Pednekar et al, Gerontechnology (2026) 25:3
https://doi.org/10.30289/gt.202604_25(3).1246

Financial capacity challenges among older adults with vision impairment: Technology implications

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Abstract
Background: Older adults with vision impairment are likely to experience unique challenges with financial tasks, including performance skills (e.g., counting currency, paying bills) and judgment abilities (e.g., budgeting). Little is known about the specific issues this population faces with everyday financial tasks, which have become increasingly digital in society.
Research aim: We investigated the financial capacity challenges experienced by older adults with long-term vision impairment. The goal was to classify the challenges and provide guidance for improved financial technology (fintech).
Methods: We analyzed data from Aging Concerns, Challenges, and Everyday Solution Strategies (ACCESS) – a mixed-method study exploring everyday challenges and user needs of people aging with long-term disabilities. Participants (N=103) included older adults with long-term vision impairment (i.e., at least 10 years) who discussed challenges with shopping and financial activities in the interview.
Results: Participants used a variety of assistive devices to complete financial activities (e.g., screen readers, scanners, magnifiers). The most common challenge was accessibility, which encompassed barriers interacting with physical documents (e.g., reading/paying bills, completing forms) and digital financial information (e.g., online shopping and banking). Other challenges included cognitive and knowledge limitations (e.g., memorizing passwords and personal financial details, technology familiarity), reliance on other people for assistance (e.g., quality of help, desire for independence), and privacy/security concerns.
Conclusion(s): We identified critical challenges impacting the ability of older adults with vision impairment to carry out financial activities. To support more inclusive financial independence, we translated these findings into actionable design requirements for fintech and transaction systems, including preserving context under magnification; enabling error prevention and clear confirmation for high-stakes actions; reducing cognitive burden through progressive disclosure and just-in-time guidance; minimizing harmful timeouts by supporting flexible pacing; and offering multimodal, privacy-preserving interaction and assistance pathways. Broadly, these insights have implications for shopping vendors, financial companies, fintech designers, and policymakers.

Keywords: vision impairment; blind/low vision; finance; fintech

Introduction

Financial capacity, the ability to manage one's financial affairs, is essential for maintaining independence and quality of life. It encompasses both performance skills (e.g., counting currency, completing check registers, paying bills) and judgment abilities that optimize financial self-interest to promote autonomy. The former ensures one's ability to execute financial tasks, the latter enables them to make decisions that secure their financial stability (Ghesquiere et al., 2019). Aging can create new challenges to carrying out every day financial tasks independently. Cognitive declines (e.g., reasoning, working memory), mobility limitations (e.g., frailty), and psychological challenges (e.g., depression, social isolation), can inhibit the financial capacity of older adults (Axelrod et al., 2020; Preusse et al., 2016) and put them at risk of financial exploitation (Wood & Lichtenberg, 2017). Within this context, older adults with vision impairment represent a particularly vulnerable and understudied subgroup. Vision limitations, such as the reduced ability to read print, recognize faces or objects, and navigate physical or digital environments (Hochberg et al., 2012) can have a profound impact on the everyday activities of older adults. Instrumental activities of daily living (IADLs), such as shopping and managing finances, are highly-visual tasks, that can be especially challenging for

people aging with vision impairment (Remillard et al., 2024). Older adults with vision impairment are at increased risk of cognitive decline, social isolation, and depression, (Swenor et al., 2020), which could make engaging in financial activities even more difficult and increase their vulnerability to financial fraud and exploitation (DeLiema, 2018).

These vulnerabilities are especially concerning given the scale of elder financial exploitation: financial institutions filed over 155,000 suspicious activity reports in a single year, involving nearly $27 billion in suspected fraudulent activity targeting older adults (FinCEN.Gov, 2024). This alarming figure underscores the urgency of addressing financial capacity in aging populations, especially among those with additional impairments.

The shift toward digital financial services introduces yet another layer of difficulty. Tasks such as banking, budgeting, or paying bills are now primarily conducted online, often through interfaces that lack accessibility for people with vision impairment. As financial technology, or 'fintech', becomes pervasive, the inclusive design of users with disabilities has yet to be prioritized. A 2025 industry audit by AudioEye found that over 90% of finance-related websites failed to meet basic accessibility standards, indicating that widespread digital inclusion remains unrealized in the financial services sector (AudioEye, 2025) There is a growing population of older adults with vision impairment, with over 7 million in the U.S. today, projected to double by 2050 (Flaxman et al., 2021). Yet, research on financial capacity challenges among older adults has largely centered on cognitive decline. A few regional studies, such as work in Palestine and Fiji, have identified that people with vision impairment experience issues with banking accessibility (e.g., online platforms, Automated Teller Machines (ATMs), security, as well as internet and technology access (Fayyad & Al-Sinnawi, 2024; Goundar & Sathye, 2023). Among the limited recent research on financial capacity challenges among people with vision impairment, there is a lack of focus on older adults.

