German Social Elections in 2023: An Overview and first Analysis

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Abstract: In 2023, the third largest election in German, the social elections (in German Sozialwahlen), offered an online channel for the first time. Of particular interest is the fact that the system provides a form of cast-as-intended verifiability, allowing the voter to verify that their vote was cast as intended and not manipulated by the device they used to cast their vote. This paper describes a first analysis of the overall voter experience with a special focus on this verifiability functionality. We utilize a cognitive walkthrough method, with three people having different levels of expertise regarding online voting, including a layman, a security expert, and a voting expert. Our findings reveal a number of issues with the system in terms of communication and presented information, and highlight areas in need of improvement to enhance user experience in particular with respect to the verifiability functionality.

Keywords: Sozialwahl; Online Voting; cast-as-intended verifiability; Cognitive Waltrough

1 Introduction

This contribution explores the pioneering implementation of online voting in Germany's third largest election, the so called social elections (in German 'Sozialwahl'), in 2023. The possibility to cast the vote online for the first time in this election signifies a groundbreaking advancement, allowing voters to exercise their democratic rights through digital means – in particular as there is no online voting channel for any parliamentary election in Germany (not on federal, not on state and not on local level). Furthermore, a system is in place providing some form of cast-as-intended verifiability – namely voters can check that there vote is cast as intended, i.e. that their voting device did not manipulate their vote by changing it before sending it to the voting server (or not sending it at all). To do so voters are supposed to use a second device, e.g. their laptop for vote casting and their mobile phone to verify. Thus, as long as one of the devices is trustworthy, voters will detect misbehaving devices.

With limited information available in English about the election and the voting system in place, the first objective of this paper is to compile publicly accessible information, including requirement documents, voter-related information and the actual user interfaces, to provide an overview for the international electronic voting community.

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The main purpose of this paper is then to conduct a first analyses of the usability of the online voting channel with a special focus on the effectiveness of the cast-as-intended verifiability. To do so a cognitive walkthrough methodology was employed. This approach involves systematically analyzing the provided information to use the system and the system's user interface design and interaction flow from the perspective of potential voters. Note, by simulating the thought process of users and identifying potential usability issues, the cognitive walkthrough aids in identifying areas for improvement and enhancing user experience.

The paper is structured as follows. We provide background information about the elections in Sect. 2. Sect. 3 describes the voting system used in online elections this year, as per official documentation and other publicly available information. Sect. 4 describes the voting process and all it's possible steps. The analysis of said voting process is discussed in Sect. 5, as well as the underlying limitations. Finally conclusions are drawn and directions for future work are presented in Sect. 7.

It is important to clarify that the authors of this contribution are not directly involved in the election administration or responsible for the operation of the voting system. However, they actively participated in discussions concerning the requirement documents, providing valuable insights for this research.

2 Background

In this section we shortly present some background information relevant for the reader's understanding. First we present some general information on the German social election, then we shortly present the requirements that needed to be met for the social election to be held in a partly digital format.

2.1 German Social Elections

The Sozialwahl in Germany is a democratic election where individuals (not necessary Germans) with a German public health insurance and pensioners at "Deutsche Rentenversicherung Bund" are eligible to elect representatives who advocate for their interests in the social parliaments of the pension and health insurance sectors[4]. The election takes place every six years since 1953, enabling voters to influence key aspects of the insurance systems such as their budget, policy decisions and overall management[5][6]. As of 2023, a total of 52

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[4] `https://www.vdek.com/presse/pressemitteilungen/2023/sozialwahl-2023-ersatzkassen-online-wahl.html`, Last accessed on 23 Jun 2023

[5] `https://www.sozialwahl.de/die-sozialwahl-2023/was-ist-die-sozialwahl`, Last accessed on 04 Jul 2023

[6] `https://www.bundesregierung.de/breg-de/themen/arbeit-und-soziales/sozialwahl-2023-2188062`, Last accessed on 21 Jun 2023

million of people are eligible to vote in this election[7]. The voter turnout varied over time, ranging from 20% to 44% since the election's inception, with it being on a decline since 1986 [Dr08]. The latest available statistics show a turnout of 30% during the Sozialwahl in 2017 [Bu18].

