Journal Guidelines

Title: **Workarounds, Shortcuts, and Improvisations – Older Adults’ Intuitive Website Navigation Strategies When Seeking State Social Benefits** .

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**Abstract**

*Objective*: Policy makers and scholars increasingly warn that older adults with low e-health proficiency are excluded from services and information they need or value. This study draws from the fields of cognitive psychology and the sociology of science to examine how older adults navigate the Israeli National Insurance Institute (NII) website when determining their eligibility for common services and support.

*Methods*: Relying on the “Think-Aloud” technique as part of a mixed-methods study, we elicit a real-time understanding of how older adults perform navigation tasks online. A total of 102 men and women participated in the study, ranging in age from 68–98 (M=82). A carefully designed observation protocol guided two research assistants as they observed the participants perform a navigation task on the NII website, while encouraging them to share their thoughts, feelings, and intentions.

*Results*: The participants, relying on their cognitive strengths, adopted two main navigation strategies to circumvent the hurdles posed by the website’’s design: “Translation” and “Contextualization.” However, despite exhibiting a good understanding of different search techniques, and skill at improvisation when engaging with complex (and counterintuitive) websites, the incompatibility of the website design and navigation logic with their cognitive strengths hampered their efforts.

*Conclusions*: Given that benefit uptake among older citizens is an important public goal, this study corroborates calls for proactively and personally reaching out to eligible older citizens. In addition, if online platforms will continue to mediate benefit acquisition, older adults would be better served if web designers would build sites better aligned with the intuitive navigation strategies used by study participants.

Key Words

Up to 8 keywords. Note: you will also enter them separately into the online editorial system during submission.

**Introduction**

Over the past five years, there has been a surge in the use of digital tools and services by individuals, businesses, and government authorities (Merkel & Hess, 2020). The COVID-19 pandemic accelerated this trend, presenting governments with unprecedented demand for digital access to services and an opportunity for some to extensively upgrade their digital infrastructure. For many elderly citizens, however, the disappearance of human services once provided face-to-face exacerbated existing and deeply rooted inequalities involving utilization of digitized services (Warr, Luscombe & Couch, 2021). The abrupt shift left many seniors with diminished access to services pertinent to maintaining an acceptable standard of daily living (Mitchell et al., 2019; Wanka & Gallistl, 2018;).

Moreover, as has become clear in countries around the world, times of regional and national stress only increase the urgency of better connecting older adults digitally. Survey data reported by Israel’s Central Bureau of Statistics, for example, indicate that between YEAR and YEAR 30% of older citizens reported an increase in distress, along with severe feelings of loneliness and psychological anguish, compared to a 20% increase in the general population (Levy-Belz & Aisenberg, 2020; Lissitsa, Zychlinski & Kagan, 2022).

In general, older citizens are less likely to access services via the internet than are younger citizens. As services and information are increasingly provided online, lagging adoption of digital technologies by elders may hinder their ability to actualize their rights to services. In addition, in their study comparing internet use among two generations of older adults, &find an association between digital exclusion and social exclusion and postulate that seeking information on digital search engines is paramount for preserving cognitive ability, absorbing new information, engaging in lifelong learning, and enjoying ongoing exposure to current events. The implications make it imperative and pressing to better understand i.

Over the last 13 years in Israel, the rate of internet use among people aged 65 years and older have increased by 2.8%, with 65% of all Israelis aged 65+ reporting that they surf the internet via mobile phones and 49% reporting that they own a computer in addition to a mobile phone. The most popular uses for the internet include searching for information (94%), sending emails (80%), and social networking (66%). Despite growing and widespread use of digital technologies, however, only 30.7% of internet-using older adults use the internet for government services. Since this statistic reflects only the number of older adults entering a government website, the number of those actually successfully completing an online process is likely much lower. Indeed, research has shown that few older adults claim entitlements via the official government website (Bar-Lev, Aisenberg & Luria, 2021; Central Bureau of Statistics, 2020).

As the country’s provider of social security, income support, and disability benefits, beginning in YEAR, Israel’s National Insurance Institute (NII) advanced several initiatives aimed at increasing the uptake of social security and other entitlement among older adults. These include automating the actualization of rights through internal and external information crossover, having agency representatives reach out to eligible citizens, launching a “personal service” platform on the NII website, and introducing a “helping hand center” offering free counseling and guidance for filing claims (Gal et al., 2019).

Despite the NII’s important steps, there is growing concern about the enduring problem of low uptake of social security entitlements. In 2015, the Israeli state comptroller claimed that at least NIS 300 million (equivalent to approximately USD 80 million) were not transferred to eligible individuals. Low uptake of social security benefits is a concern shared by many governments (Bargain, Immervoll & Viitamäki, 2012; Lambregts & Schut, 2020;) and may indicate not only growing inequalities, but a mistrust of the social security system overall (Macé & Daigneault, 2020). Researchers cite XX, XX and XX to explain low uptake.

That digital access issues represent barriers to older adults was confirmed by a government report issued in Israel in 2017 noting that, despite the many advantages of a digital revolution in social services, more limited access to and great discomfort with digital services can significantly hamper older adults’ ability to realize their rights and claim entitlements for which they are eligible (Gal et al., 2019; Russo-Carmel, Sokolover-Yaakovi & Kremer-Nevo, 2019; Tarshish & Holler, 2021).