The purpose of this study was to learn from older adults with long-term vision impairment about their lived experiences related to financial capacity challenges. This analysis is part of a larger study called Aging Concerns, Challenges, and Everyday Solutions (ACCESS; Remillard et al., 2018) investigating user needs of older adults with long-term disabilities. Through a thematic analysis of interview discussions on the challenges they experienced with shopping and financial activities, we obtained detailed insights on key challenges that can inform the design of more inclusive financial technologies and services for this population.

Methods

Overview

ACCESS is composed of self-report questionnaires (e.g., demographics, health, disability characteristics) and an in-depth interview, conducted via phone or Zoom, assessing participants' challenges with everyday activities and their strategies for managing those challenges. ACCESS was conducted at the University of Illinois Urbana-Champaign and Georgia Institute of Technology with Institutional Review Board (IRB) approval at both sites. The ACCESS study protocol has continued to reveal rich insights about user needs of people aging with disabilities. As such, there have been additional phases of the study that focus on distinct subpopulations of interest. This paper focuses on participants with long-term vision impairment who participated in Phase 1 (interviews conducted June 2016 - October 2017) or Phase 2 (interviews conducted July 2021 - May 2023). Phase 1 focused on vision impairment broadly (i.e., a variety of causes), whereas Phase 2 focused on two specific vision conditions, macular degeneration and glaucoma, which impact central vision and peripheral vision, respectively.

Procedure

For detailed procedures of the ACCESS Phase 1 and Phase 2 studies, which varied slightly, see Remillard et al. (2018, 2023). To summarize, participants completed an initial phone screening to determine eligibility. Eligible participants completed questionnaires (45–60 min) via online survey, mailed paper copies, or phone to assess background information including demographics, health, and vision impairment. Interviews (60–90 min) were conducted via phone, Zoom, or in-person by trained research team members. All participants provided informed consent and received compensation ($30 for Phase 1; $45 for Phase 2). Interviews were audio-recorded and transcribed verbatim.

Structured interviews were designed to elicit discussions about the challenges participants faced in everyday activities as well as their responses to those challenges. There were six broad activity categories that contained 5-8 specific activities; these activities were selected based on subject matter expert interviews and previous study results (Preusse et al., 2016). For each category, participants rated which activity was most difficult within each category. Participants were then asked open-ended questions about their most difficult activity in each category. Specifically, they were asked, 'What aspect or part of this activity creates the most challenge

for you". They were also asked questions about the various strategies they used to manage those challenges, including tools and technologies, assistance from others, or own methods/things they came up with. The study was designed as a structured interview to capture this scope of information consistently.

Participants

Participants were recruited via outreach to local and national organizations for individuals with vision impairment. Other methods included flyer distribution, social media posts, participant registry queries, and word-of-mouth referrals. We analyzed data from 120 ACCESS participants with long-term vision impairment. ACCESS 1 participants (n=60) represented diverse causes of vision loss and ACCESS 2 participants (n=60) had vision loss specifically due to macular degeneration or glaucoma. Comparison of participants across phases was not the goal of this study; the two phases are combined to represent a larger sample of individuals aging with vision impairment. Eligible participants were aged 60-80 and self-identified as having a long-term vision impairment for at least 10 years. All participants were fluent in English and resided in the U.S.

Our analyses focused only on participants who discussed activities related to shopping and finances, as these are the contexts in which financial capacity tasks commonly arise. *Figure 1* shows the shopping and financial activities that were included in the analysis. In ACCESS 1, there was an entire category of specific activities related to shopping and finances; therefore, all participants discussed them. In ACCESS 2, shopping and finances were just two activities under the category of 'Household Management'; some participants (n=17) did not discuss these activities. There was a final sample size of 103 participants. (*Figure 1*).

