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A QUALITATIVE EXAMINATION OF VOTERS' PERCEPTIONS OF TRUST IN ELECTION SYSTEMS

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Abstract

Over the last few years, election integrity has become a pivotal topic of discussion in popular media and political circles (Shanahan, 2023; Reimann, 2022). The causes for this have been diverse and might stem from propaganda, public perception, the 24-hour news cycle, or partisan messaging. Regardless of the cause, ensuring the results are accurate is critical to beginning the counter message that elections do indeed have integrity. Ensuring the voting machines are secure and getting voters to perceive the machine as secure is believed to play a big role in the security of US elections. One potential measure for securing the machines is the use of homomorphic encryption. This research continues work (Kaufman and Lapke, 2022) that examines this phenomenon of perceptions of election security. Qualitative data was collected to validate and support the quantitative data collected in prior research.

Keywords

Election security, homomorphic encryption, voter perceptions, socio-technical model

Introduction

In the United States, we have a system where there are representatives that are responsible for running the country, state, and local government and the elections are critical in this process as this is how the leaders are chosen. During the 2022 Midterm Election cycle, election security has continued to receive a lot of attention by the media outlets, especially prior to election day. This demonstrates a need for the perception security of elections to be addressed in research to identify the factors that affect it and to identify better solutions to the perceived integrity issues among voters. One recent incident involved an increase in phishing emails to election officials prior to the 2022 Midterm Primaries and General Election in Arizona and Pennsylvania (Graham, 2022). Another recent event that speaks to the security issues that occurred is that the machines might need to be changed due to the release of the machine code to a group of people and that this release affects the real as well as perceived security (Gray, 2022).

As elections have progressed and the population has boomed in United States, the use of technology to conduct them have continued to grow (Technology in Elections, n.d.). Technology is used in all aspects of elections from election campaigns to the counting of the ballots. According to the US Election Assistance Commission, elections are administered the by the local and state government for all elections in the United States. This has the potential of a lower cybersecurity posture due limited funding and staffing at the local and state level as well as a lack of standard security practice. According to Verified Voting, there are some states that used many different voting systems in the 2020 US Presidential Election. This demonstrates a need to ensure that they are secure since managing all the different models could become extremely difficult.

There are a few key security aspects of elections that need to be maintained throughout the election as mandated by law (US Election Assistance Commission, n.d.). With the current system, there are many checks in place to ensure that the results are correct (Zoch, n.d.). However, in recent elections, many individuals believed that there was widespread fraud in the election (Murphy, 2022). This belief by voters could be for multiple reasons including lack of trust in the systems, fake news, social media, etc. This paper is focusing on the role that technology plays in this belief. This demonstrates the need to ensure the election results are secure and accurate. However, it is also important to ensure there is perceived security as well.

When it comes to the security of the system, the perceptions that voters' have must be factored in as well as the acceptance of the system by the voters. As was seen in the 2022 election, there were voters who chose not to vote due to their perception that the system was untrustworthy. In this research the aim is to determine if the voters' intention to use a system is affected by the trust that they have in the system.

Given the nature of presidential elections being nationwide, the first phase of this study intended to reach a broad audience via a randomized sample of the entire adult population. The first phase was proposed initially in 2021 and carried out

in 2022 (Kaufman & Lapke, 2022). In this since completed work, a pilot study and a full study was carried out where we used a survey as the research instrument. A data collection company, Qualtrics, was utilized to ensure a broad-based randomized sample was achieved.

This work will expand upon our previous quantitative survey that was conducted by adding qualitative methods to the research study (Kaufman and Lapke, 2022). We are adding qualitative methods to the study to get a deeper understanding of the phenomena at play. Furthermore, additional qualitative data can help confirm or reject the quantitative findings from the first phase.

This paper will address the qualitative data collected in this phase of the election security research project. As this has evolved into a mixed methods approach, we will discuss the methods utilized, the data collection, the initial findings of the data collection, and the potential ramifications. The research questions from the original paper that was published has changed slightly to better address the focus of this research. The primary change to the research questions was removing the question relating to online voting since that is not the focus of this research. The new research questions that will be addressed are:

1. How does the structure of the election system affect voters' trust in the election system?
2. How does the implementation of technology affect voters' trust in the election system?
3. Can technological solutions such as homomorphic encryption assuage voters' trust in election systems?
4. Does trust affect a voters' intention to use the election system?