Tarshish and Holler (2021) identify three types of barriers to entitlements’ uptake: bureaucratic, know-how, and psychological. While the first refers to design aspects of policy, the other two address the target audience’s cognitive and psychological make-up.

A recent meta-analysis study found that age was inversely correlated with the intention to use technologies, perceived ease of use, and perceived usefulness (Tsai et al., 2019). The authors also suggest that older adults may face a variety of challenges acquiring the skills needed to be proficient in using information and communication technologies, involving various degrees of visual, mobility, or cognitive decline. This line of inquiry has inspired a wealth of programs designed to support older adults’ technology acquisition and learning, including assistance with the initial set-up of devices, and support for learning to use them (Tsai, Shillair & Cotten, 2017).

Unfortunately, recent studies show that the positive benefits from participation in such programs are short lived. Although they contribute to accumulated knowledge, increasing confidence in using technology, empowerment, and an enhanced sense of self-efficacy, a significant portion of the accumulated gains fade with time since the older adults often cannot practice or communicate with instructors after completing the program (Lev-On et al., 2020).

Another weakness in the literature is a tendency to depict older adults as a homogenous group of technology-resistant, non-internet users suffering from technology anxiety (Bergström & Ekman, 2021; Neves et al., 2018), a posture that may impede inquiry. Perhaps, as a result, these studies overlook the intuitive strategies that older adults try to apply when navigating official websites to perform various procedures when there is a discrepancy between digital system design and user navigation practices or understanding (Buck et al, , 2020). We argue that overlooking the cognitive skills that older adults *do* employ to circumvent obstacles to achieving their goals – including workarounds, shortcuts and improvisations – can hamper our understanding of how digital design changes could improve older adults’ access. This study aims to begin closing this research gap by focusing on older adults’ hands-on experience navigating Israel’s NII website to solve a service uptake problem. By employing a concurrent think-aloud methodology, this study reveals “real-time” information about those areas of an online system that can cause problems for older users.

Given the growing importance of digital service provision and its implications for service access among older adults, this study examines how older individuals actually navigate a government service website. It explores patterns of information-seeking and documents challenges expressed by older adults aged 65+ as they perform a task to determine service eligibility on the National Insurance Institute’s (NII).

**A sociotechnical approach to navigating the NII site**

We draw on two fields whose insights inform the approach taken in this study. ….

First, we adopt a sociotechnical approach to understanding the interface between technology and users from the sociology of science and technology. This approach highlights the ways in which older adults themselves shape the technology while they are working around physical and/or cognitive differences between themselves and the web designers’ normative user (Wanka, & Gallistl, 2018, 2018). Sociotechnical systems analysis (STS) examines the reasons behind the poor acceptability, uptake, and performance of many information and communication technologies (ICT) (Coiera, 2007). The field of health informatics has increasingly focused on identifying the types of sociotechnical interactions that shape the meanings attached to various technologies and their uses in different settings (Berg, Aarts & van der Lei, 2003), with STS analysis revealing the messy realities of IT implementation.

The detailed focus on the real-life obstacles to use and that cause unintended consequences is aligned with the study of cognition in practice drawn from the field of cognitive psychology. Studies in this field show that what we conceive as “individual thought processes” are actually heavily structured by the social and material context in which these processes take place (Berg, Aarts & van der Lei, 2003; Timmermans & Berg, 2003). Accordingly, it is not sufficient to research the cognitive resources, limitations, and capabilities of individual users in a vacuum; what also must be considered is how these interact with the social and material settings in which the technology is implemented (Coiera, 2007).

Applying this approach in our study, the NII website is not singled out as an isolated technology platform, but is analyzed as embedded in relations to other tools, practices, skills, professionals, and citizen groups. This implies that a better understanding of the NII website, or its older users as they seek online rights actualization, is linked to designers’ and policy makers’ understanding of human agency, the context in which older adults use the NII site, and the support network on which older adults rely. Furthermore, STS theory also suggests that “technologies are neither fixed nor universal, but emerge from situated and reciprocal processes of interpreting and interacting with particular artifacts over time” (Orlikowski, 2010, p. 8). From this perspective, users employ workarounds to improve the fit between the technology’s design, users’ capabilities, and the meaning ascribed to it by users. An STS approach thus allows us to understand not only how use of the technology is patterned among distinct groups of users, but also how certain norms and expectations – for example, a certain vision of “successful ageing,” competency, and literacy – are embedded in the technology itself.

This paper hypothesizes that workarounds employed by older adults as they navigate the NII website are actually adaptions to a lack of fit between users’ abilities or cognitive framing and the system’s requirements or logic, intended to achieve the users’ goals and compensate for deficiencies in the system’s design (Buck et al., 2020; Wibisono et al. 2019;). Rather than concluding that the need for workarounds reflects older adults’ limited capacity, this paper sheds light on the strategies they employ when trying to cope with counterintuitive online systems. As we observed the older adults performing tasks in the NII site, we discerned two major navigation strategies: translation and contextualization. Both were developed as the older adults struggled to overcome the difficulties faced in the NII website.