Traditionally, the Sozialwahl was conducted exclusively through mail-in voting (i.e. postal voting). However, in the 2023 Sozialwahl, several insurance companies offered their voters the option to vote online in addition to the traditional mail-in voting method. Eligible voters were provided with their voting materials, which encompassed not only the required documents for mail-in voting but also the essential information for casting their votes online. According to the federal ministry of labor and social affairs (BMAS), online voting reflects efforts to modernize the election process and provide participants with alternative voting options[8].

The possibility of voting online was implemented as part of a model project called "ARGE Modellprojekt Online-Wahlen 2023". The health insurance companies Techniker Krankenkasse (TK), BARMER, DAK-Gesundheit, Kaufmaennische Krankenkasse (KKH) and Handelskrankenkasse (hkk) joined forces for this purpose. A total of over 22 million members of these five insurers were entitled to cast their votes online in this year's Sozialwahl[9].

While there are currently no comprehensive figures available from federal election organizers on the 2023 election, some of the health insurance companies have released data regarding voter turnout, showing a trend towards decreasing turnout. As such, TK (Techniker Krankenkasse) reported that this year's voter turnout declined, with only 23.45% of all eligible TK members participating, representing from a turnout of 32.09% in 2017[10]. Approximately one tenth of the eligible TK members voted online[11]. Likewise, the DAK Gemeinschaft reported a decrease in voter turnout, with only 20.1% of DAK members participating in the election, compared to 28.4% in the previous Sozialwahl election held in 2017. Notably, less than 3% of eligible DAK members opted to exercise their voting rights online[12].

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[7] `https://www.sozialwahl.de/`, Last accessed on 21 Jun 2023.

[8] `https : / / www . bmas . de / DE / Soziales / Sozialversicherung / Sozialversicherungswahlen / sozialversicherungswahlen-artikel.html`, Last accessed on 04 Jul 2023.

[9] `https://www.vdek.com/presse/pressemitteilungen/2023/sozialwahl-2023-ersatzkassen-online-wahl.html`, Last accessed on 23 Jun 2023

[10] `https://www.soziale-selbstverwaltung.de/wer-wir-sind/unsere-traeger/techniker-krankenkasse-wahlergebnis-2017`, LAst accessed on 03 Jul 2023.

[11] `https://www.tk.de/techniker/unternehmensseiten/unternehmen/sozialwahl-2023/sozialwahl-2023-wahlergebnis-2012900`, Last accessed on 25 Jun 2023.

[12] `https://www.dak.de/dak/bundesthemen/sozialwahl-2023-ergebnis-steht-fest-2623564.html`, Last accessed on 22 Jun 2023

2.2 Requirements

There are mainly two documents which regulate which requirements must be met for the Sozialwahl, namely the Online Voting Regulation ("Verordnung zur Onlinewahl") [Bu20] and the Technical Guideline TR-03162 issued by the German Federal Office for Information Security ("Bundesamt für Sicherheit in der Informationstechnik (BSI)") [Bu23].

The Online Voting Regulation primarily addresses abstract content and defines important terminologies. With regard to the necessary security requirements, the regulation refers to the Technical Guideline TR-03162 issued by the BSI [Bu23]. Additionally, Paragraph 10 of the regulation briefly addresses rules on usability and accessibility. Specifically, Paragraph 10 mentions that the eligible voters must be informed about suitable security measures with the transmission of the election documents, with which the device used for the election action can be protected against third-party interference according to the state of the art [Bu20].

The Technical Guideline TR-03162 [Bu23] is a set of guidelines established by the Bundesamt für Sicherheit in der Informationstechnik (BSI) in Germany. These guidelines are part of a model project pursuant to § 194a of the Fifth Book of the Social Code (SGB V) and are intended to complement the Online Voting Regulation. The technical guideline includes specifications for the operation and use of applications and IT systems used in the implementation of the online social election model project.This technical guideline largely aligns with and builds upon fundamental principles of IT protection and security. The key areas covered include: establishing basic requirements and determinations, implementing BSI IT basic protection guidelines, emphasizing the use of up-to-date encryption methods, and providing relevant information on election preparation and execution. A previous version of the TR is discussed and proposal how to improve the TR are included in [Be21].

