

Identification of the Key Considerations to Design: Assistive Tools for Blind Lottery Sellers in Sri Lanka

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Abstract – Without the gift of sight, blind people bravely and independently navigate life, demonstrating that real vision is beyond what the human eye can see. This study examines the particular obstacles experienced by blind lottery sellers in Sri Lanka, namely in the Colombo District, where urban congestion makes it more difficult for the blind to work. Blindness is one of the most prevalent disabilities worldwide, with many visually impaired individuals in Sri Lanka turning to self-employment, such as lottery selling, as a primary income source. Approximately 60–70% of visually impaired individuals in Sri Lanka rely on self-employment due to limited access to higher education and formal employment. Considering their determination, a significant research gap exists in understanding the specific challenges faced by blind lottery sellers compared to their sighted coworkers. Addressing this gap is essential because these individuals often face severe barriers that affect their safety, productivity, and economic independence. This study pinpoints psychological, physiological, social, and economic obstacles that directly impact the well-being and occupational stability of blind lottery vendors. The many challenges faced by blind lottery vendors include dangerous mobility in congested places, financial exploitation, social shame, and ineffective handling of everyday duties such as managing tickets and cash. This study emphasises the critical need for assistive design solutions that support efficiency, safety, and independence. By emphasising the value of assistive tools, this study highlights how innovation may empower blind lottery sellers and reduce accessibility and equality barriers. The results indicate that in order to improve the sellers' capacity to carry out their duties independently and safely, need of specialised devices for navigation, a method for ticket and money management, and safety are necessary. By developing assistive tools that target these crucial areas can empower those in need by enhancing their economic stability, dignity, and quality of life.

Keywords: User-Centered Design; Blind, Lottery Sellers; Assistive Tools

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I. Introduction

Millions of people throughout the world struggle with blindness, a handicap that affects almost every part of everyday life. The purpose of this study is to determine important factors that should be considered when creating assistive devices and solutions for Sri Lankan blind lottery dealers. Blind people in Sri Lanka face significant social and economic challenges due to their restricted access to high-quality education, good jobs, and community support. Only a low percentage of blind persons in Sri Lanka obtain official jobs, many turn to self-employment or rely on community empathy for survival due to a lack of structural inclusion (Theekshana Suraweera, 2021). For some blind people, selling lotteries has become the main source of revenue, among other self-employment activities. While offering a certain level of financial freedom, this line of work comes with its own set of difficulties.

Usually, blind lottery vendors in Sri Lanka face challenges in consumer engagement, safety, and mobility. It is dangerous to navigate crowded public areas without sight, and managing currency transactions makes their job more difficult. These people also frequently experience social stigma and rely heavily on the kindness of others. Since current support systems and solutions rarely address the particulars of their everyday interactions and work situations, the lack of assistive technologies catered to their particular demands worsens their struggles.

In Sri Lanka, lottery-selling culture involves both sighted and visually impaired sellers, each adopting unique practices. Sighted sellers use counters, bicycles, motorbikes, or walk to sell tickets, while mobile sellers display tickets on bicycles or carry them in hand. They keep records of previous winning numbers and use small bags, trays, or lockers for secure storage. For instance, a paper shows that a seller mentioned starting out by selling tickets on a bicycle for two years before transitioning to a counter setup, emphasizing how sellers adapt their methods based on circumstances and experience (Dissanayake H, 2022) These practices highlight the typical workflow of sighted sellers, providing a useful comparison to the challenges faced by visually impaired sellers, who must navigate similar tasks with significant additional barriers.

This research addresses the difficulties experienced by blind lottery vendors in Colombo, Sri Lanka, using interviews, observations, and a review of the literature. Interviews with community leaders from the Blind Association of Sri Lanka and the lottery vendors themselves are part of the research, which on this urban region because of its complexity and high activity levels, creates a challenging environment for the blind sellers. The study aims to find design characteristics for assistive devices that are effective, sensitive to their requirements, and supportive of their freedom by focusing on this representative group, blind lottery sellers within the visually impaired self-employed community.

