Evaluation of Amazon Shopping's Accessibility with Screen Readers

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This study assesses the accessibility of Amazon Shopping for users with visual impairments (i.e., blind, low vision) who use screen readers to use the website. The study involved three visually impaired participants who shared their challenges with browsing, comprehending product descriptions, navigating suggestions, and completing the checkout processes. Participants stated that they often relied on outside help for less detailed descriptions and often experienced confusion with suggested products on their checkout page and search results. We suggest working with sellers to provide comprehensive descriptions, potentially using AI to support them, introduce a "Screen Reader" mode to clear up extra recommendations and advertisements, give clear directions on how to use/apply gift cards, and establish dynamic notifications for changing information (i.e., price, availability). These results highlight the importance of ongoing accessibility enhancements for e-commerce platforms to improve the online experience for not only those with vision impairments, but all Amazon customers.

CCS CONCEPTS • Human-centered computing → Accessibility → Empirical studies in accessibility • Social and professional topics → User characteristics → People with disabilities

Additional Keywords and Phrases: Accessibility, Usability Testing, Visual Impairment, Human-Computer Interaction (HCI), Online Shopping, Screen Reader

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1 INTRODUCTION

Online shopping has become an integral part of consumer culture, allowing people to quickly and conveniently access products and services that meet their needs. Online shopping has seen a massive increase in both overall growth and popularity due to the COVID-19 pandemic, as many brick-and-mortar stores have closed and shifted online [1]. As e-commerce continues to evolve, ensuring accessibility for all users, including those that are blind or low vision, is a necessity to ensure equal access to the marketplace.

As we continue to witness e-commerce becoming indispensable, we asked: how inclusive are these services? Some people who are blind and low vision seek help from sighted people as a solution for inconsistencies in shopping websites. For many, that is not an acceptable or available solution for multiple reasons including privacy concerns and the desire

for independence as a user who is blind or low vision [11]. With that in mind, our research focuses on the evaluation of one of the largest e-commerce platforms, Amazon Shopping (Amazon.com). For this study, we are interested in the experience and usability on desktop computers/laptops.

Currently, Amazon is the largest e-commerce company by sales in the US, making up 37.6% of the market [6]. The nearest company to them is Walmart at only 6.4%. According to Amazon's vision statement, they aim to be "Earth's most customer-centric company" [3]. Amazon claims to have a screen reader friendly app and website with more features to help people who are blind or low vision shop. However, some users are still hesitant to trust e-commerce websites, like Amazon, because of inaccurate product descriptions in addition to other similar factors [2, 7].

Researchers have found that users with visual impairments find it difficult to navigate e-commerce websites for several reasons including: (a) insufficient details in description [9], (b) low perceivability and operability principles, and (c) a failure to link the purpose and relationship between the content [8]. Users have also reported experiencing distractions (e.g., pop-up advertisements), information overload, and an overall lack of consistency while browsing the web [4]. Previous research studies highlighted the deficiencies in the details on e-commerce sites as a major factor for bad experiences as well. Our study aims to contribute to the ongoing discourse for a more inclusive digital experience for screen reader users.

Researchers have identified crowd sourcing methods like using customer reviews to generate product image descriptions [10], use of voice and touch inputs, and providing socially and culturally appropriate suggestions [8] as effective interface enhancements. With this research in mind, we have designed our intended tasks to explore these concepts on Amazon.com. We are particularly interested in seeing how users interact with descriptions for screen readers to:

1. Identify intended and unintended navigation landmarks such as heading tags or irrelevant words to a user [10]; and
2. Discover/understand image descriptors [9].

In the next sections, we present our methods and findings which will help us discuss the implications for the design team at Amazon.

2 METHODS

The following sections describe our participants, procedures, and data collection/analyzation methods for this study.

2.1 Participants

We recruited three participants who are visually impaired to participate in a usability study. We recruited these participants through our personal networks. There were no other restrictions for participation other than that our participants needed to be at least 18 years old.

Table 1: Participant Demographics

Pseudonym	Age	Gender	Location	Screen Reader
Julia	46-55	Female	Indiana, USA	NVDA
Daisy	56+	Female	Illinois, USA	JAWS
Shelby	36-45	Female	Illinois, USA	JAWS

2.2 Procedures

We conducted all usability testing sessions virtually using Zoom. Each session included one researcher to act as both the moderator and observer. Each researcher used the same procedure script to conduct the session. Prior to the testing session, each participant received an informed consent document in an email to review before giving their verbal consent during the session. Once the participants provided their consent, we started recording the meeting. Additionally, once the participants confirmed their participation, we sent them a $15 Amazon gift card to apply to their account for use during the testing (Shelby received her code during the checkout process and the other two participants received an email to add the gift card to their account before).