For the electronic voting community and for the focus of our paper Section 5.2 of the Technical Guideline TR-03162 is of special interest as it addresses verifiability. The relevant points are translated below:

> *The individual voter SHOULD be given the opportunity to understand the election result. The following aspects of verifiability are considered:*
>
> 1. *The voter can verify that their online vote was sent as intended, received, and stored in the ballot box.*
>
> 2. *The voter can verify that their vote was correctly included in the count.*
>
> 3. *The voter can verify that all votes were correctly summed up to the election result.*

It is important to emphasize that these points are introduced with the verb "SHOULD". As defined in the Technical Guideline, this expression means that a requirement should

normally be fulfilled, unless there is a good reason against doing so – as opposed to "MUST", meaning that the requirement is mandatory in any case. In particular this paragraph of the TR has been criticized by researchers [Be21], arguing that there is a lack of specification on what constitutes as a good enough argument against implementing verifiability, potentially leading to this requirement being neglected by election organizers. While other critique by these researchers were addressed in the newest version, to our best knowledge, no explanation addressing this criticism has been publicly provided. Note, it is also not defined, who decides that the justification is deemed sufficient.

3 Voting system

In this section we summarize the available information about the voting system. The available information on the system and it's security were very limited, although general information on the Sozialwahl was plentiful. Therefore the following sections are subdivided by the origin from which the information was retrieved, beginning by the voting material received by mail, the information found on TK's website and finally, further information that was found online in an extensive google search. It's important to note, that we exclusively focus on the information provided by Techniker Krankenkasse (TK), as the authors and all participants of the cognitive walkthrough have assurance in this specific health insurance company. Thus, it might be that it is different from company to company. In this case, the description and the late analysis strictly reflects the perspective of a TK-insured voter.

3.1 Information from the Voting Material

The material received by mail consisted of the following components:

- A personalized letter inviting the recipient to participate in the election. The letter contained two links and a QR code, which referred to the same URL as the second link.

- An envelope attached to the letter that could be used for postal voting. This voting envelope also included the personal election identification number.

- The ballot paper for postal voting and a pictorial instruction for postal voting enclosed with the letter.

- A detailed "Guide to Online Voting 2023", which described the process of voting and verification through diagrams and text.

In particular, the included guide led participants through the process of online voting, beginning with the authentication. The two possibilities of authentication, via insurance

number and insurance card or via AusweisApp2, a mobile application designed for online identification using the electronic ID card (Online-Ausweis)[13] , were explained. Afterwards the process of casting a vote was briefly explained and it was mentioned that you have to confirm having read the security notes for protection against third party interference. Additonally, a website[14] was given, where these instructions should be able to locate.

Regarding the security and encryption of the ballot, it was only stated, that there is a very strong encryption method in place and therefore it might take a moment to submit the vote. No further details were disclosed. The possibility to verify one's vote 30 minutes after vote casting using the "Sozialwahl Verifier" app was also briefly mentioned. The significance of this step was not explained but it was stressed, that this step is explicitly not obligatory. All information regarding cast-as-intended verifiability from the received voting material is translated into English below:

> *After the election, you have the option of photographing the displayed QR code within 30 minutes using the Social Election Verifier app. As a result, your vote stored in the electronic ballot box is displayed.*

Lastly the election period was mentioned as well as, that in case somebody would cast their vote online and per mail, only the online vote would count.

3.2   Information presented on TK's Website

In analyzing the information available on TK's website pertaining to its online election system and security protocols, we prioritized the content that was most relevant. Among the plethora of articles and news available, particular emphasis was placed on the websites referenced in the printed voting material, which suggests their significance as deemed by TK. There were two websites of paramount importance linked in the voting material. The first linked website[15] provided an overview that primarily consisted of news articles about the impending election and featured several related pages; of which, two were germane to the online election. The very first of these pages sketched an outline of how the online election was made possible, as already described in Sect. 2.1. Although it briefly mentioned that the voting application complied with high security standards set by BSI, it did not provide specific details on the system and security standards. The second website[16] furnished general instructions about the voting procedure and mirrored the content in the voting material disseminated via mail. It contained a link leading to the election website, a flowchart illustrating the voting process, and a downloadable detailed instruction in PDF format

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[13] `https://www.ausweisapp.bund.de/home`, Last accessed on 03 Jul 2023.