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II. Research Problem

In a world that aspires to equality and inclusiveness, the challenges faced by people with disabilities remain a major source of concern. In tackling these issues, design plays a part that goes much beyond practicality and includes enabling people to live independent, respectable lives. Blind lottery vendors face social, psychological, ergonomic, and financial challenges every day that are made worse by the lack of adaptive technologies. Even while assistive technologies have made significant progress in meeting accessibility requirements in general, there is still a noticeable lack of workable, customised solutions for particular professions, such as lottery sales. Additionally, a substantial knowledge gap is highlighted by the absence of current literature and research concentrating on the particular difficulties faced by blind lottery sellers. This shortcoming impedes the creation of well-informed, successful design solutions in addition to restricting our understanding of their particular demands. In order to ensure that blind vendors can compete on an equal basis with their sighted coworkers, this study topic highlights the urgent need for human-centered design solutions that solve these professional obstacles while promoting long-term economic and social equality.

III. Literature Review

A. Understanding Visual Impairment

Vision is the most dominant of human senses and necessary for a variety of everyday tasks, including reading, learning, working, and interacting with others. The term blindness and visual impairment refers to a variety of disorders that impair a person's vision, frequently making it difficult for them to carry out daily activities and lead independent lives (Geetha, et al., 2024). According to the World Health Organisation, visual impairment is the result of an eye disorder that interferes with the visual system and impairs essential vision functions including clarity, depth perception, and surrounding awareness (WHO, 2023). A variety of problems that are not able to be resolved with traditional glasses or contact lenses are included in visual impairment. Limited sight is a condition in which a person has some useful vision left but not enough to do daily tasks. In more extreme situations, blindness sets in, leaving the patient completely blind. Optic illnesses, neurological disorders that impact visual pathways, and harm to vital components of the eye, including the retina or optic nerve, can all cause these deficits. The retina's role in converting light into nerve signals is crucial, as damage here or along the visual processing pathways can result in severe vision loss or total blindness. Different forms of blindness exist. Blindness can also be congenital, partial, legal, or nutritional. Partial blindness causes limited vision, total blindness is no light perception, legal blindness causes severe visual limits, and nutritional blindness affects eyesight in low light. There are several reasons a person may experience blindness. According to Geetha, blindness can be congenital, present from birth, or developed later in life as a result of diseases or traumas that impact the eyes or the parts of the brain involved in visual processing (Geetha, et al., 2024).

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B. Prevalence of Blind in Sri Lanka

Surprisingly a significant proportion of the world's differently-abled population is blind or visually impaired, which emphasises the need of meeting their particular requirements and improve accessibility in many facets of everyday life (WHO,2011). According to a study conducted by the International Agency for the Prevention of Blindness and Sri Lanka's Vision-2020 project, 15.4% of people were blind and 1.6% of people had severe vision impairment. The Uva province had the greatest, with 2.9%. In addition to having restricted access to basic healthcare, clean water, sanitary facilities, and suitable housing circumstances, visually impaired people sometimes confront severe financial difficulties (Wickramaarachchi, et al., 2023)The necessity for specialised methods to address the needs of the blind community in particular regions, where there may be a smaller availability of services and a larger number of visually impaired people, are highlighted by this local data.

C. Educational and Employment Barriers

In Sr Lanka, just a small number of visually impaired people get to higher education, and they face significant challenges in their goals of education and work. Between 25 and 30 visually impaired people enroll in universities each year, a small number proceed to the GCE Ordinary Level, and even fewer finish the GCE Advanced Level. The majority of visually impaired people have limited educational qualifications, which limits their access to steady, well-paying jobs in the public or private sectors. There are few government jobs available to people without advanced degrees, and the commercial sector frequently offers only low-paying work that some people with visual impairments find insufficient to maintain a basic standard of living (Suraweera, et al., 2021). The above data demonstrate a significant lack of educational and job opportunities for those with vision impairments. This group is systematically disadvantaged in Sri Lanka due to the absence of sufficient support networks for higher education and a lack of employment opportunities. Many are thus forced to look for informal work, which frequently lacks the stability and advantages of regular occupations and so contributes to economic instability.

