

# A Collaborative Digital Platform for Charity Thrift Store Workers

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**Abstract**—This paper introduces a digital platform concept derived from a comprehensive study of a clothing charity thrift store and its operational model, aimed at enhancing communication and coordination among a diverse workforce. The platform was created using Participatory Design (PD) and Computer Supported Cooperative Work (CSCW) principles. Insights into the thrift store’s operations were gained through observation and interviews, informing subsequent co-design workshops where the final artifact was collaboratively developed. The resulting platform prioritizes accessibility and usability, featuring a dashboard display with a stylus and a mobile application that promotes collaboration and communication via mixed-reality technology and shared space. It emphasizes the ability of collaborative digital platforms to improve communication, organization, and productivity among charity thrift store employees.

**Keywords**—participatory design; PD; computer supported cooperative work; CSCW; thrift store.

## I. INTRODUCTION

Fast Fashion (FF) is a retail technique whereby businesses use marketing strategies to keep up with the newest fashion trends by regularly updating products with quick renewal cycles and quickly turning the inventory [1]. The Spanish corporation Zara introduced the concept of FF to the United States in the 1980s, which quickly gained popularity. Over the past two decades, there has been significant growth in the FF market share. In fact, the consumption of apparel is predicted to increase by 63% by the year 2030 [2]. Though clothing poverty is a topic that sheds light on the uneven development of our society, revealing a hidden world of fashion that many are not aware of emphasizing the social and environmental consequences associated with the FF industry [3]. For many people who are living in poverty, buying clothes is a luxury that they simply cannot afford. This issue has led to a growing movement of charitable organizations that focus on providing clothing to those in need. Not only is this work beneficial for those who lack the means to buy new clothes, but it can also be environmentally friendly.

Non-Profit Organizations (NPOs) with philanthropic and social goals are known as charities [4]. Charity thrift stores play an important role in assisting those in need by providing low-cost or free clothing and other items. It has a significant positive impact on the economy, society, and the environment [2]. However, volunteers frequently face difficulties collaborating with one another while organizing donations and maintaining inventory [5]. Compared to for-profit organizations, NPOs tend

to be more decentralized [4]. This study focuses on creating a collaborative digital platform for charity thrift store employees to enhance communication and task coordination, ultimately improving the efficiency and effectiveness of the store’s operations. This platform aims to address these challenges and provide a more rewarding work experience for charity thrift store employees while better serving their communities by leveraging the principles of PD and CSCW.

Our study is based on a Clothing Center, which has provided free clothing to more than 1,600 people since May of 2022. According to the clothing center, a significant number of people in this area are experiencing financial difficulties, with low-income households relying on social benefits, disability allowances, unemployment benefits, and other forms of assistance. The clothing center exemplifies how charitable organizations can have a significant impact on the community, and our proposed digital platform will help similar organizations by streamlining the donation and inventory management processes by improving communication and coordination among employees.

The purpose of this study is to investigate the creation of a collaborative digital platform specifically designed for charity thrift store employees. Our primary goal is to answer the following research question: ” How can a collaborative digital platform improve the efficiency and effectiveness of communication and task coordination among workers in a charity thrift store?”.

The paper is structured as follows. Section 2 provides an overview of existing literature, while Section 3 presents the framework used in this study. Section 4 outlines the methodology utilized, and Section 5 presents the study’s findings. Finally, Section 6 engages in a discussion, while Section 7 concludes the study.

## II. LITERATURE REVIEW

Few researchers have looked into the possibility of PD and CSCW collaboration in a variety of settings. Paras et al., investigated the current clothing reuse industry in order to develop a charity-driven model for the reuse-based clothing value chain in their study [5]. David and his co-authors proposed a new online collaboration platform for the exchange of goods between various organizations in order to improve communication, foster collaboration, and more efficiently and

effectively fulfill each organization’s mission while also increasing community involvement [6].

Vyas & Dillahunt, emphasize how people who are financially struggling demonstrate resilience in the face of adversity, which may assist them in understanding how technologies can support their current efforts [7]. Then, they offer empirical insights into their participants’ situated resilience and articulate how design can support their existing social and collaborative practices. In a study conducted by Bysani et al., they proposed an Remote Sharing Network (RSN) solution for the workplace that promotes collaboration [8]. The system enables people to work both independently and collaboratively, spawning a new category of professionals known as e-professionals, who can collaborate online regardless of their physical location [8]. Michelini et al., aimed to shed light on how new digital technology is reshaping alternative distribution networks and what kind of value is added by the many developing models in their paper [9].