[14] `https://www.bsi.bund.de`, Last accessed on 07 Jul 2023

[15] `https://www.tk.de/sozialwahl`, last accessed on 03 Jul 2023

[16] `https://www.tk.de/techniker/unternehmensseiten/unternehmen/sozialwahl-2023/waehlen-sie-jetzt-online-2119940`, last accessed on 03 Jul 2023

which matched the guide sent with the voting documents. Additionally, there was a section titled *Security Notes for Protection against Third Party Interference* that cited a page from BSI[17] for relevant instructions. Though it claimed encryption and security as the utmost priority, it did not offer any explications or supplementary information on these claims. The website did hint at security being pivotal, but fell short in providing concrete specifics, and critical inquiries regarding the secrecy of the vote, verifiability without traceability, and management of a substantial number of votes remained unaddressed. The mention of vote transmission potentially being time-consuming due to very strong encryption[18] was present, but no additional insights into the encryption process were disclosed.

3.3   Further information

In an endeavor to glean additional information pertaining to the Sozialwahl 2023, several investigative measures were undertaken. Among the steps taken was reaching out to the press office via email with queries. Through this communication, it was ascertained that regio iT[19] and Smartmatic[20] were engaged as IT service providers for the election. Additionally, a comprehensive Google search was conducted on 30.06.2023 to ascertain whether the necessary conditions were fulfilled for the election; however, this search did not yield pertinent information.

Moreover, during the search, an explanatory video was discovered which elucidated the general election process and discussed the voting rules[21]. It is important to note that the video primarily emphasized the usability of the voting system and the provision of a basic understanding of its operations. It did not delve into technical aspects such as encryption or security measures.

4   Voting process

In this section, a detailed analysis of the voting process employed during the Sozialwahl 2023 is provided, meticulously examining each step involved. Initially, upon receiving the voting materials, the voter was expected to familiarize themselves with the information described in Sect. 3.1. This phase of orientation was crucial to understanding the subsequent steps. It is important to note that one of the links available in the voting materials directed voters to an information page provided by the insurance company, where a flowchart illustrating the

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[17] `https://www.bsi.bund.de/DE/Themen/Verbraucherinnen-und-Verbraucher/verbraucherinnen-und-verbraucher_node.html`, Last accessed 07 Jul 2023

[18] `https://www.tk.de/techniker/unternehmensseiten/unternehmen/sozialwahl-2023/waehlen-sie-jetzt-online-2119940`, Last accessed on 27 Jun 2023.

[19] `https://www.regioit.de`, last accessed on 04 Jul 2023

[20] Smartmatic is also involved in the official elections in Estonia. `https://www.smartmatic.com`, last accessed on 04 Jul 2023

[21] `https://www.youtube.com/watch?v=qn6mhcykCV0`, Last accessed on 29 Jun 2023

voting process was displayed. However, both the author of this paper and a participant of the cognitive walkthrough found the insurance company's flowchart to be rather confusing. As such, this flowchart and the critiques against it will be elaborated upon and discussed in the subsequent Sect. 5.

To facilitate a more coherent understanding and to overcome the limitations of the insurance company's flowchart, an alternative flowchart has been generated by the author that elucidates the progression from the acquisition of the voting materials, through the voting process, to the verification of the vote via a dedicated app (see Fig. 1). This author-created flowchart is particularly beneficial in visually comprehending the sequence and interactions involved in the process.
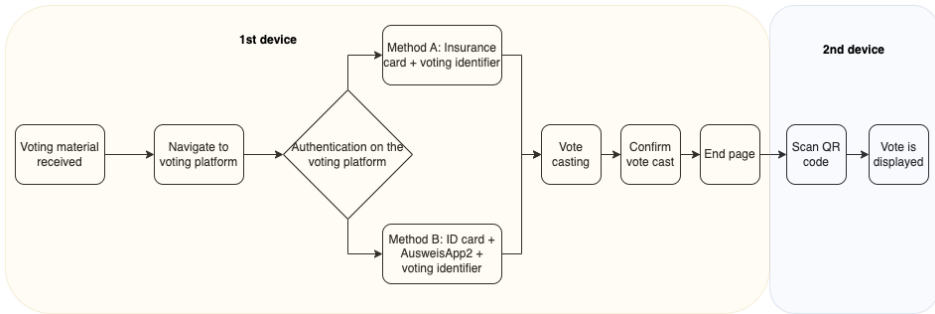

Fig. 1: Author-created Flowchart illustrating the complete voting process

Accompanying the author-created flowchart, screenshots from the voting application have been incorporated below. It is essential to mention that these screenshots are in German, mirroring the language used within the system, and no option was available for altering this setting. This serves to ensure authenticity and a representation of the user experience as encountered by the German-speaking electorate.