D. Self-Employment as a Source of Income

Due to this circumstance, the majority—roughly 60–70%—have turned to self-employment as a source of income. However these self-employment activities are frequently unofficial, and many of them rely more on public sympathy than on formal business plans. Selling lottery tickets, books and small goods like incense sticks at busy places like marketplaces, places of worship and public transportation hubs are common ways to make money. Others turn to begging on the street. These initiatives highlight the broader social and economic challenges that Sri Lanka's visually impaired population faces (Suraweera, et al., 2021). The high rate of unofficial and unregistered self-employment is another sign of the restricted choices for people with visual impairments, particularly in the lack of inclusive workplaces or accessible career development routes.

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E. Mobility and Navigation Challenges

Mobility issues can impact the self-esteem and confidence of visually impaired people, making them a psychological as well as physiological burden. This problem is made worse by the lack of specialised navigational equipment and infrastructure. Blind people in Sri Lanka who are self-employed, such as by selling items, have a difficult time getting around in public and doing duties that are necessary for their jobs. It can be challenging to navigate new places since they frequently run into problems like getting lost or having trouble finding familiar locations, like their homes. These difficulties raise the chance of stumbling, accidents, and injuries when combined with limitations in movement (Tirupal, et al., 2021).

F. Financial Management Difficulties

The management of finances is still another major obstacle. Sri Lankan banknotes lack recognisable tactile characteristics that facilitate identification due to the last modifications in currency design. Visually impaired people find it challenging to recognise denominations by touch alone because the new notes only differ in length by five millimeters (Wikkramasnghe & Silva, 2013). It is challenging for visually impaired people to handle their money on their own without assistance due to the lack of tactile characteristics. This difficulty is a significant obstacle to their freedom in addition to being a bother.

G. Need of Purposefully Designed Assistive Tools

The aforementioned challenges underscore the significance of intentionally crafted solutions that enhance the security, independence, and use of tools and assistance for those with visual impairments engaging in self-employment. Since solutions that are specifically designed to meet the requirements of the visually impaired may significantly improve their quality of life, there is a greater need than ever for innovation in assistive technology. The design of such items may directly contribute to increased mobility, financial independence, and safety by taking ergonomics, accessibility, and user experience into account. To guarantee that the products satisfy their practical demands, it is also essential to include visually impaired people in the design process. According to this study, creating inclusive, useful, and accessible products is essential to empowering the visually impaired community in Sri Lanka and elsewhere.

IV. Methodology

This research addresses the difficulties experienced by blind lottery sellers in Colombo, Sri Lanka, using interviews, observations, and a review of the literature. To capture both official viewpoints and firsthand experiences, the research involves interviews with community leaders from the Blind Association of Sri Lanka as well as the lottery sellers themselves, focusing on this urban region because of its complexity and high activity levels. The research identifies key psychological, physiological, social, ergonomic, cognitive, and economic factors affecting these vendors' daily lives. The study aims to find design characteristics for assistive devices that are effective,

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sensitive to their requirements, and supportive of their freedom by focusing on this representative group, blind lottery sellers within the visually impaired self-employed community.

A. Research Approach

This study consisted of three stages, incorporating grounded theory, self-observations, and case study methods to comprehensively explore the specific challenges faced by blind lottery sellers in Sri Lanka. Grounded theory offered an organised method for identifying reoccurring problems by enabling the systematic construction of themes based on similarities seen in participants' experiences. Self-observations provided direct knowledge of the vendors' everyday responsibilities, highlighting real-world challenges such as negotiating crowded public areas, completing transactions, and engaging with clients. Finally, the case study approach captured both institutional and individual viewpoints through focus groups and qualitative surveys with Blind Association community leaders and particular lottery sellers.