To establish an understanding of our participant's online shopping habits, we asked pre-test questions to learn about them, their experience with screen readers, and any other past experiences with online shopping. We then asked them to share their screen to start working through the following three tasks:

1. Search for an item within the given parameters (Under $13 with Prime/under $7 without Prime, 4-star user rating, eligible for Prime shipping) and add it to your cart.
2. Visit your cart and purchase the item {with the provided gift card}.
3. Imagine a few days have passed, navigate to your recently placed order and find the expected delivery date.

In between each task, we asked them to rate their experiences and share any thoughts about the process for each performed task. After completing all three, we followed up with final questions about their experience on Amazon, any additional comments they may have about online shopping, and standard demographic questions.

2.3 Data Collection and Analysis

Our team's primary method of data collection came from a mix of handwritten and digital notes. Further details of our notes came during a follow-up team session reviewing the recorded Zoom meetings of each participant. Once we collected all testing data, we created an affinity diagram using Figma's FigJam feature to discover patterns/themes in our observations. These patterns and themes are how we informed our recommendations for Amazon Shopping.

3 FINDINGS

We have categorized the unique observations by task, with individual themes emerging from each, providing valuable insights for our recommendations to Amazon Shopping.

3.1 Task #1: Browsing Amazon

The first task of the participants is to look up a product they want to buy with at least 4 stars rating and within the $15 budget ($13 for participants with Amazon Prime account, $7 for participants without Amazon Prime account). All participants were able to find a product that fit in the parameters. Our participants mentioned that this task was the most difficult since they had to sift through clutter and spend a lot of time ensuring that what they chose was what they wanted.

3.1.1 Product Description

Some of the participants stated that they still need a sighted person's help when shopping for items that require more insight into texture or "look and feel". They mentioned that was to get a more accurate description to ensure they are buying an item they want. Daisy shared a common experience where she would return clothing because she did not

prefer the texture which is always frustrating to her. She also mentioned that is one of the main reasons why she prefers shopping in-store for clothing instead of online.

3.1.2 Product Recommendation

Participants took more time to find a product due to the recommended products by Amazon Shopping getting in the way of their search results. This led to confusion as the participants, Shelby most notably, had to spend more time understanding if they added the item they wanted or one that Amazon recommended to them to their cart. This also increased navigation time as the screen readers would go through multiple unwanted items before reaching the product they searched for.

3.2 Task #2: Checkout

The checkout process was less challenging because it included familiar processes such as navigating the cart page and completing the payment process. All participants were able to check out at the end.

3.2.1 Information Overload

All three of our participants experienced varying degrees of information overload while navigating the cart page. Julia shared her frustration while trying to navigate around an advertisement for a credit card when attempting to check out. It took her many tabs on her keyboard to exit all aspects of the advertisement and find the information she wanted.

The other two participants also found the checkout page cluttered with related items and suggestions, making it difficult for them to access their cart and complete the checkout process.

3.2.2 Adding a Gift Card

Initially we did not consider the gift card experience as a part of our focus, however, we discovered some challenges that we believe are significant. Because our participants do not usually pay with a gift card, the process had some new challenges for them. Amazon has two different ways of adding gift cards, via email or via a code. For Shelby, the researcher gave her a code rather than an email link. They encountered problems finding the code field via screen reader. Since Amazon does not feature the gift card field prominently on the page, they required her to drill down several layers to find it.

One of our researchers also observed that Daisy would not have been able to complete the task without the researcher's aid. This is due to the unintuitive information structure of the gift card email when accepting/applying the gift card to her account. The email method required users to visit a webpage through a link in the email which also required them to press an "accept" button that they could only find after the researcher told them that they had not applied the code.

3.2.3 Payment Process

A lot of the challenges that participants encountered were because the default Amazon options, with a screen reader or not, do not prioritize gift card use. Participants struggled to pay with a gift card because the default option, even after users added a gift card to their Amazon account, was a credit card. This caused participants to develop a sense of mistrust in Amazon and in turn, prolong the checkout process as users hesitated with their choices.

3.2.4 Pricing Changes

One participant, Daisy, did not realize that there was a pricing change on the item she chose until she heard the final amount due at checkout. Amazon displays prices for items that have multiple color and style choices on a range from cheapest to most expensive. While on the search, she heard/expected the item to cost $13, but the color she chose was $19. The website did not inform her of this change before she added the item to her cart. The checkout page was the first time the website informed her of the different price for her item. Then, she had to go back and review her order to figure out what happened.

3.3 Task #3: Order Review

All participants unanimously agreed that Task #3 was the easiest to complete. While reviewing their feedback, we identified two themes/patterns for this task.

