damage.

   If the cord is damaged, contact Election Central.

Test the documentation

- For documentation developers:
  - Have people follow instructions
  - Observe without helping or hinting
  - Take notes on where they had problems
  - Revise and test again
  - Do a usability test with your users or participants like your users
- Our research
  - Develop a pass/fail usability test protocol for test labs to demonstrate usability for poll workers of the documentation (and, to some extent, the voting system itself)

Qualitative exploratory study of voting system documentation for poll workers

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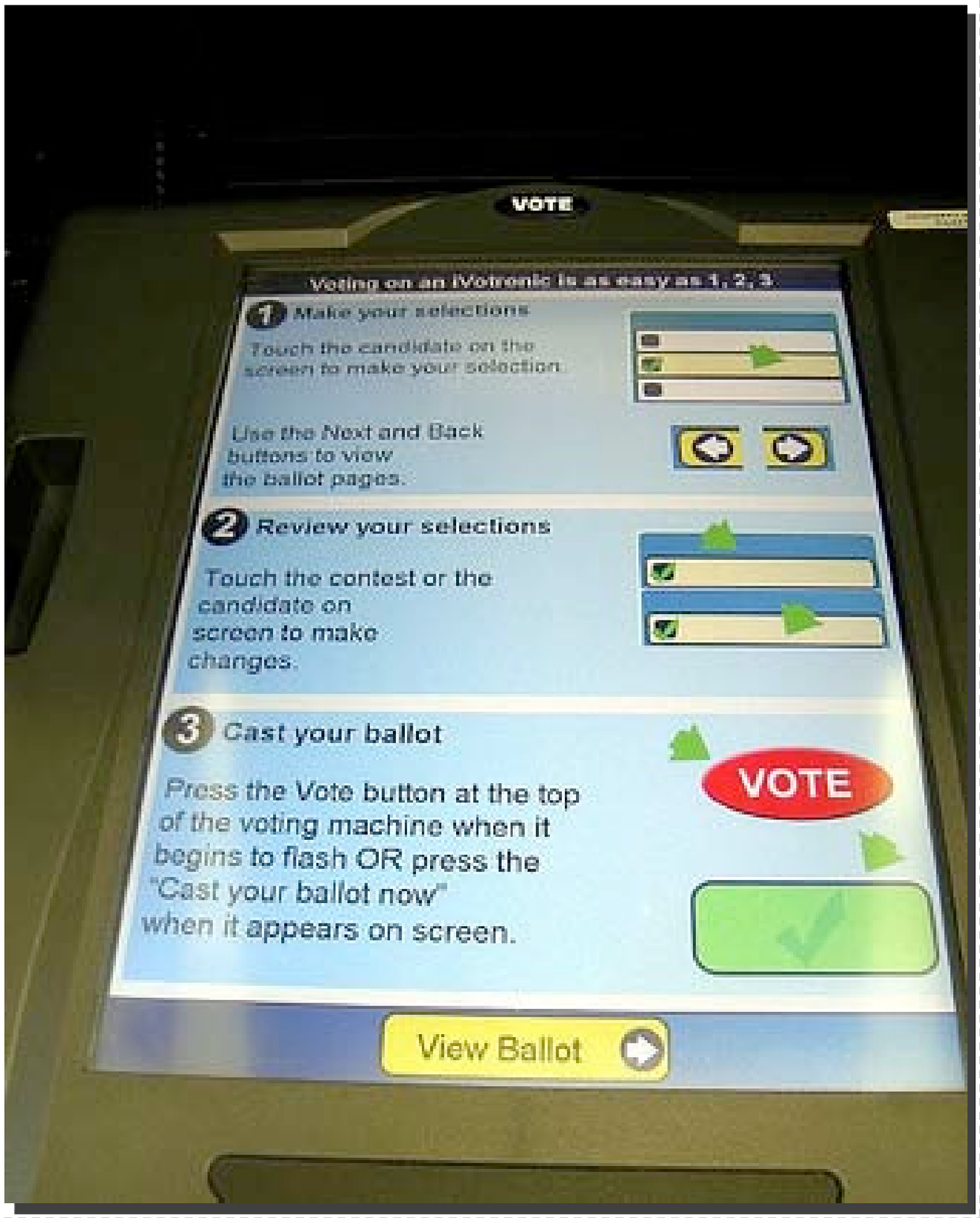
Research questions

- Tasks:
  - What are they?
  - How long do they take?
- Participants:
  - Pairs?
  - How many?
- Pass/fail criteria for the documentation?