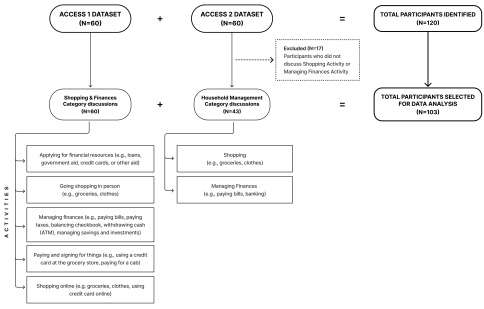

Figure 1. Activities related to financial capacity, as discussed by participants in ACCESS 1 and ACCESS 2

Data analysis

We present descriptive statistics about the sample (e.g., mean, SD, frequency counts) from self-report questionnaires. We conducted a thematic content analysis to develop a coding scheme for financial capacity challenges, utilizing both deductive (Koon et al., 2020; Remillard et al., 2024) and inductive (Elo & Kyngäs, 2008) methods. All coding was conducted by a single coder who is a graduate student in human-computer interaction (first author). The coder was supervised by a research scientist in gerontology (second author). The team iteratively refined the coding scheme, including codes, subcodes, definitions, and example quotes from transcripts. Both team members coded sample transcripts until reliability and agreement were achieved (r = .85); the graduate student then completed the coding of all transcripts using the finalized coding scheme. Discussions about navigating stores, cost/affordability of items, and income were excluded, as they were deemed external factors that were not relevant to financial capacity. We present frequencies of challenge codes.

Results

Participants

Demographic information was collected from a self-report questionnaire, with data missing for one participant who did not complete it. There were 70 females and 33 males (age: M = 68, SD = 5.18). The mean age of onset for serious vision difficulty was 20.8 years (SD = 22.14). Causes of vision impairment were diverse with the most common causes being retina damage or conditions (e.g., retinitis pigmentosa, macular degeneration; 42.7% of sample) and nerve damage or conditions (e.g., optic nerve atrophy, glaucoma; 35.9%,) with all other causes each accounting for less than 8% of the sample. Most participants had higher education, with 30.4% holding a master's degree or post-graduate training, and 25.5% holding a bachelor's degree. Most participants were White/Caucasian (65.7%), with a smaller representation of Black/African American (23.5%), other racial groups (9.9%) with one participant who did not wish to answer (0.9%). Less than half of the participants were married (44.1%).

Assistive device use

Questionnaires assessed participants' use of common assistive devices for vision. *Figure 2* depicts the percentage of the sample (N =102) that reported using each device; one participant did not complete the survey. The most commonly used devices were white canes, followed by audio description and screen readers.

Financial capacity challenges

Out of the 103 participants selected for data analysis, there were 64 participants who described tasks specifically related to financial capacity or their ability to manage financial tasks. The remaining 39 participants (38%) did not discuss financial capacity, as their discussions were centered around other issues such as navigating stores, identifying items, and concerns related to cost/affordability and income which were not the focus of our research questions.

The finalized coding scheme of financial capacity challenges is presented in *Table 1*. For detailed information on the coding scheme, see Pednekar et al. (2024). *Figure 3* illustrates the most common financial capacity challenges reported among the participants who discussed them (N=64). Accessibility challenges were mentioned most frequently followed by cognitive and knowledge-based challenges, and issues getting assistance from others.

The contextual details about each of these top financial capacity challenges and quotes from participants provide valuable insights about the nature of the challenge. Participants reported using a wide range of strategies to manage financial capacity challenges, including getting support from other people and utilizing various technologies, tools, and devices. However, these strategies were not always effective and sometimes created their own set of challenges as illustrated in their discussions.

Accessibility emerged as the most frequently discussed challenge with participants highlighting a range of physical and digital financial barriers. Reading and filling out physical documents (e.g., bills, receipts, forms, checks) were reported as particularly difficult and frustrating, especially with small print. To execute these paper-based tasks, participants reported using assistive tools, such as magnifiers (e.g., handheld or video), scanners, and signature guides. However, these tools were described as tedious and time-consuming to use.

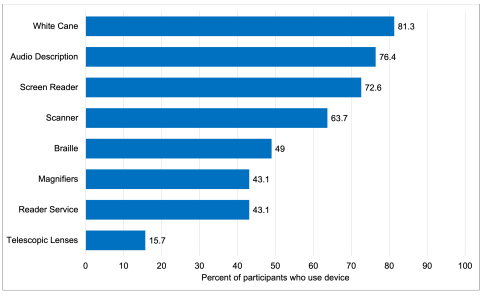

Figure 2. Common assistive devices used among participants (N=102)

"I'm left-handed and I kind of hook my hand when I'm writing, which casts a shadow when I use a magnifier. Having to read the amount, find the place to put the tip, the total, then the signature—it was all exhausting."

Distinguishing paper currency amounts was another issue mentioned that made transactions difficult and often required help from others. Participants described effectively using technologies (e.g., money readers) and strategies (e.g., folding methods for bills, wallet organization) to address this issue.