B. Context Selection

Because of its large population density and status as Sri Lanka's main economic hub, the Colombo District was selected as the research location. Due to these factors, blind lottery sellers have a difficult environment as they have to negotiate crowded public areas and engage with lots of people. The study's focus on Colombo enables it to highlight the particular challenges encountered by sellers in a busy urban environment, where crowded settings and quick transactions make their jobs more challenging. Examining how social and environmental elements affect the day-to-day activities and general well-being of blind lottery sellers is made possible by this complex background.

C. Participant Selection

Ten blind lottery sellers from the Colombo District and community leaders of the Blind Association of Sri Lanka participated in this study. These people were chosen with the intention of obtaining a wide range of viewpoints, including personal accounts from the sellers themselves as well as organisational insights from association executives. While interviews with blind lottery dealers showed personal problems such as navigating busy locations, getting transactions, and maintaining client contacts, the participation of community leaders provided a more comprehensive knowledge of the institutional challenges and support structures. This mix of participant types offered a thorough understanding of the professional and social challenges faced by blind lottery sellers on a regular basis.

D. Data Collection Methods

Data was collected through direct observations and open-ended interviews with two different participant categories, community leaders from the Blind Association of Sri Lanka and selected blind lottery sellers. Initially, the Blind Association of Sri Lanka's community leaders' interviews offered insightful background information on the socioeconomic status and general circumstances

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of blind people engaged in self-employment. These conversations addressed topics including educational attainment, employment opportunities, and other general difficulties this group faces. These interviews revealed that one of the most common forms of self-employment for visually impaired people in Sri Lanka is selling lottery tickets.

According to literature findings, to better understand the psychological, physiological, social, ergonomic, cognitive, and economic elements that affect blind lottery sellers' day-to-day life, interviews were conducted.

- Psychological Factors: Anxiety about possible money exploitation and social shame both add to the emotional toll.
- Physical Factors: Crowded public areas pose mobility and safety risks for both vendors and others, while exposure to weather elements increases the need for protection measures.
- Social Factors: Vendors' connections and sense of security are impacted by social judgments and their reliance on community benevolence.
- Ergonomic Factors: Handling lottery tickets and cash requires little hand skill.
- Cognitive Factors: The necessity of memory aids and the capacity for prompt decision-making during transaction management.
- Economic Factors: Irregular income and vulnerability to fraud create financial instability.

Together, these factors elements influence the challenges that sellers have at work, especially when it comes to handling cash, negotiating crowded spaces, and maintaining financial stability.

V. Analysis and Results

A. Overview of Visually Impaired Self-Employment in Sri Lanka

Early conversations with officials of Sri Lanka's Blind Association provided important information on the social and economic standing of blind people engaged in self-employment. About 1,000 of the 1,500 members of the organisation are self-employed, and many of them depend heavily on lottery sales as their only source of income. The lack of educational options, which prevents visually challenged people from obtaining steady, well-paying employment, is a major contributing factor to the dependency on lottery revenues. As a result, a large number of people in this neighborhood still struggle financially.

B. Impactful Factors

In depth interviews with blind lottery sellers revealed a number of social and psychological issues that have a big influence on their day-to-day existence. The psychological toll brought on by the ongoing possibility of cheated by customers was one of the main worries. Vendors reported instances of fraud including the swapping of non-winning tickets as winners, underpayment, and customers stealing more tickets than they had paid for. These people experience worry and emotional distress as a result of this financial exploitation. On the other hand, Sighted sellers are

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far less vulnerable to these types of fraud. The likelihood of being tricked is significantly reduced by their capacity to visually verify winning numbers, ensure the right amount of tickets are exchanged, and validate an amount of cash. Because of this, they experience significantly less psychological stress when handling transactions. This remarkable difference draws attention to the significant emotional strain blind sellers face as they must always be on alert and trust the honesty of others in a system that does not sufficiently meet their requirements.