**Methodology**

This study is part of a larger research project applying quantitative and qualitative methods to gain an in-depth and empathic understanding of how older adults apply their skills to adapt to a new technology. Previously published findings measured older adultsin completing a task as it related (authors, 2021). In this phase of the project, we employ the concurrent qualitative, “Think-Aloud” methodology (Alhadreti & Mayhew, 2018) as XX older adults were observed working on a task related to rights actualization on the NII website.

The Think-Aloud method asks participants to verbalize everything that crosses their mind from the moment they are given a question to answer on the NII website until they decide to stop working on the task (Joffer et al., 2016). Because it uncovers what and why users actually do when they interface with the technology, it enables researchers to identify participants’ usability issues with the technology interface, how they relate to the website, what information catches or diverts their attention, and what they find most confusing (Shomir et al., 2015). Importantly, the participants use their own words to describe their feelings when attempting the task, including confusion, tiredness, weariness, boredom, difficulties concentrating, excitement, or satisfaction with their accomplishments. These user-centered terms proved important in understanding how the participants relate to the system (Jaspers et al., 2009; Johnson & Turley, 2006; Lundgren-Laine & Salantera, 2010).

Although the Think-Aloud technique is well accepted in cognitive (language) and human engineering research, it has two limitations. First, it requires the presence of an observer/researcher during task fulfillment which can influence the behavior of the participants, especially their motivation to expend effort navigating the website. Second, verbalizing thoughts while concurrently performing a task may affect participants’ performance by, for example, slowing them down, affecting accuracy and concentration, or creating an additional cognitive load (Olmsted-Hawala & Bergstrom, 2012).

To mitigate these possible effects, the research assistants conducting the sessions explained to the participants that the study’s purpose was not to test their abilities, but to understand the challenges they face in navigating the website. They also explained that the study is anonymized and that they can choose to stop working on the task at any time, even if incomplete. The study’s design also allowed for a retrospective in addition to a concurrent Think-Aloud in the form of follow-up questions that the participants were asked after completing work on their task. Moreover, the research assistants were instructed to engage the participants in a pleasant conversation and let them take their time on the task.

The study received approval from the IRB and from a Helsinki committee.

**Study Participants**

Several assisted living facilities’ managers were contacted about their willingness to host the study. Upon receiving their consent, we gained access to a sample population of XXX people, representing individuals over the age of 65, of middle to high socioeconomic status, and with moderate to high functioning levels. The project’s research manager then contacted these residents, explained the study procedure, and invited XX willing participants to a personal meeting with the two research assistants (RA) performing the study.

At the meeting, the RAs explained the research objectives and the task at hand, and asked willing participants to sign an informed consent form. Consenting participants then filled out a short questionnaire detailing their online activities. Using the Mini Mental State Examination and Digit Span tests (MMSE; Folstein, Folstein & McHugh, 1975) to screen for memory and working memory functioning, potential participants were screened for cognitive impairments. Those with scores lower than the threshold score for their age and/or years of education were removed from the study. The final sample of participants included 102 individuals (XX% female) ranging in age from 68 to 98 (average age = 82; sd = 5.845). Most interviews (80.2%) took place at one of two assisted living facilities, with a minority interviewing at adult day activity centers (3.1%) or at home (16.7%). [See Table 1]

**Study Procedure**

To minimize the potential effects of undergoing the cognitive tests on task fulfilment, the study commenced at a second meeting scheduled a few weeks later. Participants living in assisted living met with the RAs in the facility’s library (a private computer-equipped room). The RAs asked the participants to randomly choose one of four online navigation scenarios, each depicting age-relevant queries concerning eligibility for state benefits. The scenarios, each assigned a fictitious name, included: (1) Moshe’s efforts to determine his eligibility for transportation assistance; (2) Shlomit’s efforts to determine her eligibility for a surviving spouse’s death grant; (3) Hanna’s efforts to determine whether her eligibility for live-in assistance; and (4) Haim’s desire to appeal a decision refusing his request for income assistance. [See Table 2 for further details.] . To complete the task, the participants had to navigate the NII’s website. Successful completion of the task was defined either as arriving at a definitive answer regarding eligibility or completing a request for eligibility determination.

Two RAs were present in each session. One read the task scenario together with the participant and clarified any questions regarding task instructions; the other documented each participant’s phrasing using a structured protocol. In addition, tguide mapping so that the RAbetweenatEach meeting lasted about one hour. Throughout, the RAs encouraged participants to share their thoughts and explain their choices. These were documented on a structured protocol and served as a basis for the qualitative analysis that followed. Upon completion, the participants were asked a series of questions aimed at deconstructing their experience. Afterwards, the participants were offered the opportunity to work on a second scenario. Transcripts were prepared…….using ….

**Data Analysis**

We used \_\_\_\_\_\_\_\_\_\_ method to analyze the 80 transcripts for participants who fully or almost fully completed the navigation tasks on the NII website (Flick, 2014; Lieblich, Zilber & Tuval-Mashiach, 2008). Three researchers separately reviewed each transcript, identifying and documenting central themes, and finding relevant quotes expressing each theme. To analyze reliability, two research assistants independently read each transcript , after which a correlation between their central themes was calculated, reflecting the number of times each theme was identified by each of the research assistants in all 80 of the transcripts. A high correlation was found, indicating consistency and inter-rater reliability in the transcript analysis (r=.87, p<0.01). Themes that were rarely represented or about which the researchers disagreed were removed from the analysis. Themes were then grouped into two primary meta-themes: navigation strategies (translation, contextualization) and action strategies (avoidance, returning to the home page, typing a full query, planning steps). This paper focuses on the two navigation strategies.

