

As a 20 year veteran of software project management in business, here's the most succinct statement of my scepticism toward the Excel workaround in your state:

The Excel solution presents your state with two equally vicious choices. If the Excel algorithm is not automated the process will be vulnerable to human error at numerous points, and is not even in principle susceptible to review (which might involve more human error). The review *is as likely* to suffer from error as the original process. If it is automated (in Excel VBA or in any other programming language), it becomes susceptible to review only by experts, who, like the original developers, can manipulate the algorithm and perhaps even erase their tracks. In other words, automation of the algorithm makes it even more vulnerable, in principle, to fraud that not even other experts can corner.

We currently have automated vote counting, but it is very straightforward by comparison and can be checked by a manual recount. It's just counting. No complex rules are applied.

Election judges on site can see what is happening with physical ballots, even when they are counted automatically by scanners. But election judges cannot see into the calculation rules embedded in software without expertise, and even then, it can become very difficult to understand if the program has in fact consistently imposed the agreed upon rules. The more complicated the algorithm, the more impossible it becomes for people of good will to agree that the outcome is the one truly implied by the rules.

The primary goal of the voting system is to ensure the public's confidence in the results. The more complicated the voting algorithm, the more impossible it becomes for the *voters themselves* to understand and review the process -- whether it is automated or not. But the automation clearly increases the opportunity of "experts" to commit fraud.

Calculation rules can be placed in "arrays" and changed dynamically. The code that makes these dynamic changes could also be placed in temporary arrays and then erased at the end of the automated process, destroying any evidence that the rules were being manipulated in the first place. The implication of this is that any voting system that cannot be backed up by a simple, manual recount makes it impossible, in principle, to prevent fraud. If IRV is not susceptible to manual processing (within a reasonable amount of time) it makes the voting algorithm more vulnerable than ever to fraudulent manipulation. If the business rules operating in a software program cannot be applied manually to the process in question, as a quality and accuracy test, to every permutation of the use cases in question, then we can never be sure that the system has produced the right outcome. This is acceptable when we test software systems in business, since nothing as serious as the voter's franchise is in question. But it is an unacceptable risk when the integrity of our democracy is in question.

How can the state prove, to those who have standing (all voters) consistent with the compelling state interest, that the automation is working properly and not committing fraud? And who has the burden of proof if not the election officials responsible for the integrity of the process?

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