Challenges using financial transaction machines in public spaces, such as ATMs, kiosks, and Point of Sale (POS) terminals, were described. Poor contrast, small text, and unclear icons were a few issues that made it hard to identify information on the screen, enter PINs, or navigate menus. Inconsistent layouts across stores added to the challenge, requiring users to relearn interfaces each time.

"FTMs [Financial Transaction Machines] are much more challenging for me now. I often miss the chip slot and have to ask for help. When there's a long line, I get anxious—worried I'll make a mistake or enter my PIN wrong. I have to remind myself it's better to go slow and get it right than to rush."

Digital financial services, such as online shopping and banking, were reported as challenging. Despite the convenience of completing financial tasks and transactions from a personal smartphone or computer, participants detailed accessibility barriers that inhibited their use. Unlabeled buttons, poorly structured form fields, and unclear navigation often made it difficult to complete transactions. Although screen-reading software (e.g., JAWS) can be an effective tool for people with vision impairment to navigate websites, several users described encountering websites where key content was inaccessible. Examples included unclear navigational structures, unlabeled buttons, and missing alternative text for images.

"Websites that deal a lot with pictures of what they're selling and not descriptions of what they're selling [is challenging]."

"Online banking is impossible for me. My screen reader isn't accurate enough, so I usually have to go to the bank—which means arranging a ride. It's time-consuming and frustrating."

Participants described using magnification to navigate online interfaces, but this came with trade-offs.

Table 1. Financial capacity challenges coding scheme

Challenge Code	Subcode	Frequency	Definition
Accessibility	Websites / Apps / Digital Forms	23	Difficulty navigating and inputting information on websites/apps/digital forms due to accessibility issues such as missing alternative text for links and images, improperly labeled form fields.
	Financial Transaction Machines	16	Difficulty using financial transaction machines (e.g., ATMs, credit card readers, kiosks) due to issues such as difficulty signing, locating slots, inaccessible text, or varying layouts.
	Physical Documents	16	Difficulty reading and inputting information (e.g. filling out forms, signing) on physical financial documents due to small font size, low contrast, or poor text clarity.
	Money Identification	4	Difficulty with identifying and organizing different denominations of bills (e.g., dollars) due to visual impairment
	Magnification	3	Using magnification tools makes it difficult to view the full context of a screen or document at once, requiring frequent scrolling, which leads to time consumption and disorientation.
Cognitive	Limited Technical Knowledge	12	Limited familiarity with digital tools and online banking platforms, making it difficult to complete financial transactions online and increasing reliance on others.
	Cognitive Load	6	Difficulty managing information (e.g., keeping up with credit cards expiration dates, monthly bills passwords); memorizing important financial details (e.g., account numbers, payment amounts); and managing the task of switching between stored personal credit data and online input forms. This back-and-forth is slow, mentally taxing, and burdensome, particularly for older adults.
	Financial Comprehension	4	Difficulties in understanding and managing financial processes like loans or taxes due to unclear communication, overwhelming documentation, or complex terms, leading to confusion and frustration.
Assistance from Others	Quality of Assistance	9	Dependence on others for help with financial tasks, leading to delays, condescending behavior, or reliance on others' methods.
	Desire for Independence	4	Desire for autonomy in completing financial tasks, despite a lack of self-trust or confidence, and a wish to become less dependent on others.
Security/Privacy		8	Concerns about sharing sensitive personal information (e.g., credit card numbers, Social Security numbers) during financial transactions or by relying on others.
Physical Function		1	Physical limitations (e.g., carpal tunnel syndrome) that make tasks like signing documents or using financial interfaces difficult.
Hearing Function		1	Difficulty hearing auditory feedback or instructions from screen readers or other assistive devices, making it harder to navigate or complete financial tasks independently.
Other Challenges		3	Any challenges not covered in the above categories that affect financial capacity

"Because of the magnification on my computer, only a small portion of the page is visible at a time. It's hard to navigate and find things like 'Add to Cart.' I've accidentally double-ordered before. Now, if it's something I really want, I just call—it's easier than struggling with websites that claim to be accessible but aren't."

Another key challenge was cognitive and knowledge-based barriers, which related to difficulties in processing, understanding, or recalling the information necessary to manage financial tasks. One aspect of this was limited technology experience, which some participants described as impacting their comfort and confidence using digital tools and technologies.