**Findings**

Navigating the NII site requires a type of “multilingualism” – a vocabulary and language with which to translate older adults’ lived experiences and colloquial needs into a bureaucratic language. The older adults had to reconcile their understanding of their needs, complaints, and problems with that of the NII’s bureaucratic mechanism (Lin, 2011). This complex task of deciphering the NII site’s legal formulations and successfully relating to it plays a decisive role in the older adults’ success in attaining their goals.

Two strategies dominated the older adults’ attempts to navigate the NII site. First, participants engaged in “Translation,” defined as efforts to translate the concrete task or problem into the concepts used on the NII website. Second, they engaged in “Contextualization” in their efforts to make sense of a set of relevant procedures, facts or events needed to claim a benefit. Below are examples of how participants (all names fabricated) employed each strategy. Note that, although the two strategies are interrelated, they are reported separately for the sake of clarity.

**First Strategy – Translation**

*Participants Debra, Ariella & Yoram: Lost in the Translation*

Debra, an 80-year-old female participant, given Scenario 1, was asked to search the NII website to decide whether “Moshe” was eligible for assistance with his weekly rides to the hospital. She begins the task by checking whether the NII offers such assistance, and if so, what the terms for eligibility are.

Debra: “So, first thing I do is type …what’s that…ummm [silence] is he eligible for rides to the hospital. Well, that’s my first question I need to answer. Is there such a thing”?

RA: “You can check on the website.” [Debra types the word “transport” in the search field.]

Debra: “Here are my search results.” [She scans the results with her eyes.] “I’m really searching for help with transportation to the hospital…but I don’t see anything here.”

Debra next types transport in the search bar. She chooses the word transport because it is familiar to her from her day-to-day life. However, transport provides more than nine pages of search results, with 10 results on each page. Now, Debra has to quickly scan the information that the search displayed and decide what is relevant. However, on the first page, all search results relate to equipping cars for transporting disabled, elderly, or otherwise limited individuals. None pertain to assistance in arranging a ride to the hospital. In addition, none of these search results include the word “stipend” or “benefits” or “assistance.”

If Debra had written the word “mobility” instead of the word “transport,” the first result that would have appeared on the result page would be “mobility, stipends and benefits,” the second result would have been “types of benefits for mobility,” and the third result would have been “mobility forms” – all three very relevant to her task. The difference between the words is more than semantic. In Debra’s mind, the word “transport” expresses the everyday practice of getting from one place to another; that is, it reflects *her* needs and wants. The word mobility, in contrast, usually refers to populations and is used in conjunction with statistics, bureaucratic actions, and regulations. Therefore, Debra chose the colloquial term transport and became lost in an overwhelming amount of useless information she needed to read. Thus, although her search strategy וs correct, her failure to translate the term transport into the bureaucratic term mobility led to failure. Having found no match between her words and the words that appeared on the website, she assumed that the NII does not provide assistance for transport and she ceased searching.

Ariella, a 78-year-old female study participant, was asked to check if “Hanna” in Scenario 3 is eligible to receive financial assistance to employ a live-in housekeeper. Ariella begins by searching for the title “actualizing Rights” and although she identifies “housekeeper” as an anchor in her search, she begins a search for the words “help,” “clean,” and “care.”

Ariella: “She needs someone to help keep her house clean, do her laundry, and dishes…maybe help her bathe. But how can she find someone like that? How will she pay for it? That is what she needs help with.”

Ariella understands that she needs to find the appropriate term for it. Her attention is now focused on matching the meaning of her wording with the wording that appears on the website. When she stumbles on the bureaucratic term “household employee,” she repeats the words to herself, mumbling them over and over as she mulls over the exact type of eligibility information Hanna needs. Meanwhile, her attention is distracted from the primary search, as she weighs the words “health monies” and the word “stipend” and, eventually, gives up.

Yoram is an 88 year old study participant with the same task as Ariella. His strategy is to type a full sentence in the search bar. He types “help with house chores and cleaning” and receives the answer, “No results were found on the website.”

The three participants chose different ways of translating the concrete problem into terminology that is used on the NII website – from using a single search word to using “questions and answers” to asking a full question. These are all legitimate navigation strategies, but none of them advanced them towards information that would help them actualize benefit rights. Ostensibly, this was because they unsuccessfully translated the concrete problem into the bureaucratic terms used in the site (Rafaeli et al., 2018).

Yet the problems that our participants encountered were deeper than semantic in that they may reflect age-related changes in older adults’ linguistic and cognitive patterns. Appropriate translation requires switching attention from the colloquial word to the target object (here, the bureaucratic term), and later deciding what modification is needed. This process involves switching from one’s own perspective to that of the administrators who developed the bureaucratic procedure, and that of the web designers who determined the navigation rules navigation on the site (Zhang et al., 2013).