Figure 01

A Blind Lottery Seller with his Essentials



Figure 02

Interaction with Customers



Note: Source by Author

The requirement to navigate through crowded public areas causes the physiological difficulties of movement. Using a white cane to help navigate in crowded areas increases the risk of injury, since sellers are frequently involved in traffic accidents because of their poor vision and lack of mobility aids. To increase their freedom, workable solutions that enhance mobility and guarantee public safety are crucial. To save weight, vendors just bring a tiny backpack with necessities like a notebook containing previous winning numbers. They usually don't carry umbrellas or water bottles since they make it harder to move about. However, without an umbrella, it might be difficult for sellers to locate cover in an emergency because of their poor vision and need on others for direction. This emphasises the necessity of lightweight, portable weather protection products to guarantee their security and mobility in bad weather.

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Figure 03

Using Polythene as a Rain Cover



Sighted vendors frequently have the choice to use counters, which remove the requirement for mobility and offer a stationary selling point. Nevertheless, counters are costly, and as previously stated, blind sellers stay clear of them because they concern cheating. Since they can hold all of the tickets in their hands and have a better idea of the number of tickets sold, they are forced to sell tickets while walking. Even while some sighted ticket vendors also operate on walk in congested areas, their increased mobility allows them to move more easily, preventing accidents and allowing them to confidently navigate their environment. In terms of weather protection, sighted sellers can find shade or cover quickly, but blind sellers, who must rely on others for guidance, find this far more difficult.

Sociological difficulties of dealing with social stigma increase psychological stress. Blind lottery vendors frequently rely on the sympathy of the general public, which can be advantageous in certain situations but also exposes them to misuse and manipulation. Their confidence in their profession is weakened and feelings of uncertainty are made worse by their need on others for help as well as cultural perceptions about blindness. Because sighted sellers are not subjected to the same level of reliance or social stigma, blind vendors are under a great deal more pressure as a result of these sociocultural constraints.

Ergonomically, handling lottery tickets and supervising transactions are major challenges for blind lottery sellers. The majority of sellers utilise one hand for holding their white cane and the other to hold tickets, which makes it difficult for them to deal with cash and engage with consumers. Their ability to effectively handle the sales process and interact with clients promptly is hindered by this dual use of hands. On the other hand, sighted vendors can handle tickets and manage transactions more effectively since they always have a free hand available. Due to this basic distinction, blind

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vendors are at a major disadvantage since their restricted hand availability not only slows down the procedure but also causes social difficulties. These challenges highlight how urgently adaptive equipment is needed to lessen the burden and increase their productivity and independence.

Figure 04

Using Polythene as a Rain Cover



Additionally, cognitive difficulties were noted, especially with regard to memory and recall. To remember past winning numbers or arrange their tickets in a particular sequence, many vendors must rely on their memory, which may result in transaction mistakes. Compared to sighted sellers, they don't have to worry about these mistakes cause they have notes and they can check about winning numbers always but blind sellers have to recall. This dependence on mental effort may result in delays when interacting with consumers. Blind lottery sellers are vulnerable in several ways from an economic standpoint. Even though they sell about 500 tickets a day and make between LKR 1,500 and 2,000, their financial status is still unstable. Persistent financial insecurity is caused by a lack of steady income and the possibility of financial exploitation. These sellers use many pockets to separate various monetary values to control their earnings and easily identify different values of notes. While this system helps them organize their money, it significantly increases the risk of theft, as they cannot visually monitor their cash. On the other hand, sighted sellers are able to accurately observe and calculate their earnings, which enables them to manage transactions in a more secure and effective manner. This visual advantage not only saves time but also reduces the likelihood of theft, highlighting yet another area where blind sellers face a disadvantage due to their condition. These challenges emphasize the need for assistive solutions to improve money management and enhance financial security for blind sellers.

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Figure 05

Identifying Currency



C. Considerable Factors for Design Development

The findings of the research highlight the urgent need for specialised assistive design solutions to meet the numerous challenges that blind lottery sellers in face in Sr Lanka. The findings, which highlight important concerns that affect these sellers' daily lives across several areas, depend on in-depth interviews, direct observations, and an analysis of current practices and technologies.

- ***Encouraging Dignity and Independence***

Blind lottery sellers have a very difficult time doing their jobs on their own and must rely mostly on outside help or public sympathy. Their confidence is impacted by this dependence, which also leaves them open to manipulation and social shame. Maintaining their dignity and professional integrity requires solutions that promote independence and lessen reliance, such as self-navigation aids, accessible ticket processing, and independent cash management.