For the practical illustration of a voting procedure, a random selection was made from the available options. This decision to randomly select was executed to reflect how an elector might engage with the system. The choice fell on the first item in the list of options presented.

4.1 Authentication

The voter, having reviewed the materials, followed the embedded links. A circuitous path through these links led to the voting platform. Here, the participant was offered two methods for authentication. 'Method A' included the entering of the insurance number, the last six digits of the insurance card number, and the personal voting identifier received with the voting material. 'Method B' used the personal voting identifier, the ID card and a dedicated

App called 'AusweisApp2' which is commonly used in Germany to authenticate online. However, in this analysis, only the first method, termed 'Method A,' is employed, due to the author's lack of AusweisApp2.

4.2 Vote Casting

Following successful authentication, the system displayed the available lists, with a total of four choices. Once the voter selected an option, it was necessary to review this selection in order to proceed.

Fig. 2: The voter is asked to check their selection, submit having noticed the security notices before being able to cast their vote.

The system then presented the selected option and prompted the voter to acknowledge having read the before mentioned *Security Notes for Protecting the Device Used in the Voting Process Against Third-Party Interference According to Technological Standards*. Note, that this information was not linked, nor could it be found at the given destination[22]. Noteworthy on this account is, that the information on how to retrieve these security notes was conflicting, as the detailed guide referred to a different website as the TK website "How Online Voting works". By selecting the "Stimme abgeben" button, the voter's selection was transmitted to the digital ballot box (see Fig. 2).This transmission phase lasted a few seconds.

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[22] https://www.bsi.bund.de/DE/Themen/Verbraucherinnen-und-Verbraucher/verbraucherinnen-und-verbraucher_node, last accessed on 01 Jul 2023

4.3 Cast-as-Intended Verifiability

Subsequent to the vote submission, the participant was greeted with a confirmation message, signifying the completion of the voting process. This message informed the voter that it was now safe to exit the page. Additionally, a QR code was displayed on the same page, intended for verifying the submitted vote using the "SozialwahlVerifier" app (see Fig. 3).

Fig. 3: The successful transmission of the vote is signaled and the user is given permission to sign out. The optional possibility to verify one' vote by scanning the QR code with the "SozialwahlVerifier" app is presented.

To utilize this verification feature, the voter needed to scan the QR code using a compatible secondary device such as a smartphone within the "SozialwahlVerifier" app. The app then displayed the vote that was submitted, providing an additional layer of confirmation. It is noteworthy that this verification procedure within the app did not require further authentication.

5 Methodology: Analysis from User Perspective

In this section an examination of the user experience in the Sozialwahl 2023 voting process is undertaken. The evaluation method employed for this analysis is informed by the *cognitive walkthrough* approach, which is a usability evaluation method that is fundamentally centered on comprehending and analyzing the cognitive processes involved as a new user encounters an interface or system for the first time [Wh94]. The primary questions that guide the cognitive walkthrough are: (1) Will the user endeavor to achieve the right outcome? (2) Will the user notice that the correct action is available? (3) Will the user associate the

correct action with the outcome they are trying to achieve? (4) If the correct action is performed, will the user perceive that progress is being made toward the solution of their task? [LW97]. In the context of this paper, the cognitive walkthrough approach was adapted to systematically analyze the Sozialwahl 2023 voting process from a first-time user's perspective. The walkthrough was conducted by three different people with varying levels of expertise and familiarity with online voting systems and security protocols. Two of these verified that their vote was cast-as-intended, with the other refraining from doing so, due to the process being too tedious.

6 Results

The general insights gathered from the cognitive walkthrough highlighted several concerns. Most of these concerns stem from information not being clearly communicated or even confusing: e.g., the flowchart (see Fig. 4 provided in the voting material was perceived to be confusing by all participants. Furthermore, some information that was perceived as necessary, e.g. the before mentioned security notes, was either unavailable or difficult to find. Other information was perceived as too vague and lacking in precision, for example no details regarding the security of the voting system was disclosed, while it was just mentioned that the system is "very secure".

The most striking issues are listed below:

- No information why the possibility to verify one's vote or why this may be important was given, which led to one of the participants not verifying their vote.