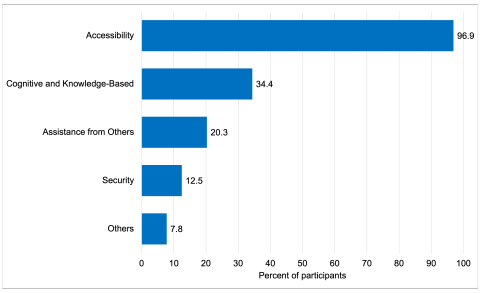

Figure 3. Distribution of financial capacity challenges among participants who discussed them (N=64)

"It's totally because I'm blind that I'm not as computer savvy. I'm not of that age where you grow up with this so I'm not as comfortable with it... anywhere throughout our society, we're using computers for one thing or another and that makes it a little bit more challenging for me."

Some described being overwhelmed by software updates and the sheer number of available technologies, making it difficult to keep up, know where to start, or navigate tools effectively.

Struggles with financial comprehension were reported. Participants shared feeling overwhelmed by the complexity and volume of paperwork involved in processes like taxes, loans, and credit agreements. This issue was amplified in situations where content was not accessible. Some acknowledged feeling financially illiterate and lacking the skills to fully understand complex financial systems.

"You want to get a full understanding of what they mean by 'twelve-month free interest.' Does that mean I don't have to pay anything for twelve months? No, it means they won't charge you interest. Things might come up to bite you usually happen because you didn't ask the questions you needed to."

The cognitive burden of managing personal financial details, such as passwords, credit card

numbers, and transaction histories, was described as particularly taxing. Several noted how age-related declines in memory and processing speed have made it even more difficult to keep track of this information.

"Listening to the computer, going to a file to get my credit card info, making sure the security number is right, then going back to the shopping website—it's become more cumbersome. I don't trust myself as much now. At 76, I don't have the mental capacity I had at 66. It's the mind, not just the vision. Switching from one file to a site and back again and remembering what goes where—it's harder now."

Participants shared strategies for organizing financial information, such as keeping printed or digital records in labeled folders. However, some expressed hesitancy around saving payment information due to fears of data breaches or misuse. Although these strategies provided some relief, they did not fully reduce the underlying cognitive strain—especially when navigating across multiple platforms. The back-and-forth interactions across systems (e.g., between online stores, saved personal files, and financial apps) often disrupted focus, increasing the mental effort required to complete routine financial tasks. Moreover, there was the issue of websites timing out, given the time needed to find and input information.

Given the challenges with accessibility, technical knowledge and experience, financial comprehension, and cognitive load, many participants turned to others in their support network for help with financial activities. Assistance from family members, friends, or trusted individuals emerged as the most common strategy for completing financial tasks—particularly those requiring detailed attention, such as filling out forms, signing documents, or making purchases—both in-person and online. However, this reliance on help from others came with its own set of challenges.

Issues were reported related to the quality and nature of the assistance received. Participants described a strong reliance on trust, often choosing helpers carefully based on the complexity of the task and the person's attitude or capabilities. Although some recounted positive experiences with helpful store clerks or compassionate friends, others felt rushed, condescended to, or misunderstood.

"My medical insurance provider changed their staff... the people before were real kind, but now these people are condescending, they're like, 'oh child, you have no idea what you're doing, haha!'"

Despite the practical help it provided, assistance often came at the cost of independence. Many participants expressed a deep desire to regain autonomy, especially in managing finances.

"I would like to be more able to do online shopping. I would like to know everything that would help me to make me more independent like I used to be."

Relying on others raised concerns around privacy and security. Participants highlighted the discomfort of sharing necessary sensitive information—such as credit card details, passwords, or personal data, with others to complete financial tasks.

"I have to be very careful and I'm always worried that I am being taken advantage of. I have to be very vulnerable... more people know personal information about me than ever before because I have to depend on them."

Finally, some participants described other challenges that made it harder to complete financial tasks independently. These included hearing and physical impairments that interfered with using digital tools making the experience overwhelming.

"The hearing, because, even with having digital voice, it's sometimes difficult for me to understand it."

"Due to my carpal tunnel, I really don't use a keyboard anymore because I can't feel the keys and I double strike the keys. I just end with more problems than I do."

In addition to these, one described the strain of physically waiting in line to pay, whereas others shared frustrations with assistive technologies that failed to function as expected.

Discussion

We explored the challenges older adults with long-term vision impairment experience with financial capacity or the ability to carry out everyday financial matters. Participants discussed their most difficult shopping and financial activities, providing contextual insights on the issues they experienced and how they were coping. We identified key challenges, including a lack of accessibility, cognitive and knowledge-based limitations, reliance on others for support, and concerns with security and privacy. The findings address a critical gap in the literature at the intersection of aging, vision impairment, and financial well-being.