How we tested the test

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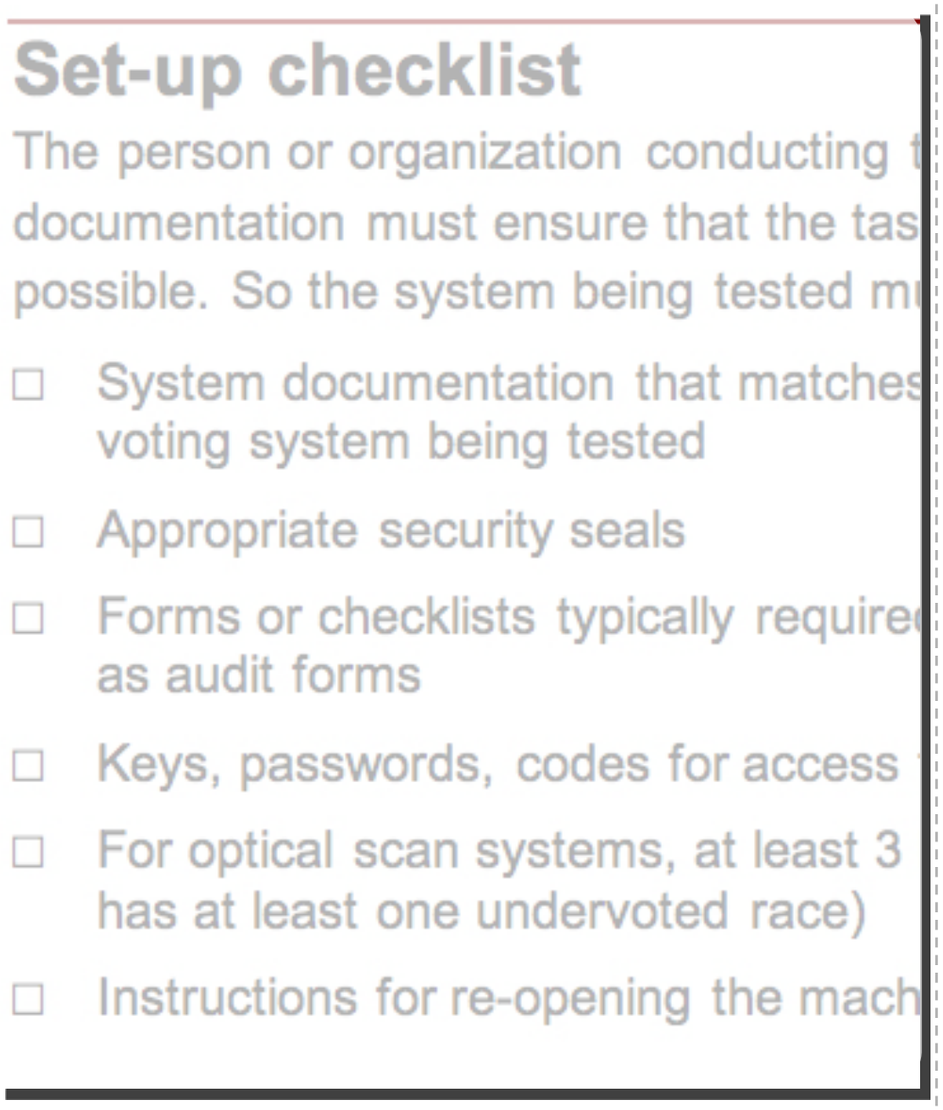
Test plan

- Draft protocol and checklists
- Four pairs of poll worker participants
- Two voting systems - one DRE* and one optical scan
- Each pair worked on both systems