Literature Review

Prior research (Kaufman & Lapke, 2022) reviewed a wide range of literature including history of election integrity issues, current state of security in elections, elections in the context of e-government, lenses of election security, election equipment used in the US, security concerns, voter perception, and finally homomorphic encryption. It was found that the idea of election integrity issues is not new (Troxler, 2008). According to Verified Voting, the current state of election security revealed that there are a lot of states that seem to have no standardization in the equipment used including some at the state level. Since technology has become very prevalent in elections demonstrates that this system is an e-government system (Specter and Koppel, 2020). There are three lenses to election security which are infrastructure, campaigns, and spread of information (n.d.). Verified Voting also found that throughout the US, there are many makes, and models of election equipment used which as mentioned previously results in no standardization (Kaufman & Lapke, 2022). Ballot secrecy and integrity are two of the biggest concerns and voter perceptions play a large role in trust of elections (Election Assistance Commission, 2021). Finally, the use of homomorphic encryption could help secure elections further (Benaloh, 1987). To expand the literature review, election fraud will also be discussed.

Voter Fraud in the United States

The Heritage Foundation has provided a database that gives information relating to election fraud in the US. Data from 1990 demonstrated a total of 34 voter fraud convictions. From the year 2001 through 2010, there were 340 voter fraud convictions. From the year 2011 through 2020, there were 603 voter fraud convictions. Finally, from January 2021 to October 2022, there were 62 voter fraud convictions. Within this database, some records are for multiple people. Therefore, these numbers could potentially be higher. The amount of election fraud, even though it looks like a lot, is not since only about 0.000022% of the US adults over 18 commit voter fraud each year. Not only do the data show that there is fraud in the US, but it also demonstrates that there has been an increase in voter fraud throughout each time period.

Another source that has discussed the statistics about voter fraud is the Brennan Center for Justice. This article provided an overview of studies that were conducted about voter fraud and the results from the study. In one report on this topic, they determined that the number of voter fraud incidents are between 0.0003 and 0.0025 percent (n.d.). These numbers are slightly higher than the data that was presented by the Heritage Foundation. Even though the number is higher, it is still not even 0.1% of the population.

One final source that discussed the details of one instance of voter fraud would be the article by Molly E. Reynolds (2018) that discusses the election scandal that took place during the 2018 primary in North Carolina's 9th Congressional District. This scandal involved individuals collecting unsealed absentee ballots from other individuals, which is illegal (Reynolds, 2018). This scandal was big enough where the Board of Elections refused to certify the results because of found anomalies (Reynolds, 2018).

Presenting this data is relevant to this research since we are exploring voters' perceptions of trust and security and this data provides background information since this was one of the main arguments that was used as propaganda for the individuals who disagreed with elections. However, these statistics do not support those individuals since the amount of voter fraud in a single year would not be significant to change the elections; however, previous research found no evidence to support the claims of voter fraud in some jurisdictions where fraud claims were made (Bastian et al., 2021). Statistical information such as this is a significant source for creating a misunderstanding.

Philosophical and Methodological Underpinnings

Within information systems research, there is a spectrum of philosophical approaches in which to conduct research. The first approach, positivism (Taylor and Medina, 2011), holds that every rationally justifiable assertion can be scientifically verified or is capable of logical or mathematical proof. Through this approach, the researchers collect and analyze the research data in an objectively defined way (Taylor and Medina, 2011). This type of research is often used to test theories (Taylor and Medina, 2011). Most of this type of research would be conducted by using a quantitative research method. This type of research is used to determine the ideas that are like-factual data (Taylor and Medina, 2011).

Moving along the epistemological spectrum, one would encounter the post-positivist approach (Taylor and Medina, 2011). While not fully interpretivist (Walsham, 1993), the post-positivist method allows for more interaction between the researcher and the subject (Taylor and Medina, 2011) which acknowledges the intrinsic bias introduced by the researcher. It does not go as far as the interpretivist perspective in that objective truth is still seen as a viable and worthy goal. The main use case for this method would be to develop a general set of knowledge about the social relationships within the research context (Taylor and Medina, 2011).

The first phase of the study (Kaufman & Lapke, 2022) which was a large-scale quantitative survey was clearly in the positivist domain. This follow up research was conducted through the lens of post-positivist. This qualitative portion still uses the positivist rules where it is viewed from an objective lens. This allowed us to test the Election Security Model which will be introduced in the next section. The other reason that we chose this approach is because it allowed us to interact with the participants more which allowed for analysis of the social relationships present in the electoral system.