- The requirement that the verification process required a second device (with a camera), was not communicated beforehand to the voters; a possible consequence of this might be, that some voters used their smartphone to cast their vote and were left unable to verify the vote, in case they did not have a second device with a camera to scan the QR code.

- The voting materials lacked clear instructions regarding the voting rules, such as the number of permissible votes. This is of particular relevance as voters were not warned if the selection they made would make their vote invalid (e.g. if they selected more than one voting options)

- In order to proceed with voting, voters had to confirm security notes, which none of the participants of the cognitive walkthrough managed to locate.

- The finalization of the voting process was not clearly communicated. In particular, the system did not provide any clear indication that closing the window or signing out would leave the voter unable to verify their vote.

We elaborate on specific insights from each participants of the cognitive walkthrough below.

Layperson: The layperson found the voting process to be complex, and chose not to engage in the verification process to avoid additional effort and because they lacked the understanding why it was even needed. The participant struggled to locate the necessary information in the voting material, such as the link to the actual voting platform. They found the voting identifier prone to errors, as it contained many special characters. The layperson was inclined to trust the system's security, mainly because it appeared too intricate for them to understand or assess. Due to being to tedious, needing to download of a dedicated app, the layperson refrained from verifying their vote.

Security Expert: The security expert lamented the absence of technical background information. They chose to ignore the QR code on the voting envelope due to security concerns, namely, that they could not figure out the destination of the QR code . The security expert noted that some form security notes were placed towards the bottom of the information page and could easily be overlooked. After inspecting these security note, they negatively highlighted the absence of actual notes but rather only claims that encryption and security were the priority, without disclosing details, as already mentioned in Sub-Section Sect. 3.2. Although the expert did not have strong security concerns for this particular vote due to its perceived low relevance, they mentioned that in a more significant election, such as parliamentary elections, the concerns would be significant.

Voting Expert: The expert was particularly critical of the unavailability of the mentioned security notes, and the necessity to submit to those, in order to cast their vote. They highlighted, that all that was found in an extensive search phase, using Google, the general search functionality at BSI's website[23] and checking the links, provided in the voting material, was only vaguely related and pertained to conventional offline elections focusing on detecting and avoiding the receipt of fake news. On this account they noticed conflicting information provided by TK, how these security notes may be found. The detailed guide (see Fig. 4) referenced a different source than TK's website providing information about the election. Moreover, they also found the diagram to be confusing due to it being two-fold and illustrating a non-clear path through the voting process. This obscurity was mainly due to conflicting wording in the diagram. The expert was critical of the absence of an additional security step for the second device to protect the vote, such as time-based PIN, as proposed in similar applications[24], as this step serves two important purposes: (1) It assists in alleviating the confusion that non-experts might experience when they see their vote being directly displayed by the server, as this display could lead laypeople to mistakenly believe that the secrecy of their vote has been compromised.(2) It contributes to preventing vote-buying schemes, as individuals who might be inclined to sell their votes cannot easily furnish proof that they have voted in the manner they were compensated for. They noted an overwhelming number of similar links in the voting materials, which provided excessive

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[23] `https://bsi.bund.de`, last accessed 07 Jul 2023

[24] `https://www.polyas.com/security/individual-verification`, last accessed 3 Jul 2023

information but lacked relevance, such as the first link provided[25] in the voting material, which served as a collection for all related links to the social election. The primary criticism was that, despite the abundance of information provided about the Sozialwahl, the majority of it lacked any pertinent connection to the aspect of online voting. They found that the extensive instructions (Fig. 4) were informative for the voting process but did not address voting rules or technical details about the underlying system or security. The voting expert was critical about the absence of information on several important aspects, including a layperson-friendly explanation about (1) the purpose of the cast-as-intended verifiability step, (2) why a voter should participate in this step and (3) against which kind of attack scenario this step protects.