*Direct Recording Electronic Touchscreen



Set-up checklist

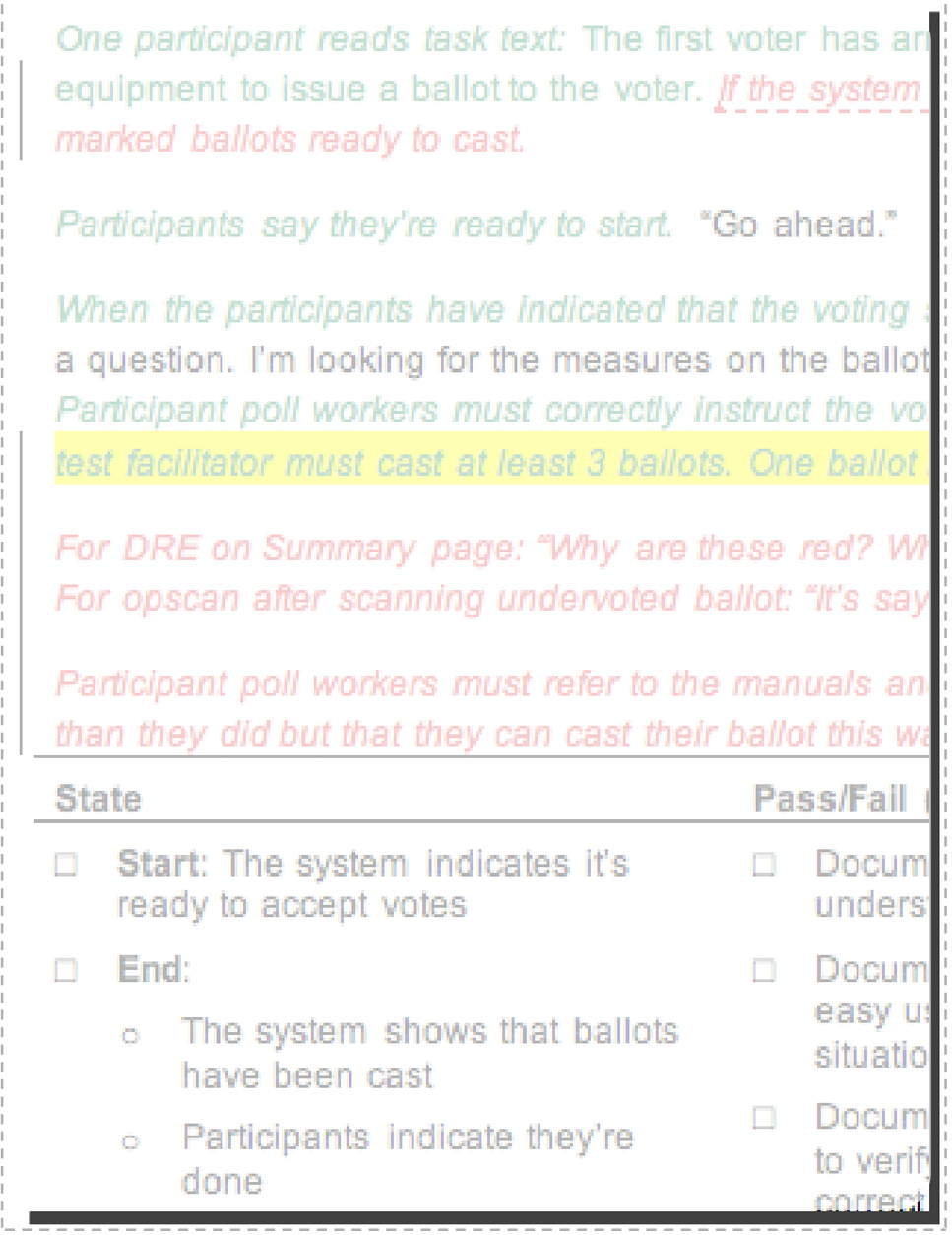
The person or organization conducting t
documentation must ensure that the tas
possible. So the system being tested mu

- ☐ System documentation that matches voting system being tested
- ☐ Appropriate security seals
- ☐ Forms or checklists typically require as audit forms
- ☐ Keys, passwords, codes for access
- ☐ For optical scan systems, at least 3 has at least one undervoted race)
- ☐ Instructions for re-opening the mach

We iterated the test design

At the end of each day, we adjusted

- wording in the test script and tasks
- instructions for the test administrator
- the organization and layout of the overall protocol



One participant reads task text: The first voter has an
equipment to issue a ballot to the voter. *If the system*
marked ballots ready to cast.

Participants say they're ready to start. "Go ahead."