3.3.1 Efficient Navigation

We noted that participants generally found the navigation to the "Orders" page very intuitive and quick. While Daisy mentioned that the process could have been faster with a different header structure on the "Orders" page, she said that she had no real complaints. Overall, participants found it easy to locate the information they needed for the task.

3.3.2 Mobile Preference

One observation across all three participants is that they mentioned how they typically used the mobile version of Amazon Shopping, and that navigating to the orders page on a desktop/laptop was a new experience for them. We also discovered that they found the mobile version to be even more accessible overall than the experience they had on the web browser version.

4 DISCUSSION

Our evaluation focused on assessing the accessibility of Amazon Shopping through the experiences of three participants who are blind and have relied on screen readers for over two decades. While these participants expressed that they ultimately trust Amazon to provide accurate descriptions, a recurring theme highlighted the need for sighted assistance. This was particularly evident from products with characteristics that are difficult to convey with text. Daisy's story mentioning the need for help in the past to describe the texture of clothing exemplifies this limitation.

Participants also shared their perspective on the product recommendations presented by Amazon, viewing them as clutter more than a helpful feature. The consensus is that these suggestions harm their experience, complicating the navigation process for screen readers. We observed this problem on both the browsing/searching process and in the checkout process. These additional challenges made it difficult to locate the item they wanted and complete their purchase, which is bad for the user and Amazon as a business. One of our participants expressed their frustration over the change of the price for their selected item because they were not aware until they visited the cart. While a sighted user may have been able to visually notice the change, someone with a screen reader is not able to learn about that change without checking it themselves. While Amazon is inclusive of many users, there are aspects of the website that seemingly fall short of what is necessary for users that are blind or low vision.

While our primary focus is on screen reader usage on Amazon.com, it is crucial to acknowledge the broader implications for screen readers on the internet. Users are more likely to use a program like JAWS or NVDA; however, the effectiveness of these tools depends on how compatible the website is with assistive software programs [5]. Ensuring

website compatibility is critical to provide inclusive experiences for screen reader users. Our hope is that this study highlights the importance of web accessibility for users reliant on assistive technologies. Ultimately making online spaces more accessible for people who are blind or have low vision. Based on these findings, we have developed some recommendations for the Amazon design team.

4.1 Recommendations

The following are our recommendations based on four major areas that we believe Amazon could improve: (1) product descriptions and user guidance, (2) product recommendations, (3) adding and using gift cards, (4) continuous accessibility improvements.

4.1.1 Product Descriptions and User Guidance

- Collaborate with sellers by mandating detailed product descriptions to enhance accessibility and accuracy
- Utilize AI generated descriptions for items that lack sufficient detail, including texture related descriptors. Image recognition can add more detail to a product page if necessary.

4.1.2 Product Recommendations for Screen Reader Users

- Introduce a "Screen Reader" mode to give these users a way to eliminate extra advertised/recommended products for a more efficient experience.

4.1.3 Adding and Using Gift Cards

- Write clear instructions and expectations for activating gift cards from an email delivery.
- Add an extra gift card balance notification to let screen reader users know that they have an available balance or make it the default payment if possible.

4.1.4 Continuous Accessibility Improvements

- Add dynamic notifications for screen reader users to know when something has changed about an item (i.e., price, size and/or color availability)
- Maintain the screen reader's position on the page when returning to a previous page. This would help with the continuity of the shopping experience for these users.

4.2 Limitations

We had a limited number of participants in this study with only three individuals that have similar backgrounds in terms of gender, location, and education. We cannot generalize the result to the rest of the population as well as we hoped. Ideally, a more diverse participant pool with varied backgrounds would be preferable for generalization.

We gave the participants the freedom to select an item of their choice for purchase. This led to a substantial variation in the time it took to complete the task. Participants with a predetermined item in mind completed the task notably faster than those who were uncertain about which item to purchase.

All participants are regular users of Amazon Shopping. Therefore, they are familiar with the website and accustomed to its features. Hence, they have encountered and developed solutions for any flaws within the website.

We believe that to truly evaluate the accessibility of Amazon Shopping; the participants must be people who have little to no experience with the website. This approach ensures that participants will not have pre-established workarounds for any flaws within the website.

4.3 Future Work

Future research on Amazon Shopping should ensure a larger participant pool that includes a diverse representation of individuals who are blind or have low vision. While our focus has been on Amazon Shopping, we learned about more challenges in online shopping overall. This observation creates an opportunity for a comparative study across multiple websites to identify and address common issues in online shopping usability. While we may start by looking at the largest company, there is still a lot to learn from others.

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