However, few or no studies have focused on enhancing collaboration and communication within NPOs such as charity thrift stores using the PD method and CSCW. Therefore, this study aims to fill this research gap by exploring how PD and CSCW principles can be tailored to the context of NPOs, specifically charity thrift stores, to enhance collaboration and communication among volunteers and staff members.

### III. FRAMEWORK

Effective collaboration demands diverse participation and clear communication, integrating varied perspectives for success [10]. Cultural backgrounds shape communication styles [11]. Shared-space technologies enhance coordination in cooperative work environments [12]. Mixed reality expands collaboration possibilities, reshaping how we understand and model collaborative efforts [13]. Our project leverages mixed reality in a dashboard display and mobile application. Cooperative work relies on communication to determine task significance. Activity theory informs our understanding of human-computer interaction [14].

CSCW is a field of study that looks into individual collaboration and the impact of technology on teamwork. Understanding team member roles, assessing the effects of technology on collaboration, and promoting effective communication are all necessary design principles and guidelines for encouraging authentic teamwork. The location or context of CSCW design is not fixed or predetermined [15] [16] [17].

PD is a collaborative design approach where designers involve end-users in the design process to prioritize their needs and promote empowerment and ownership over technology. PD has been globally implemented and demonstrated its effectiveness in meeting users’ requirements [18] [19]. PD considers users as domain experts, ensuring their crucial role in the design process and producing computer systems that address real-world practical challenges [20]. Designers choose PD for practical or political reasons, recognizing users’ right to have a say in the technology they use [21].

### IV. METHODOLOGY

Our research aimed to develop a collaborative digital platform for charity thrift staff members to enhance their communication, organization, and productivity. The methodology included observation, interviews, and workshops with the staff members. The following sections describe each step in detail.

#### A. Contextual Background of the Thrift Store

The charity thrift store, which serves as the focus of our project, operates as a small organization reliant on the efforts of approximately 30 individuals. Among these workers are individuals of varying ages, with most facing disabilities or illnesses. Operating for four days each week with two shifts, the store undertakes diverse tasks. Initially, workers interact with customers and collect clothing donations, meticulously documenting each item received to ensure equitable distribution. Subsequently, workers transition to the warehouse phase, where tasks include sorting, cleaning, and organizing items. Communication and task management are facilitated through platforms like Facebook, aiding in information dissemination and task coordination. Additionally, workers handle diverse items such as children’s toys, accessories, sports equipment, shoes, and ornaments. Periodic events necessitate enhanced communication and collaboration among staff members. Considering the diverse backgrounds and abilities of volunteers, the development of an accessible and user-friendly collaborative digital platform is deemed imperative for the organization’s productivity and success. Such a platform has the potential to optimize communication, task organization, and overall workplace efficiency.

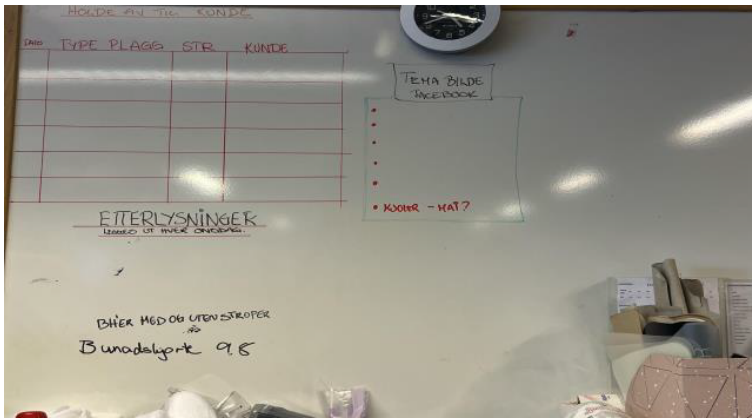
#### B. Initial Discussion

Before engaging in formal data collection, an initial discussion session was conducted to establish rapport and gain an overview of the thrift store’s history, mission, and operational dynamics. A sense of trust and collaboration was hoped to be established with the staff members by authors, through establishing a relationship with them, which was believed to help facilitate the research process.

#### C. Observations

Two observation sessions were conducted to gain insights into the thrift store’s operations. The first session, held after an initial discussion, aimed to validate and contextualize information obtained during discussions. This timing allowed for observations of day-to-day activities, collaboration patterns, and interactions among staff members and with customers.