Limitations: It is imperative to acknowledge the limitations of the analysis conducted. Firstly, the number of participants in the cognitive Walkthrough was limited, involving only three participants. A larger and more diverse group of participants could potentially provide a more comprehensive and varied set of insights. However, already the findings so far show a lot of room for improvements of both the voting material as well as the user interfaces. Secondly, the acquisition of information was constrained. The analysis was mainly based on information sourced from the insurance company's materials, which might not encompass all the relevant aspects of the voting process. It is possible that additional information and perspectives from external sources could contribute to a more in-depth understanding and critical evaluation of the system. This limitation in information acquisition could have affected the depth and breadth of the analysis. However, it is not very likely that the average voter would have spend time to search for additional information other than the information provided in the voting material or other sources send to him by the election officials. Thirdly it is important to highlight, that the main focus of this analysis was focused around the voting experience with regards to the cast-as-intended verifiability step and the accompanying material provided by TK. As every insurance that offered the possibility to vote online used their own voting platform and accordingly may have provided different material in preparation for their voters, it is likely that the gained impression may differ for voters from different insurances. However, our findings are relevant for the TK insurance company for sure. Considering these limitations, it is important to interpret the results of this analysis with caution, and to recognize that they represent a snapshot of experiences and insights within the constraints of the methodology employed. Further research involving a larger and more diverse set of participants, and a more exhaustive collection of information from various sources, could contribute to a more robust analysis of the Sozialwahl 2023 from a user's perspective.

7 Conclusion

While in general, it is good to see that the technical guideline [Bu23] considers verifiability and the system in place for the social election provides some form of cast-as-intended

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[25] https://www.tk.de/sozialwahl, last accessed 03 Jul 2023

verifiability however, this research has identified several short comings regarding the communicated information and the user interfaces in general and in particular regarding the cast-as-intended verifiability process.

The analysis of the social election / Sozialwahl 2023 in Germany has exposed several pertinent concerns and areas for improvement in the realm of voting process, communication, and system security. The findings point to an overarching lack of information and clarity on critical elements of the voting system. It is striking that despite the scarcity of easily accessible information necessary for assessing the security of the voting system, there has been little media discussion or public criticism regarding these issues. One of the crucial aspects that require more attention is the verifiability of the votes. The information about this feature was not effectively communicated, and as a result, many voters may not have realized its importance or how to utilize it. Verifiability is a fundamental component of ensuring the integrity and reliability of an election system, and thus, it is vital that this aspect is transparent and easily understandable for all voters. Upon reviewing the technical guideline and considering the elements outlined regarding cast-as-intended verifiability, it is evident from the publicly accessible information that only the first criterion - namely, that the vote was transmitted as intended, received, and securely stored in the ballot box - is met only under specific assumptions. These assumptions are that at least one of the devices employed for voting and verification is not compromised, and that the election administrator is both ethical and free from manipulation. In further research conducted after the cognitive walkthrough, we also examined the information available from other health insurance companies, such as "DAK Gesundheit". Interestingly, DAK addressed some of the aspects we critiqued in TK's materials (e.g., existence of an explanatory video, stating the voting rules & the necessity of a second device), though it also had other areas that warranted criticism. For example DAK Gesundheit stated, that you can also be sure without checking that your vote is reliably recorded by the system, implying that verification is not necessary[26]. As we look to the future, it is essential that election organizers invest in providing more comprehensive and accessible information. Future work should focus on enhancing the usability, perception, and understanding of the voting system among the electorate. This includes not only ensuring that the information is available but also that it is communicated in a way that is clear and understandable to the average voter. Additionally, feedback from diverse groups of stakeholders including security experts, voting experts, and laypeople should be sought to understand different perspectives and identify areas that need improvement. It is also important for the media and civil society to play a more active role in scrutinizing and discussing the election systems, especially in terms of security and verifiability. This will help in fostering an informed citizenry, which is crucial for the integrity and success of the democratic process.

In summary, while the Sozialwahl 2023 represents an important exercise in democratic participation, the findings of this paper suggest that there are significant areas for improvement in terms of communication, clarity, and voter education. A commitment to transparency,

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[26] `https://www.dak.de/dak/unternehmen/sozialwahl-bei-der-dak-gesundheit/sozialwahl-2023-erstmals-auch-als-online-wahl_33916`, Last accessed on 30 Jun 2023.

accessibility, and continuous improvement is critical for ensuring the integrity and public trust in the election systems.