This means that, to successfully translate the concrete task into bureaucratic parlance, our participants needed not only to familiarize themselves with bureaucratic terms, but also to view the scenario from NII administrators’ perspective. Such an approach requires continuous goal maintenance is not optimal for older adults for whom switching and perspective-changing can be cognitively demanding (Long et al., 2018).

Our participants reported feeling and were visibly overwhelmed by the vast amount of information presented to them simultaneously, even when only one piece of information was relevant. Faced with so much extraneous or redundant information required them to continuously separate relevant information (i.e., the primary pathway) from peripheral information (i.e., the secondary pathway). This likely results in an over-expenditure of time on irrelevant web pages, unnecessary cognitive load, frustration, and fatigue. Further, this experience is likely to give an older adult the sense that they are navigating through a maze or that they are lost or purposelessly wandering. Hence, contexts involving topic shifts are cognitively costly, demanding not only sensitivity to the linguistic discourse and/or visual scene but also perspective-taking (Long, Rohde & Rubio-Fernandez, 2022).

**Second Strategy – Contextualization**

Our study participants employed two kinds of contextualizing when navigating the NII website. Their first common contextualizing approach was to put the problem described in the scenario into perspective by deciding which problems were solvable and which were not. The second common contextualizing approach was to try to understand the connection between different procedures in the site.

*Participants Debra, Datia & Ezra*

Let us consider XX-year-old Debra’s attempt to keep track of this sequence when asked to consider “Haim”s’ desire, in Scenario 4, to appeal a rejection of his claim for income supplement.

Debra: “I’m starting from the beginning to submit a claim. Afterwards, I’ll get to the point where they reject it and then I’ll submit an appeal…I think that the appeal stage comes after submitting a claim and after it’s rejected. How did I get to this? I clicked on ‘submit a claim’…Here, I clicked on ‘personal service’ [then] I clicked on ‘ill person’s rights’ [then] I clicked on ‘mobility’.” But she is unable to find where and how one can appeal.

Debra: “I can go back to ‘actualizing rights’, but there are so many rights that it is not realistic to go over each of them.” So Debra decides to type “appeal” on the search banner and concludes that, “if it doesn’t come up on the search, it’s possible that the website does not allow requesting an appeal.”

Attempting to follow the procedural logic on the website failed the user. Although Debra was only asked to advise “Haim” about how to appeal a decision, she plays a chronology of events in her head that starts with submitting a claim, and this helps her form her navigation plan. However, the website is ordered not as a sequence of chronological events, but of related procedural themes, and she gets lost.

Datia was adamant to follow the procedural logic of the website. Yet difficulties in translating “Hanna”s’ need, in Scenario 3, to find a housekeeper to one that the NII could solve, got her lost.

Datia: “I found ‘actualizing rights.’ It says here ‘costs.’ Now I need to check what her options are for getting any kind of assistance. I clicked ‘actualizing rights.’ Now I need to look for ‘nursing help’; So I can say that…[She carefully scans the screen, go up and down]. No! she doesn’t need any of this stuff. She needs someone to take care of her. I don’t know how to get to that. So maybe here under ‘senior citizen’? Should I click on that? No. A ‘household employer’? No. We said help. This isn’t what she needs. I don’t know. Maybe you can help me? Where does it say ‘medical care’ that I can click? Here, ‘Hanna’ had an accident, right? She needs someone to help her with the house chores. So I am looking for a woman that would take care of her. A stipend or an allowance, it doesn’t matter. It’s money. But I need a caretaker…oof, I’m lost.”

Datia knows she has to focus on eligibility but feels she must first solve the pressing problem of how to find help. While the website addresses the problem of finding a housekeeper, Datia searches for someone to nurse her protagonist. She expects the site to guide her in finding such caretaker.

Ezra, a 78-year-old study participant, opened the session by saying that he shuns computers whenever possible. Ezra was asked to determine whether Moshe in Scenario 1 is eligible for regular transportation assistance to a hospital. Ezra first tries to understand how to convey Moshe’s problem in a way that matches the online form. When he fails, he finds a creative solution for bypassing the form.

Ezra: ]instructs the RA]: “Please press ‘documents.’ He then reads out loud: “In this site you can find the documents needed to….the documents are in PDF format. Ok, so what now?”

RA: “You can scroll down and look for options.”

Ezra: “Please press here [points to an icon of an envelope]. I need to know where Moshe lives. Where does he live?”

RA: “Is that important?”

Ezra: “Let’s say that he lives right here in the assistive home [with me]. Ok, so I look for Beit Moses in this list where it says: Place of Residence [he scrolls the list of cities and towns]. But Beit Moses is not listed. Ok, try to print ‘Beit Moses’ [He instructs the RA]. I will write them a letter and mail it to them. I will ask if he is eligible. I will write his story and ask them. I need to mail it to Netanya. But what are all these banners that pop up? It’s too fast for me. I don’t understand….”

RA: “These are commercial banners. Ignore them.”

Ezra: “So I think you want me to fill out a form. What do you want from me now?”

RA: “You need to first find out if he is eligible for assistance.”

Ezra: “You want me to press whatever I want to find that out? But it doesn’t make any sense to me. I want to be reasonable. Oh...here…where it says ‘Contact us.’ I’ll just write them a letter and post it tomorrow. I always prefer ‘certified mail,’ that way I get a receipt. I don’t trust these on-line forms.”