The second session, conducted after interviews, included a visit to their warehouse to observe activities, collaboration, and cooperation inside the warehouse and between the store and warehouse, and the overall setup of both the warehouse and the store. Activities, communication patterns, and interactions during both sessions, noting any notable behaviors or practices was observed by the authors. During the warehouse visit, it was observed that staff members are using a manual dashboard, including a blackboard and pen to manage their work



(a) Whiteboard



(b) Whiteboard

Figure 1. Manual dashboard inside the warehouse.

schedules and a whiteboard to write their to-do lists. The to-do list included different themed Facebook posts that needed to be posted and a goods holding list for customers. The customer holding list included the date, the type of goods the customer needed, its size, and customer details. Refer to the manual dashboard, as illustrated in Figure 1, observed during the warehouse visit. This observation provided additional insights into the daily operations of the charity thrift store, supplementing the data obtained through interviews. These observations were structured to provide a holistic view of the thrift store’s functioning and complement insights gained from discussions and interviews.

**D. Interview**

The interview was conducted after the initial observation session to gain a deeper understanding of the thrift store’s daily work processes and communication patterns among staff members. To accomplish this, a semi-structured interview was conducted with the founder of the thrift store. The reason for interviewing the founder is the founder’s extensive experience since the store’s inception and their role as both leader and worker.

Pre-prepared open-ended questions facilitated discussions on topics including tasks, workloads, and communication systems used within the store. This approach aimed to uncover challenges, identify opportunities for improvement, and explore potential technological interventions.

The interview was scheduled during a working day at the thrift store and took place in a private room within the store. Throughout the interview, detailed notes were taken, and audio recordings were made to ensure the accuracy and completeness of the data. The interview session lasted approximately 30 minutes.

**E. Workshop for Co-Design**

The workshop was conducted on two different days, with each day featuring different sessions. The first session focused on ideating the artifact, while the second session centered on implementing the ideas generated in the first session. Five staff

members from various roles within the charity thrift store, all above 18 years old, participated in the workshop. This diverse representation aimed to capture unique insights and experiences to enrich the design process. While the selected participants may not fully encompass all roles within charity thrift stores, they were chosen to reflect common responsibilities. An introduction to the research and the goals of the PD workshops was provided to the participants. More details about the workshop are provided below.

1) *Ideation:* After conducting observations and interviews, a workshop was held with the staff members of the charity thrift store, involving five participants. The workshop included the founder of the thrift store and various staff members involved in different activities from different sections of the store. Customers were not included as participants, as the collaborative platform was initially aimed at serving the needs of the store’s staff exclusively.

The main objective of the ideation session was to utilize the information and challenges that the participants shared through interviews and observations to create a possible solution for the thrift store employees, making their work easier and more efficient. Participants and authors engaged in detailed discussions about potential features and technologies. Pen and paper were provided to facilitate the drawing and explanation of ideas and features. Additionally, different types of application examples were shown to the participants to provide insight into possible technologies and stimulate brainstorming.

Through their involvement in the ideation process, participants developed a collective understanding of the platform’s essential features. While they initially expressed uncertainty about their exact needs, they ultimately concluded that an application and digital dashboard would be beneficial for the staff.

2) *Design Implementation:* After the conclusion of the first session, it was collectively decided that what kind of digital tools they will have. Subsequently, a second session was conducted to design these digital tools in collaboration with the staff.



Figure 2. Photos during the workshop activities.

During this phase, a hands-on approach was adopted, using paper and colors to create an interactive environment. Mobile interface-sized paper pieces were provided in green, reflecting the staff’s preference as indicated in the previous ideation session and aligning with the store’s logo color. Additionally, small pieces of paper containing function names suggested by the staff were distributed to aid in the design process. Furthermore, additional A4-sized papers, mobile screen-sized photos, paper pieces to add new features, crayons, colored pencils, markers, pen, pencil, scissors, and a scale were provided to empower staff members to introduce new features or elements to the application. Refer to Figure 2 for photos from the workshop. Though most of the implementation was for the mobile application, for the dashboard, they preferred it the same as the manual dashboard that they were using and only added some other functionalities as they could access the dashboard using their mobile application. This participatory approach aimed to facilitate flexibility in design, allowing for customization according to the staff’s preferences and operational needs.

*F. Ethical Considerations*

Participants were provided with informed consent forms before observations, interviews, and workshops, ensuring transparency and respect for privacy. The consent form outlined the scope of discussions, confidentiality measures, and data handling procedures. These measures upheld participants’ rights and privacy throughout the research process.