With the different philosophical approaches to research discussed, it is time to discuss the methods utilized for this research. Given the broad philosophical base, the methods cross the two methodological domains. This is typically referred to as mixed methods research (Doyle et al., 2009). With this type of research, a method from both quantitative and qualitative are used to conduct the research study (Doyle et al., 2009). Performing this type of research can benefit the research. One of the primary benefits of performing this type of study is it allows the research topic to be analyzed in a multi-dimensional way (Doyle et al., 2009). This type of research is starting to become more popular in the research world (Doyle et al., 2009).

Within mixed method research, there is a subtype of methodological approach called multi-method that refers to using multiple methods within the same study. The terms multi-methods and mixed methods are sometimes used interchangeably; however, in the research world these two terms have two different meanings (Venkatesh et al., 2013). This is like the mixed methods approach as you are using multiple data collection methods, however there is one key difference. The primary difference between the two data collection methods is that mixed methods use quantitative and qualitative methods where multi-methods use multiple data collection methods in one category such as multiple qualitative methods (Salmons, 2015).

Given the results of the quantitative phase, the research was expanded to encompass a multi mixed method approach. The initial phase was a quantitative survey and we ended up with unexpected findings. During the analysis of our findings, we felt expanding the study with additional methodologies could enhance our understanding of the situation. Performing a case study and a focus group during the 2022 midterm elections seemed the best opportunity. The primary reason for choosing to do this method is so we can supplement the data that we found through the quantitative portion. Additionally, a multi-mixed methods approach facilitates a greater depth of data and allows for a more detailed analysis of the Election Security Model.

Election Security Model

In prior research (Kaufman & Lapke, 2022), a model was proposed that outlines the relationships between the socio-technical model components to the trust of the election system and from the trust of the system to the intention to vote in elections. An initial version of the model was initially proposed in the work by Kaufman and Lapke (2022) has been adjusted to better fit with the scope of this research. The initial model looked at enhanced security protocols and the move to online voting with the relationship to trust and the relationship from trust to intention (Kaufman and Lapke, 2022). However, the new model as shown in this work incorporates the socio-technical model as the framework for this model.

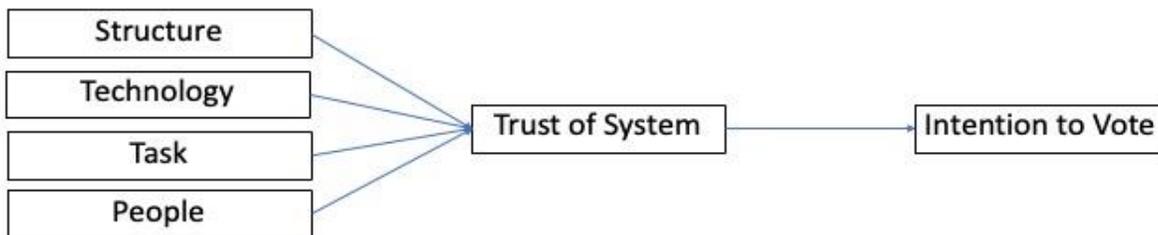


Figure 1: Election Security Model

In Figure 1, the relationships that drive electoral systems are described. We proposed that the components of the socio-technical model, which are structure, technology, task, and people, as discussed in our previous paper have a direct correlation with the trust voters' have in the election systems (Kaufman and Lapke, 2022). Following this, trust impacts a voter's intention to use the electoral system. Our hypothesis was that there is a direct correlation between trust and intention to vote. The detailed findings of the research will be discussed in future publications but at a high level, we found that the components of the first relationship, structure, task, people, and technology, have a statistically significant value when grouped together with structure and technology being the strongest contributor to the relationship. However, we found that there was a statistically significant but weak relationship between trust of the system and the voters' intention to vote as the p-value for the linear regression was <0.001 with an R-value of 0.228.

A Multi-Method Electoral Analysis

For this phase of the study, a multi-method approach including a qualitative case study and focus group was employed. We have decided to use qualitative methods for this research to allow us to get a deeper understanding of the voters' perceptions on trust and security. Given the unusual domain of the case, two methodological approaches were needed to maximize analytical metrics. In a typical case study, the domain is restricted to an organizational setting. As described in the introduction, electoral systems are nation-wide and controlled by many disparate groups.