When the participants have indicated that the voting
a question. I'm looking for the measures on the ballot
Participant poll workers must correctly instruct the vo
test facilitator must cast at least 3 ballots. One ballot

For DRE on Summary page: "Why are these red? Wh
For opscan after scanning undervoted ballot: "It's say

Participant poll workers must refer to the manuals an
than they did but that they can cast their ballot this wa

State	Pass/Fail
☐ **Start**: The system indicates it's ready to accept votes	☐ Docum understa
☐ **End**: ○ The system shows that ballots have been cast ○ Participants indicate they're done	☐ Docum easy us situatio ☐ Docum to verify correctl

Results of the documentation study

Matching the documentation to the machine was difficult

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Participants had questions that the documentation didn’t answer

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Information on troubleshooting was hard to use because it was not related to tasks

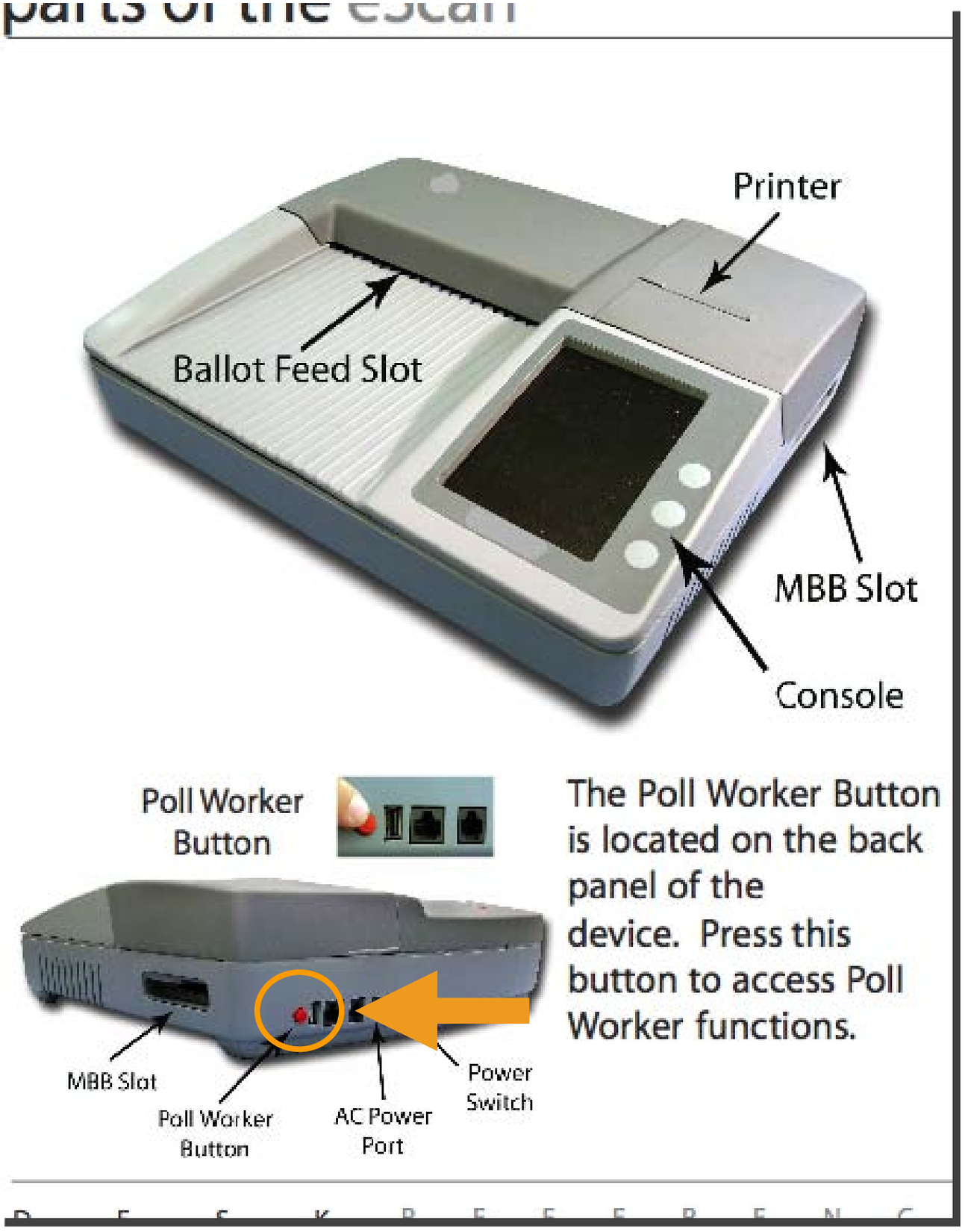
Election Day De

Introduction

[redacted] - Electronic Ballots

[redacted] - Paper Ballots

Documentation covered too many systems



Met many best practices but fails because the configuration is not the same as implementation

1.6 Setting up the HAAT

Follow the steps below to set up the HAAT.