**V. RESULTS**

After the ideation session, the team agreed on implementing a dashboard display with a stylus and a mobile application for the charity thrift store. The application offers essential functionalities for collaboration and communication. Particularly, the dashboard with a stylus aims to replace traditional whiteboards and blackboards in the warehouse. The mobile app enables staff to access and manipulate the dashboard, along with other features. Instead of using manual whiteboards and blackboards to keep track of tasks and schedules, workers can write on the dashboard just like they would with a pen

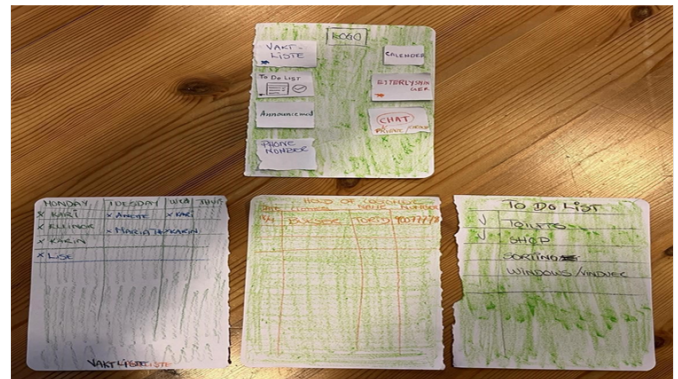


Figure 3. Designed application interface.

and paper. They can easily update tasks, mark off what’s been done, and see what needs attention, all in one place. With the help of mobile app, workers can access the warehouse dashboard from anywhere. Even if they’re not in the warehouse, they can still see what’s going on and add notes or tasks as needed. The team opted for a green color to align with the store logo and specified desired application features.

During the design implementation phase, the team collaborated to design the mobile application interfaces based on staff preferences for color, features, and aesthetics. Figure 3 illustrates the designed mobile application interface. The home page (Figure 4a) showcases various features divided into left and right sections. The left side includes the Work schedule, To-do-list, Announcement, and contact information for staff and officials. The right side contains the Schedule calendar, Etterlysninger, and a chat option. Features marked with a star indicate newly designed interfaces. The Work schedule allows staff members to choose their schedules, similar to Doodles (refer to Figure 4c). The To-do list (refer to Figure 4b) outlines daily tasks. The Announcement feature facilitates event announcements, while including staff phone numbers enable easy communication.

The Schedule Calendar resembles the Outlook calendar for scheduling appointments and tasks. The Etterlysninger feature lists customer requests (refer to Figure 4d), including the date,

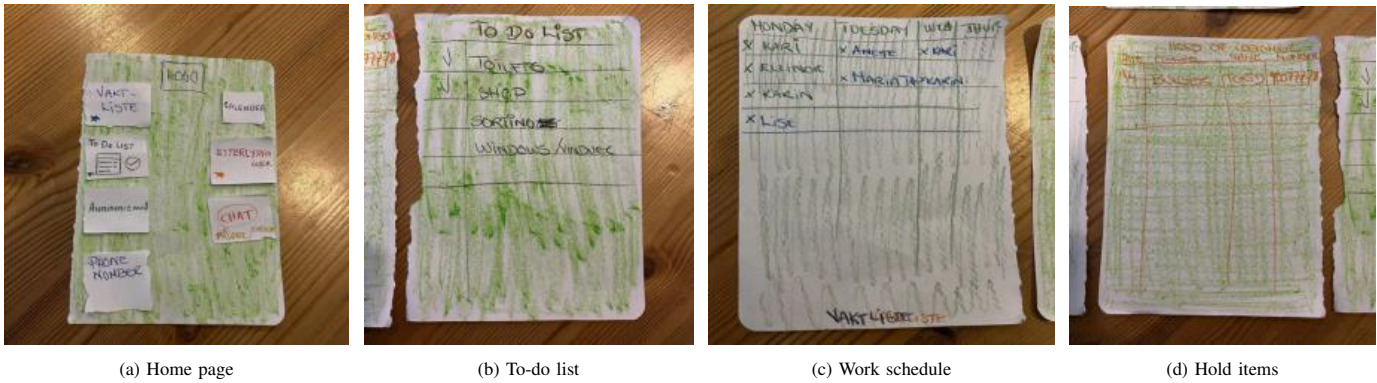


Figure 4. The application interface designed during the workshop.

type of goods, name, and number. The chat option supports both group and individual chats.

Regarding the display with the stylus, staff preferred functionalities similar to their current manual system in the warehouse (refer to Figure 1). Staff can input information using the stylus on the display or through the mobile application, allowing access to information from anywhere without the need for multiple applications or being physically present in the store.