At first, one may get the impression that Ezra has difficulties staying on topic. It can also look like he has difficulties filtering out irrelevant information. But, what may seem like a peculiar sidetracking may seem more reasonable if we consider the communicative value of writing a letter. Ezra thinks he can better advocate for the protagonist in a free-text format, where he can use his own words to relate the protagonist’s story (Long, Rohde & Rubio-Fernandez, 2020). To advocate for Moshe, he needs to fill in the blanks of his story. Ezra’s insistence on learning more about the protagonist’s biography may become clearer if we consider Manny’s experience with the protocol.

Manny, an 81-year-old male, is asked to determine whether Hanna in Scenario 3 is eligible for a life-in housekeeper.

Manny: “I’m all for actualization of rights. Is there a book that lists all my rights?”

RA: “You can look for them right here in this website.”

Manny: “Only in the website?”

RA: “Yes. Would you like to help Hanna in the scenario?”

Manny: “Hanna? Yes. Yes. I think I need to look under benefits, or allowances. But for that I need to know her income. I assume she paid social security her whole life. Here I see ‘Contact us’ but whom do I contact? There is a phone number here [reads the titles out loud] ‘general questions,’ ‘personal inquiries.’ Ok. I think that ‘general questions’ will do [reads the page]. There is nothing here that can help. What box do I need to tick?”

RA: “Whatever you think would help Hanna.”

Manny: “I don’t really know how to relate to this. But my personal history with the NII taught me that they…their policy is not very helpful. If you are injured, you need to go to your sick fund in-person and demand what they owe you. When I needed them I simply…[He goes on to tell his story]. My advice to Hanna is to get a good lawyer and sue them. She needs professional help from a good lawyer.”

Manny insists on giving the protagonist in the scenario a face and a biography he can relate to. He wants to know her income and assumes that she has paid social security her whole life. Filling in the blanks in Hanna’s story and injecting his own insights, based on his personal experiences, helps him create a context he can relate to and understand. This type of narrative production was common among our participants. James et al. (1998) found that when older adults discuss life events, they often shift their conversational goals from the concise exchange of information to an emphasis on personal narratives. We assume that this approach helped the participants find significance and relevance in their assigned scenario, and helped them convert an abstract procedure into a concrete one.

Fannie, a 77-year-old, female was also asked to determine whether Hanna qualified for a live-in housekeeper.

Fannie: “Listen, there is a lot of stuff to go through here…lots of options to choose from and it is impossible to go over everything. It says here ‘personal service.’ I want to try that option…I can’t tell a thing from this form [a long silence]. I feel like I should get up and go over there myself. I will sit there, take a number, wait my turn, and they would tell me to come back tomorrow. I will demand to see the supervisor and I will tell her my whole story. I will tell them how crippled people feel, and they will understand how ‘Hanna’ feels. I need to see them face-to-face to convince them that [she] broke her hip and needs help…It is not simple at all knowing your rights. They should look us in the eye and tell us what help we deserve.” [She looks at the toolbar…starts reading out loud and says: “I’m done. It’s enough.”

Fannie feels sympathy for Hanna. She empathizes with her and is willing to be her advocate. She does so by creating a biography for Hanna as she imagines the troubles Hanna must face. By devising a story to create a context, Fannie engages in narrative production. A story has a coherent structure with a beginning, middle, and end and, most importantly, has an underlying theme or purpose. In contrast to the website’s abstract wording, a narrative is both concrete and unique. The participants’ tendency to fill-in missing details based on their own life experience seems to help them to create coherence in the stories. If so, frequent use of what ostensibly seems to be redundant information may not reflect insensitivity to communication efficiency, but rather a general preference for a communication strategy other than the one imagined by the website designers.

The study participants, in this respect, behave in a goal-directed manner in that they seek ways to convey the protagonist’s predicament to an official figure in a letter, by telephone, or face-to-face. When they look for the phrase “Contact us,” they are seeking a way to write their grievances in a lengthy letter to justify their claims. Moreover, this strategy demonstrates the language strengths that characterize older age. Research shows that older adults have a highly developed ability to create meaningful dialogue and tell stories (Guendouzi, Loncke & Williams, 2011; Kamper & Kemptes, 1998; Young, 2010; Mergler & Goldstein, 1985). Compared to young participants, older adult participants are better at understanding stories with complex structures, “thickening plots,” and detailed descriptions of character motivations and behaviors and their implications (Loncke & Williams, 2011).

If the goal is to enable older adults to actualize their rights via online platforms, it is critical to understand how the participants’ navigation logic diverged from that of the web designers. The navigation on the website is created in a hierarchical fashion; advancing from stage to stage in the process of actualizing rights requires that the user understand how different pieces of content relate to each other. For example, navigation begins at the title “actualizing rights” after which the user is asked to specify the population type – “rights for different population groups.” The user is then asked to click on specific category of people – older adults. Next, the user needs to click on “stipend for older adults” followed by “criteria for eligibility.” Then the user needs to click on “terms for eligibility.” On the right side of the screen, the user will find icons of different documents, calculators, and forms. This structure is constructed as sequence of steps that follows a bureaucratic path rather than chronological or contextual logic.