Beyond the definition of financial capacity, participants' narratives revealed other barriers that shaped their financial experiences. Notably, 38% of participants did not report challenges directly related to financial capacity. Instead, they described other obstacles related to the broader context of managing finances and shopping, including vision-related limitations (e.g., navigating physical store environments, identifying products) as well as other more general challenges, such as affordability. Although not the focus of this paper, these challenges can have a profound impact on individuals' ability to live independently (e.g., secure goods, pay essential bills) and be financially secure.

Shifting online: Accessibility gaps with digital financial systems

For managing physical artifacts (e.g., cash, receipts, documents), participants commonly used assistive tools such as signature guides, magnifiers, and currency readers. However, these paper-based financial tasks were described as labor-intensive, error-prone, and frustrating. Participant descriptions suggested that these tools often functioned as compensatory workarounds that required substantial time and effort to complete, rather than seamless solutions.

The ongoing shift toward digital financial systems presents an opportunity to address these longstanding barriers (Ratna et al., 2024). Unlike static physical formats, digital platforms can support accessibility through features such as screen reader compatibility, text resizing, and high-contrast interfaces (Hamideh Kerdar et al., 2024). Yet participants' accounts suggested that many digital financial and shopping systems failed to consistently deliver these benefits in practice.

Several participants reported experiencing screen reader issues accessing online financial information. Screen reader incompatibility is due to poorly implemented web design, such as a lack of structured navigation and alternative text for images. Some described challenges when using screen magnifiers, including a limited view of on-screen content when zoomed in, which prevented them from seeing the full context of a webpage, and increased the likelihood of user errors (e.g., accidental double-clicks). This aligns with previous human-computer interaction research demonstrating that magnification can reduce users' effective field of view, increase navigation effort, and contribute to loss of context during interaction (Baudisch et al., 2002; Pundlik et al., 2017; Wang et al., 2024). In financial contexts, these barriers are especially consequential as errors confirming details with multi-step transactions could result in important consequences such as missed payments or unintended purchases.

These challenges persist even though widely accepted guidelines such as the Web Content Accessibility Guidelines (WCAG) exist to promote digital inclusion (World Wide Web Consortium, 2024). We are beginning to see progress in certain sectors, particularly in government and public service websites, where accessibility requirements are increasingly mandated. However, these shifts have yet to meaningfully extend into the fintech and shopping spaces (Fact Sheet, 2024).

In line with recent research on accessibility of kiosks, participants described financial transaction machines such as point-of-sale devices and ATMs as unintuitive and lacking visual accessibility features such as high-contrast displays, tactile buttons, or audio guidance (Park et al., 2025). However, participants' accounts and prior research suggested that audio guidance or tactile buttons alone may not fully resolve barriers in an aging population, where hearing loss becomes increasingly common (World Health Organization, 2025) and age-related declines in manual dexterity can affect interaction with physical controls (Carment et al., 2018). These co-occurring limitations further exacerbate the challenges they face and constrain the effectiveness of single-modality supports in public or time-pressured transaction settings.

Another aspect of the shift toward digital financial systems is that many older adults may be less familiar with digital technologies. Consistent with prior work, older adults show lower confidence and comfort due to limited experience with digital devices (Barber et al., 2025; Jin et al., 2021), suggesting that their ability to take advantage of digital financial services may be shaped not only by accessibility features.

Cognitive load and complexity of financial capacity tasks

In addition to platform-level accessibility barriers, participants noted financial content itself as often technical, text-heavy, and written at a high reading level. The complexity of financial aid procedures and forms can even inhibit older adults from receiving benefits they are entitled to (Bleach, 2025). Participants reported that frequent software updates and evolving platforms disrupted learned routines and required continual re-learning, aligning with research showing that older adults vary in their ability to keep up with digital changes over time (Offerman et al., 2025). Participants described a distinct form of cognitive load associated with managing sensitive financial information with

limited vision. Tasks such as locating saved credentials, switching between files and websites, and verifying card details increased mental effort and sometimes triggered timeouts. Workarounds such as avoiding password managers or relying on written records also created privacy and security risks. This pattern aligns with recent research showing that when accessibility barriers constrain the usability of secure authentication mechanisms, low-vision and older adult users are more likely to adopt insecure password practices (Ponticello et al., 2025; Sheil et al., 2025).