- ***Improving Mobility and Protection***

The study stated the physiological strain of navigating busy roads and the frequent involvement in traffic accidents and bad weather conditions among blind lottery sellers. The use of white canes by blind vendors restricts their capacity to carry necessities like umbrellas and water bottles, risking their comfort and safety even more. It was found that they frequently lacked lightweight weather protection equipment, which left them unprotected. Incorporating reflective materials into designs can enhance visibility and weather protection must extend not only to the sellers themselves but also to the preservation of their tickets as well. Accessible and portable solutions, such as lightweight weather protection gear and ergonomic navigation aids, might greatly improve their mobility and safety to solve these problems.

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- **Reducing Vulnerability to Theft**

According to the study, blind sellers are significantly at risk of theft since they are unable to verify transactions or keep an eye on their money. A common way for sellers to arrange their money is to keep several amounts in different pockets for easy identification, which raises the possibility of financial abuse. Blind sellers' risk might be significantly decreased by assistive technology that allows them to safely handle their money and verify transactions, boosting their self-confidence and lowering their financial stress.

- **Improving Ticket Handling and Money Management**

For blind sellers, handling lottery tickets and cash at the same time presents serious ergonomic issues. Blind sellers have to use one hand to hold their white cane, leaving just one hand available for other responsibilities, in contrast to sighted sellers who can use both hands to handle tickets and complete transactions. This limitation affects their ability to interact with consumers quickly and slows down the transaction procedure. Additionally, blind sellers are more likely to make mistakes since they frequently have to rely on memory to remember winning numbers or handle ticket arrangements. Devices that help detect and arrange currency or safe ticket holders, which can make at least one hand free, are examples of adaptive solutions that might increase productivity and lessen the cognitive load.

- **Promoting Economic Stability**

Even though they sell 500 tickets a day on average and make between LKR 1,500 and 2,000, blind lottery vendors continue to struggle financially. The need for systemic changes is highlighted by the weaknesses of their existing money management procedures, financial exploitation, and lack of a reliable source of revenue. On the other hand, sighted sellers' profit from their capacity to more successfully safeguard their profits and physically confirm deals. Accessible financial management systems are one example of a solution designed to reduce the financial disadvantages encountered by blind sellers. Such solutions would not only increase their earning potential but also lessen the stress brought on by theft and mistakes.

Blind lottery vendors might become more independent, safe, and financially stable by tackling these interrelated issues with thoughtful, human-centered design solutions. By empowering these individuals to do their jobs with assurance and effectiveness, these tools will not only enhance their quality of life in the short term but also support their long-term social and psychological well-being.

VI. Conclusion

This study highlights the key challenges that blind lottery vendors in Sri Lanka must overcome, especially in the busy city of Colombo. This study highlights the urgent need for creative and customised solutions to improve their everyday lives by examining the psychological, physiological, social, ergonomic, cognitive, and economic obstacles they face. Important conclusions highlight

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how crucial it is to create assistive tools that increase mobility, guarantee security, lessen financial exploitation, and improve sellers' total productivity.

Their freedom and productivity may be greatly increased with the use of such assistance devices, such as portable mobility aids with built-in weather protection, safe and easily accessible money management systems, and intuitive navigation technology. The study also emphasises how important it is to free up at least one hand in order to handle tickets and transactions more effectively. The study also emphasises how important it is to free up at least one hand to handle tickets and transactions more effectively. Reflective materials may be used in designs to improve visibility and safety in low light levels, addressing the particular difficulties of night walking. Additionally, to guarantee continuous operation under all circumstances, weather protection must cover both the sellers and the preservation of their tickets. For blind lottery vendors, assistive devices can promote a higher level of dignity, and social inclusion by giving priority to these factors. These developments have the potential to change their work experiences by decreasing their need for outside help, improving financial security, and giving them the confidence and security to carry out their responsibilities.

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