The designers’ navigation logic relies on prospective memory – or a memory mechanism that reminds the individual which actions or steps must be performed at any given moment, at what time and in what context (Koriat, Ben-Zur & Sheffer, 1998; Reese & Cherry, 2002). However, unlike young individuals, elderly individuals must invest more effort to remember the sequence of steps or actions that are required, and to remember to perform them or to remember that they were performed. Some researchers postulate that, following a lengthy sequence of steps may distract elderly users from focusing on goals and cause them to give up (Barch et al., 2001; Lindenberger & Ghisletta, 2009;).

**Discussion**

Employing a Think-Aloud method, and drawing on insights from the fields of cognitive psychology and the sociology of science and technology, this study observed ## of elders as they attempted to determine eligibility for several social service benefits on behalf of four fictious protagonists while navigating Israel’s National Insurance Institute’s website. We show that the study participants commonly employed two navigation strategies – “Translation” and “Contextualization” – to circumvent the cognitive challenges posed by – from the older adults’ perspective – deficiencies in the design of the NII website. In addition, our observations highlighted the older adults’ talent for improvisation when engaging with complex (and counterintuitive) websites.

Beyond contributing to a better understanding of the navigation strategies older adults employ when site designs are counterintuitive or confusing, the study also revealed ways in which site design might better respond to the needs and preferences of older users. We show that participants relied on their cognitive strengths to meaningfully engage with the technology. Studies consistently show that episodic memory, which is involved in the storage and retrieval of temporally dated events or episodes, weakens with age. By contrast, semantic memory (of, for example, the meaning of words, or of facts without a specific time or place reference), which is involved in the storage and retrieval of general knowledge, remains fairly stable (Piolino et al., 2010). We showed how our participants relied on autobiographical memory to retrieve specific events in their past and present experience (‘‘the day I was injured,’, “the day I fell down the stairs”) to relate to the protagonists in the scenarios they were assigned and to serve as their advocates.

Unfortunately, there was no way to employ this cognitive strength on the NII website. While the participants strongly relied on a narrative format to advance their goals, the NII website required a quick retrieval of words that were often new or remote from their world. NII website users are expected to memorize a sequence of bureaucratic procedures whose logic was incoherent to our study’s older participants, and to follow a sequence of steps with an obscure endpoint. They were required to remember isolated dates, names, identification and phone numbers – despite the fact revealed in research, and by our study participants, that older adults remember better through stories (Piolino et al., 2010) and express themselves better in a narrative form, using their own vocabulary to describe their needs and grievances.

Study Limitations

T-A enabled this study toidentify our participants NII exampleimmediately “C”rather by talking to someone’,

However, it is possible that the Think-Aloud technique may have also affected the participants’ performance. Olmsted-Hawala & Bergstrom (2012) showed that the technique can improve accuracy in complex tasks, but decrease performance speed. Thus, it is likely that “thinking aloud” helped the older participants to better organize their performance process and perhaps also to remember the upcoming steps they planned to perform. However, it is important to note that most of the participants failed to complete the task. Therefore, even if the Think-Aloud technique influenced the results, its influence was not decisive. It is also possible that, countering this possible shortcoming, the presence of the RAs motivated participants to proceed with the tasks despite feeling tired, frustrated, or bored. However, despite these favorable conditions, XXX chose not to complete the task.

Another potential limitation of this study relates to the participant sample. The large majority (80.2%) of study participants were residents of one of two assisted living facilities in Israel. Such residents can generally be characterized by a relatively high level of cognitive and general functioning and are primarily in a middle to high socioeconomic bracket, limiting generalization of our findings to the wide older population in Israel. However, it would be reasonable to assume that the challenges faced by the study’s older participants would be even greater among a more representative sample of the general older adult population in Israel. Clearly delineating the navigation challenges and strengths typical of various population groups is highly important given that access to public benefits is increasingly provided through online platforms.

Despite these limitations, the study clearly shows that the current NII website design required complex processes of sense-making, translating, and converting abstract and heuristic language into a concrete reality. In response, participants relied on the cognitive tools available to them, employing categorization and contextualization strategies that were possible due to the semantic capacities that are preserved in older age. Converting a hypothetical scenario into a narrative story (specific and concrete) helped the participants concretize the problem and compensated for weaknesses in long-term memory, decreased capacity for inhibitory processes, and slower working memory (Kliegel et al., 2007). Such “deviating behaviors” became essential for the performance of tasks (Buck et al., 2020).

Ultimately, however, despite adoption of more natural navigation strategies, most participants were unable to successfully complete the task. Often they opted to seek a contact number so that they could speak with a representative, schedule a face-to-face meeting, or send a letter detailing their problem – an approach that turns the website into an elaborate “phone book” rather than a platform to consult when information is needed, or to carry out various procedures.

Conclusions

This study highlights three key points: (1) Participants exhibited a good understanding of the different search techniques available to them (typing a whole word in the search banner, skimming through the webpage, looking for answers in Q&A). (2) Despite their efforts, the incompatibility of website requirements and required navigation logic with their cognitive strengths and preferences hampered their efforts. (3) Participants developed clever shortcuts to circumvent the cognitive overload that resulted from the difficulties of distinguishing relevant from irrelevant information, or avoiding distractions in the form of popups, banners, and icons. The strategies employed reflect an intelligent use of elders’ cognitive strengths. Nevertheless, these strategies were insufficient to help them complete the task of actualizing rights on the National Insurance website.