Privacy, trust and autonomy in assistance

Older adults without vision impairment often depend on close others as "unofficial proxies" to manage digital banking and high-stakes transactions (Barber et al., 2025). Given the extensive financial accessibility challenges facing individuals aging with vision impairment, our research confirms how their need for support others is much greater (Turkstra et al., 2025). However, this reliance on assistance introduces new vulnerabilities with sharing sensitive information that could reduce control over sensitive financial decisions and increase risk of financial exploitation and (Wood & Lichtenberg, 2017). Given that financial transactions are deeply personal and linked to sensitive identifiers, such as home address, date of birth, and identity numbers, the ability to manage them independently is critical for preserving individual dignity and control. Beyond privacy, participants emphasized that the quality of assistance varied considerably: while some helpers were patient and supportive, others were rushed, condescending, or dismissive, which shaped feelings of dignity and trust during financial interactions. These findings highlight that assistance is not merely a workaround, but a socio-technical dynamic that can either support or undermine autonomy depending on the interpersonal and contextual conditions in which it occurs.

Design requirements

To strengthen the practical contribution of this work, we translate our highest-frequency themes into actionable design requirements for financial and shopping platforms. These requirements target (1) accessibility breakdowns across web and public terminals, (2) cognitive load and financial complexity during multi-step transactions, and (3) assistance-related privacy and autonomy risks. Where applicable, we link each requirement to relevant WCAG 2.2 criteria to support implementation and evaluation across websites, mobile apps, and public-facing transaction interfaces.

Preserve context under magnification and eliminate horizontal scrolling

Participants often relied on screen magnifiers but reported losing context and making more errors when only a small portion of the interface was visible. WCAG 1.4.10 (Reflow) is especially relevant because it requires content to remain usable at high zoom without loss of information or two-dimensional scrolling. Interfaces should therefore support high zoom while maintaining stable layout cues such as clear section boundaries and persistent progress indicators. (World Wide Web Consortium, 2017). It may additionally incorporate interaction techniques such as guided focus or line-level highlighting to support place keeping during complex forms and long pages (Wang et al., 2024).

Implement explicit confirmation and step-by-step progression in high-stakes transactions

Financial tasks magnify the impact of small usability failures because users must verify amounts and complete multi-step workflows. WCAG 3.3.4 (Error Prevention: Legal, Financial, Data) is especially relevant, requiring opportunities to review, confirm, and correct information before submission. This includes clear confirmation screens, step-by-step task flows, and prominent summaries of critical details such as totals, delivery address, and payment method (World Wide Web Consortium, 2025).

Reduce cognitive burden using progressive disclosure and just-in-time support

Participants described financial content as technical, text-heavy, and difficult to interpret, particularly when compounded by assistive technology use. WCAG does not mandate progressive disclosure directly, but its "input assistance" criteria support reducing burden during form completion and error recovery, especially SC 3.3.1 (Error Identification) and SC 3.3.3 (Error Suggestion). Financial interfaces can operationalize these principles by chunking information, introducing complexity gradually, providing contextual explanations at the moment they are needed, and offering clear, actionable feedback when an error occurs (World Wide Web Consortium, 2025).

Support slower-paced completion by minimizing harmful timeouts

Participants described transaction failures when websites timed out while they were locating credit card details, switching between systems, or using assistive technologies. WCAG Success Criterion 2.2.1 (Timing Adjustable) addresses this by requiring that users be able to turn off, adjust, or extend time limits (World Wide Web Consortium, 2025). In high-stakes financial workflows,

timeout policies should account for slower—but valid—interaction patterns and may benefit from adaptive approaches that recognize ongoing user progress rather than penalizing extended completion time.

Promote multimodal interaction and immediate verification feedback

Participants' accounts underscored that relying on a single input or output modality was often insufficient, particularly when vision impairment intersected with age-related hearing or dexterity limitations. Financial systems could therefore provide multimodal and redundant feedback (visual, tactile, and auditory, where appropriate) to support real-time action confirmation and reduce high-cost errors, consistent with prior work emphasizing redundant multimodal interaction to accommodate diverse sensory and cognitive needs in aging populations (Bhattacharya et al., 2025).

Ensure FTMs and POS terminals support privacy-preserving accessibility

Participants reported significant barriers when using financial transaction machines (FTMs), such as ATMs and point-of-sale (POS) terminals. Although WCAG is primarily web-focused, the accessibility principles discussed above also apply to these public-facing systems. However, because transactions often occur in shared or time-pressured environments, accessible payment systems should incorporate privacy-preserving supports, such as non-visual guidance delivered through private channels (e.g., headphone-compatible audio) rather than broadcast output (AusPayNet, 2019).

Build onboarding and learning supports across the full user journey

Limited digital familiarity and gaps in financial knowledge influenced participants' confidence and willingness to complete tasks independently. Rather than treating this solely as a training problem, financial systems could reduce burden by embedding learning support across the interaction lifecycle: introductory onboarding before task initiation, contextual guidance during workflows, and clear post-action confirmations that help users understand what occurred and what to do next (Kebede et al., 2022; Sharpe & Elwood, 2024).