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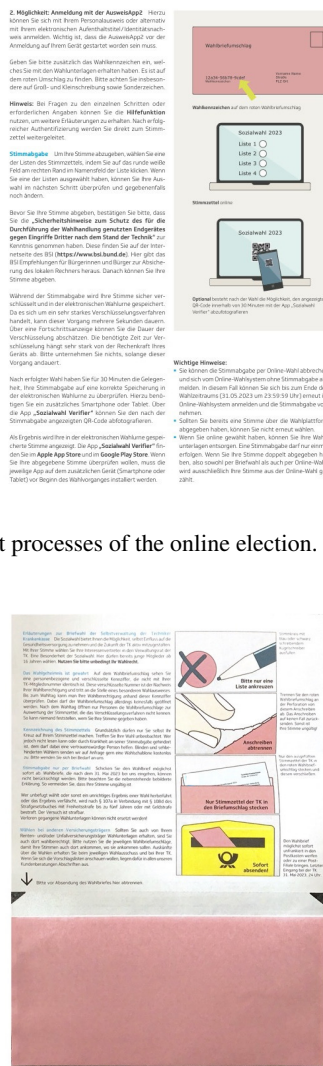
A Appendix

Fig. 4: Extensive guide to the different processes of the online election.
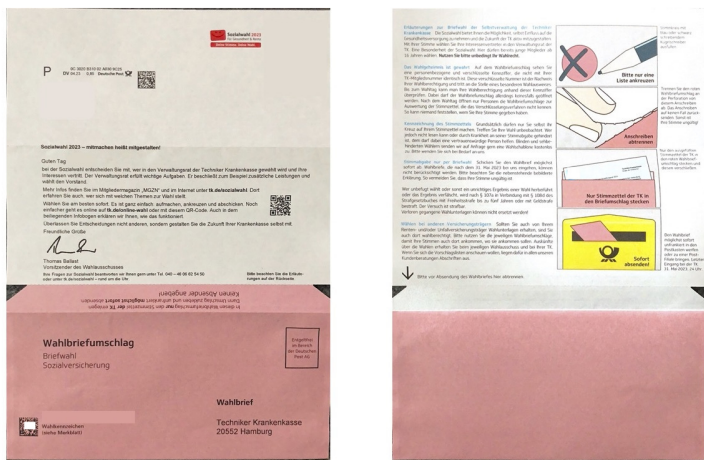

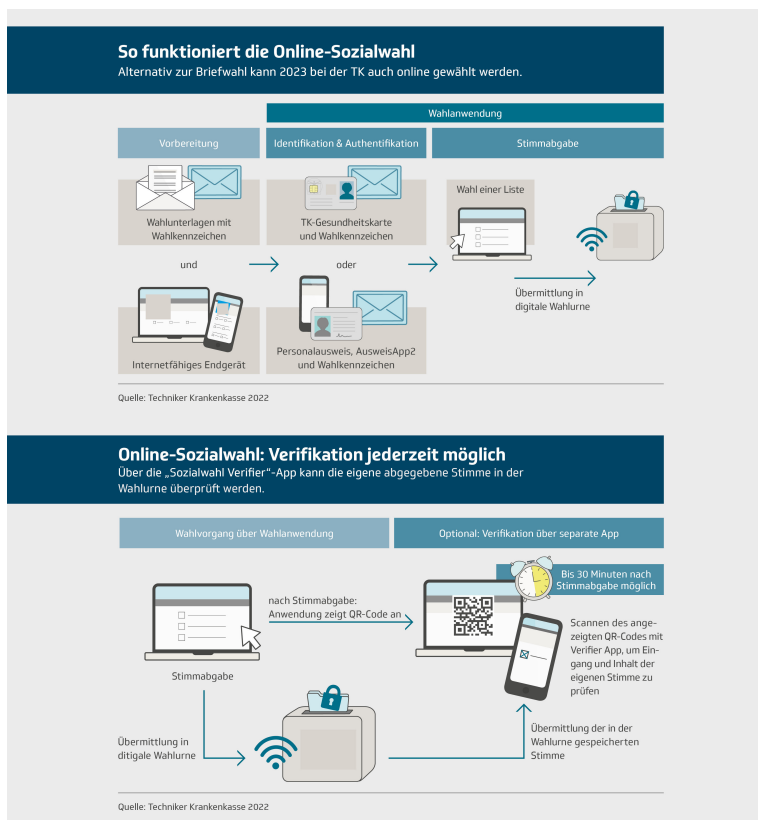Fig. 5: Letter containing the invitation to the social election and instructions for mail-in voting.

Fig. 6: Flowchart provided by TK describing the authentication possibilities at the voting application, vote casting process and the optional verifiability step (this flowchart was combined by the author into one figure for better visibility)