Given that benefit actualization among older citizens is an important public goal, at the very least, our study indicates the importance of proactively and personally reaching out to eligible citizens. However, to the extent that online platforms will continue to mediate benefit acquisition, older adults would be better served if web designers would build sites that present users with personalized information based on a single identifier. In addition, minimizing the number of required navigation steps, and presenting users with a progress bar would help older users see which steps were successfully handled and which lie ahead. Finally, we recommend that public benefit websites advise users about which forms are needed or missing.

Some of these recommendations entail a dramatic shift from passive to proactive policy implementation. Low uptake of welfare benefits is a recognized problem worldwide. In Britain, for example, an estimated 33% of the population do not claim benefits to which they are entitled (Curtis et al., 2017; O'Reilly et al., 2021; Sirendi & Taveter, 2016). Initiating contact with an elderly individual can enhance feelings of control for older adults involved in the process and could increase benefit uptake (Hilderink et al., 2013; Kavosi & Siavashi, 2018; Wiklund-Gustin, 2013).

Such paradigmatic change is both warranted and urgent, especially as older adults comprise a growing share of the population in many western economies. It would enable both digitally-engaged and less internet-savvy citizens to become actively involved in managing their own affairs, to make educated decisions based on information provided to them, and to be full partners in making decisions relevant to daily life (Lupton, 2013). Finally, the STS approach demands evaluating to what extent digital platforms facilitate independence and promote educated decision-making and self-management in the older population (Kumar et al., 2013). Embedded in a society’s technology are both norms and expectations – for example, certain visions of “successful ageing,” competency, and literacy – that have concrete implications for various population groups. For this reason, further studies are needed to broaden our understanding of how the design of various information technologies is related to the meaning different age groups attach to it, as well as to how they use the technology.

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Annex

Journal rules on tables

**Table 1: Participant Demographics, Cognitive tests, and Internet-use**

| **Variable** | **Number/Percentage** | **M/Std** |
| --- | --- | --- |
| Gender | Men: 29 (%)  Women: 71 (%)  Missing: 5 (%) |  |
| Age | xxx | M=82, 68-98, SD=5.845 |
| Interview site | Assisted living: 80.2%  Own home: 16.7%  Community center: 3.1 % |  |
| Marital Status | Widowed: 54%  Married: 32.7%  Divorced: 6.9%  Single: 1%  Missing: 3.5% |  |
| Health Status  (1= very bad; 5=very good) | 1: XX  2–4: XX  5: XX | M=4.03, SD=1.005 |
| Mini Mental State Examination score |  | M=26.72, std=3.145  Min 15 – Max 30 |
| Digit Span (forward according to age) |  |  |
| 74–68 |  | N=30 M=6.53, SD=1.97 |
| 98–75 |  | N=60 M=5.34, SD=2.02; |
| Digit Span (backwards according to age) |  |  |
| 74–68 |  | M=4.95, N=30  SD=2.62 |
| 98–75 |  | N=60 M=8.00, SD=2.56 |
| Recently had computer training | Yes: 91 (%)  No: 8 (%)  Missing: 1 (%) |  |
| Enjoy surfing the Internet  (1=to a minimal extent, 5=very much) | 1: %  2-4: %  5: % | M=2.82, N=118  SD=1.368 |
| Frequency surfing the Internet  (1= not at all – 5=very high frequency) | Not at all: 50  Rarely: 8  Frequently: 21  Highly frequent: 17  Very high frequency: 5 | M=2.23, N=118  SD=1.34 |
| Guidance while surfing the internet | Surf alone: 46  Surf with family member next to me: 49 |  |
| Uses of internet | Searching for health-related information: 12 (10.5%)  Searching for news-related information: 13 (16.1%)  Conversing with friends: 16 (23.4%)  Checking bank accounts: 28(24.2%)  Performing on-line procedures in governmental sites: 32(25.8%) |  |

**Table 2: Four Navigation Scenarios in the NII Website**

|  |  |  |
| --- | --- | --- |
| **Scenario** | **Type of Allowance/Stipend** | **Description of Scenario** |
| Scenario 1: Moshe | Mobility Stipend | Moshe is 75 years old. He recently underwent knee surgery. The NII granted him an 80% disability rating. To recover, Moshe needs to attend monthly physiotherapy sessions in a remote hospital. He would like to check whether he is eligible for assistance in getting there. |
| Scenario 2: Shlomit | A death grant paid to a living spouse | Shlomit is 75 years old. She recently lost her husband and wants to find out whether she is eligible for a death grant paid to a living spouse. |
| Scenario 3. Hanna | A stipend for lived-in housekeeper | Hanna is 75 years old. Three months ago, she slipped and broke her hip. Ever since, she is having a hard time doing basic house chores. The NII recognized her disability. Hanna is interested in knowing whether she is eligible for a live-in housekeeper. |
| Scenario 4: Haim | Appealing a refusal to grant income supplement | Haim is 75 years old. His claim for income supplement was recently rejected on the grounds of illegibility. Haim wants to find out how to appeal the decision. |