Formalize assistance and support peer-to-peer learning without undermining autonomy

Assistance from others with financial tasks often enabled task completion but required sharing sensitive information and increased feelings of vulnerability. Financial systems could better support these realities by recognizing that help-seeking is common, especially among individuals with vision impairment, and offering privacy-preserving ways to request help while maintaining user agency such as controlled sharing, read-only views, or guided co-navigation (Barber et al., 2025). In addition to platform-level solutions, peer-to-peer communities may offer scalable pathways for sharing strategies, tools, and lived expertise among older adults aging with vision impairment, particularly as financial systems, technologies, and policies continue to evolve (Bruckman et al., 2022).

Engage older adults through co-design and participatory design

A key strategy to address these challenges is employing co-design or participatory design methods that engage older adults as active partners in developing financial products and services. In FinTech, participatory approaches can help uncover adoption barriers such as low confidence, trust concerns, and fear of costly errors, and support iterative refinement of high-stakes workflows (e.g., authentication, payments, transaction review) to improve real-world usability (Munteanu et al., 2018; Darley et al., 2022).

Limitations

There are a few limitations of this study to note. First, the participants were majority White/Caucasian with high education. Financial capacity challenges are likely to be greater for individuals from underrepresented racial/ethnic groups and those with lower education, as there are known disparities in income, technology use, and financial literacy (Angrisani et al., 2021; Kaye et al., 2008). We did not analyze how age of onset and duration of vision impairment might impact financial challenges. Future research should explore how disability timing (i.e., congenital, early onset, late onset) impacts challenges among people with vision impairment as their experiences and coping strategies may be distinct. Similarly, participants represented a variety of vision characteristics (e.g., degree, cause) and we did not analyze if these differences were correlated with challenges. The sample includes participants from phase 1 and 2 of the ACCESS study who collectively represent diverse vision characteristics. The study was not designed with the goal of comparing across phases. However, in future analyses of the ACCESS 2, we intend to explore and compare the experiences of people with macular degeneration and glaucoma to uncover insights about how loss of central vision and peripheral vision, respectively, affect everyday activities.

Interviews were structured so that participants only discussed challenges with their most difficult activity(ies) in each category. As such, financial capacity challenges reported do not reflect all shopping and financial activities participants engage in, but rather their most difficult shopping and financial activities. Consequently, the extent to which people with vision impairments have difficulties with finance-related tasks is likely underrepresented in our data set. We focused on challenges with financial capacity, but that is not to say that some participants did not share positive examples of how they are effectively managing these challenges. For example, some described developing stable routines or selectively using trusted people to help manage financial tasks with confidence. Additional exploration of the specific solutions people with vision impairment are using to effectively navigate financial capacity challenges and their effectiveness could further inform the design of technology.

Conclusion

Financial capacity among older adults with long-term vision impairment is shaped by intersecting factors such as accessibility, cognitive load, technological familiarity, and reliance on others. Although fintech innovations offer the potential to overcome the accessibility challenges of traditional paper-based transactions and provide convenient, personalized financial management, access is not equitable for older adults with vision impairment. Accessibility breakdowns, high cognitive and informational demands, and reliance on others can jointly undermine autonomy while increasing privacy, security, and exploitation risks.

We identified critical challenges impacting the ability of older adults with vision impairment to carry out financial activities. To support more inclusive financial independence, we translated these findings into actionable design requirements for fintech and transaction systems, including preserving context under magnification; enabling error prevention and clear confirmation for high-stakes actions; reducing cognitive burden through progressive disclosure and just-in-time guidance; minimizing harmful timeouts by supporting flexible pacing; and offering multimodal, privacy-preserving interaction and assistance pathways. Broadly, these insights have implications for shopping vendors, financial companies, fintech designers, and policymakers. Addressing these issues requires more than meeting minimum accessibility standards – but even they are not often adhered to. Financial systems should support modular, slower-paced, multimodal interaction and promote user-controlled assistance that reduces cognitive and procedural demands. Participant experiences underscored the importance of extending mandates, policies, and incentives for the development and maintenance of accessible web content to the e-commerce and fintech sectors. Meaningful impact would require sustained investment in accessibility, stronger accountability, and participatory design approaches.

Acknowledgements

This work was supported by grants from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant numbers 90REGE0006-01-00, 90RE5016-01-00) under the auspices of the Rehabilitation Engineering Research Center on Technologies to Support Aging among for People with Long-Term Disabilities (TechSAge; www.TechSAgeRERC.org). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS).

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