1. Remove the HAAT unit, the case of voter cards, and the AC adapter from the HAAT unit case.

   Note: Some jurisdictions refer to voter cards as SmartCards.

2. Plug the two-pronged AC adapter into a 120V AC outlet.
3. Plug the female plug into the socket on the left side of the HAAT unit.

   The power light should illuminate. If not, double check that the AC outlet is operational, and re-check to power adapter connections.

4. At the power switch on the left side of the HAAT unit, press "•" to power on the HAAT unit.

Met many best practices but fails because the configuration is not the same as implementation

Determining pass/fail criteria

Evidence

Participants are able to use voting system documentation to:

Complete tasks without asking questions

Find the information they need

Match messages between system and documentation

Read, understand, and react

Perform tasks without missing steps

Perform steps to complete tasks

Pass / fail criteria

Have participants asked for help?

Have they completed the tasks in the time allotted?

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What questions remain?

Could someone else get the same results?

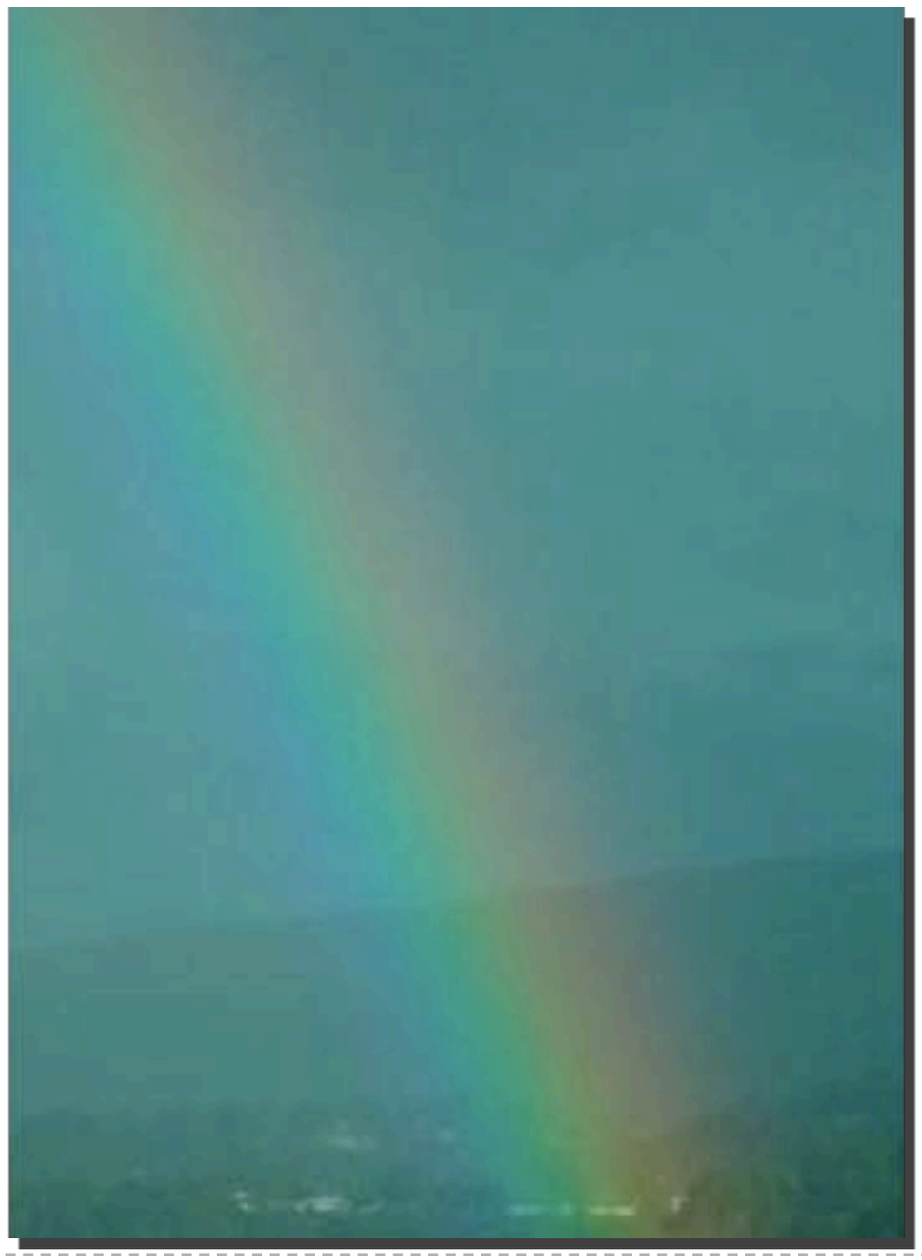
How to compute overall pass/fail score?