The first qualitative method that was used in this study was conducting a focus group. As defined in a work by Nili et al. (2017) a focus group is defined as "... a social method of obtaining research data through informal group discussions on a specific topic" (p. 1). This definition shows that it is a good way to collect data on a topic through conversations with individuals. One main reason for choosing this research method is since this research method allows one to get a deeper understanding of the data while also ensuring the trustworthiness of the data (Nili et al., 2017). With our purpose of the qualitative study being to get a deeper understanding of the perceptions, conducting a focus group was an excellent choice for this research context.

The focus group plans to get a better understanding of voters' perceptions of trust in election systems. During the focus group, we asked questions that gave us information regarding their perceptions and why they have these perceptions of the US election systems. We had 8 individuals with demographics that are similar but not exactly the demographics of US adults over the age of 18. The population was restricted to US adults over 18 years old since individuals must be 18 years old to be eligible to vote in the United States.

Before discussing the details of how we conducted the ethnographic study, let's discuss what this type of research is used for and why we chose it. Based on a work that was created by Harwati (2019), they mention how an ethnographic study is used to analyze the relationships between individuals and aspects of their life. Since the purpose of this portion of the study was to learn more about the voting procedures used in polling places, by choosing this method we made first-hand observations of the individuals interacting with the election system.

For the case study, this consisted of making direct observations of security protocols and voting procedures in a polling place in Newport News, Virginia. To do this, we had to get approval from the Newport News Board of Elections to be able to observe a polling place. When conducting this research method made note of the procedures that the election workers are following related to setting-up the equipment, safeguarding the data, and the procedures that voters follow when coming in to cast their vote. Doing so allowed for a better picture of the current procedures and will be critical to getting a full picture of security protocols. This gave us a better picture of the current state of security in elections in Newport News, Virginia.

The final part of the qualitative research method that we made use of in this research project is by conducting in-person interviews. As discussed in a work by Knox and Burkard (2009), they mention how conducting interviews allows for the researchers to collect detailed information on the relationships that are being examined.

When conducting the interview part of the qualitative study, we interviewed 97 voters as they were entering or leaving the polling place. We conducted an informal interview at the polling location asking the voters questions such as what their thoughts are on the security of elections as well as whether they trust the elections and why or why not. We asked voters who chose to participate a set of questions with one question about each of the socio-technical model components and one question asking about the voters' overall trust in the election system in the United States. By asking these questions, we were able to get a better understanding of voters' perceptions of trust and security from individuals right after voting in an election.

Initial Qualitative Findings

After conducting each part of the qualitative study, the data were then reviewed to determine the common themes that were present. When conducting the interviews at the polling place in Newport News, Virginia there were several key findings. First, many voters believe that the current security protocols that are in place are adequate; however, they do believe there could be improvements as no technology is ever completely secure. Another theme found is that the trust that they had in the system did somewhat affect whether they voted or not since all the voters that were interviewed for the most part had at least average trust in the elections since most participants trusted the elections but did not have complete trust. Overall, through the

data collected from the interviews, it was determined that the model is still found to be valid, and that this data supports the quantitative findings.

Through the focus group that was conducted as a part of this study, there were some significant findings. The first theme from this data is that all the participants believe that the responsibility for conducting the elections should be shared between the federal and state governments in addition to the federal government ensuring that each state has the resources to run their elections. They also believe that social media and news outlets play a large role in influencing voters. The participants from this part of the study believe that there should be on-call on election day. One finding that was unexpected is that the participants stated that they would still vote even if they did not trust the election. Most of the voters who had this view had mentioned that they still feel like they would vote hoping that their vote would still count. Therefore, it is believed there is still some effect, just not as strong as initially believed.

Conclusion

The initial quantitative research that was conducted for this research project, we have gathered valuable information relating to the voters' perceptions. In terms of our Election Security Model that we proposed, we found that there was a statistically significant and strong correlation between the socio-technical model (STM) components and the trust of the system. For the other relationship in our model, we determined that there is a statistically significant but weak correlation between the trust the voters' have in the system and their intention to vote. This was an unexpected result as we expected a stronger correlation between those two variables. Therefore, more data and a deeper understanding of these perceptions was needed to understand and test our Election Security Model more fully. Therefore, the qualitative methods that are discussed above was conducted.

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