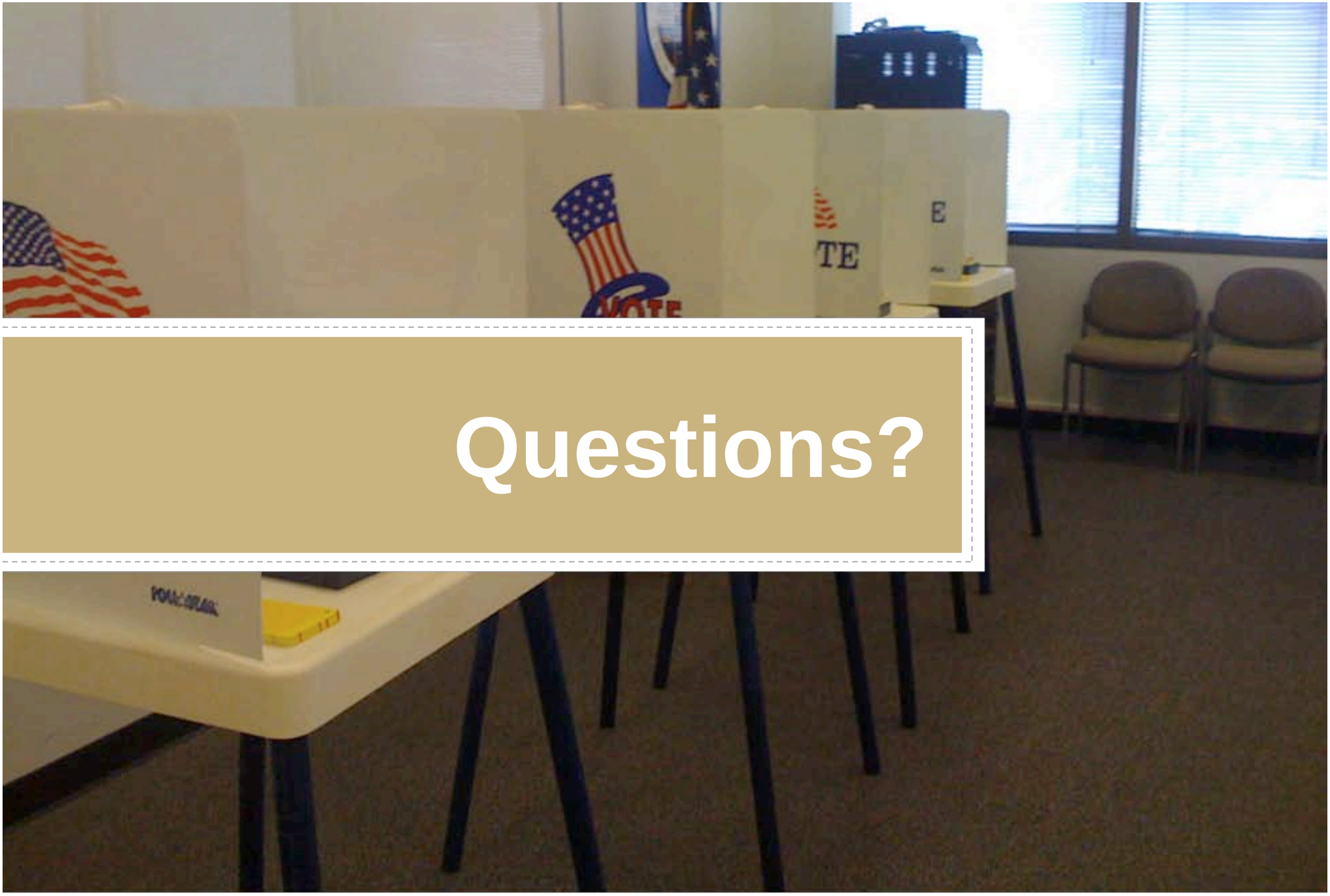
Where to learn more

http://vote.nist.gov

NIST IR 7519, Style Guide for Voting System Documentation
http://vote.nist.gov/NISTIR-7519.pdf

UPA Usability in Civic Life Project
http://www.usabilityprofessionals.org/civiclife/voting/index.html





Questions?