## VI. DISCUSSION

The principles of PD and CSCW as key concepts throughout our study. PD principles guided our approach to engaging charity thrift store staff in the different methods, ensuring that the end-users voices and perspectives were central to the design of the collaborative digital platform. Our goal was to empower and instill a sense of ownership over technology among staff members by actively involving them in the design process. This approach aimed to cultivate a feeling of investment and commitment to the project.

The sequential approach of our observation sessions and interviews provided valuable insights into the activities of the thrift store. The first observation session yielded valuable insights into collaboration patterns and interactions among staff members, customers, and donors. Meanwhile, the second observation session, which occurred after conducting the interview, helped us to learn more about the warehouse operations and the store itself. This sequential approach allowed us to deepen our insights into how the store and warehouse work together.

The initial observation phase laid the base for our interviews with the founder. In the interview, the founder shared the foundation of the store, experiences, store’s functioning, daily work processes, work culture, and the challenges they’ve encountered. Their reflections enhanced our understanding and provided valuable context for the observations made earlier, as well as for the second observation.

In the second observation, it is observed that the staff members use a manual dashboard in the warehouse. Although this aspect wasn’t explicitly mentioned by during the interview, it highlights the practical tools and methods integrated into

their daily work routines. This observation emphasizes the significance of triangulating data from multiple sources to attain a comprehensive understanding of the event [22].

By combining insights from both observation sessions and interviews, we were able to gain a thorough understanding of the thrift store’s operations and procedures. This approach enabled us to capture the nuances of how the store operates on a day-to-day basis, as well as the broader context in which it functions.

After the workshop, collaboratively proposed a solution to enhance collaborative systems within a charity thrift store. That was a mobile application and a digital display dashboard with a stylus. Workers can access and manipulate information using both the mobile application and the digital dashboard, with the latter containing essential features such as a to-do list.

One significant advantage of this solution is its accessibility to workers of varying technological familiarity, as the digital dashboard offers a user-friendly interface, particularly beneficial for older workers. Moreover, the platform grants employees the capability to access the dashboard from any location, harnessing the power of mixed reality technology to facilitate more efficient collaboration and communication. This means that workers can seamlessly interact with the digital dashboard and engage in tasks regardless of their physical proximity to the workplace. By leveraging mixed reality technology, the platform transcends traditional boundaries, enabling employees to collaborate effectively whether they are in the store, at home, or on the go.

Indeed, shared space demonstrates the potential benefits of creating a common information space that promotes collaboration and improves communication among workers. By establishing a shared space and common information, employees can easily access and contribute to a centralized repository of information, facilitating collaboration and ensuring everyone is aware of tasks and progress. This fosters a sense of unity and shared purpose among team members, ultimately enhancing efficiency and productivity within the workplace.

During the PD work, participants expressed enjoyment and effectiveness in being engaged throughout the process, especially during workshops where they had the opportunity

to design their own technology and prioritize their needs and preferences. One member even found it effortless to explain design concepts. This positive feedback from staff members regarding the PD approach underscores the importance of actively involving end-users in the design process of technological solutions. Ultimately, this user-centered solution is poised to enhance their work experience, fostering easier, happier, and more effective work for employees overall.

As the next step, we will conduct separate evaluations for the application and the digital dashboard. First, a high-fidelity prototype of the mobile application will be created and distributed to staff members for a week-long evaluation. During this period, we will provide them with notes to capture any comments or thoughts about the application. Following this evaluation, we will gather feedback, including insights from the provided notes, to iteratively improve the application's performance and user interface. Secondly, we will evaluate the digital dashboard. Staff members will interact with the mobile application, and we will simulate the interaction between the digital dashboard and the mobile application to ensure seamless communication and functionality between the two platforms. Throughout these evaluations, we will focus on assessing various efficiency metrics, such as the time taken by users to perform tasks, user satisfaction levels, and the effort required by users. These metrics will be compared between the existing methods and the proposed platform in charity thrift stores, providing valuable insights into the effectiveness of the digital solutions.

## VII. CONCLUSION

In conclusion, this research paper aimed to develop a collaborative digital platform for charity thrift staff members to enhance their communication, collaboration, organization, and productivity. The research methodology involved several steps, as described in Section 4. The study revealed valuable insights into the daily work processes, communication patterns, and needs of the staff members, which allowed for the identification of potential opportunities for technological intervention. The workshops were designed to involve the staff members in the design process of the digital platform, which resulted in two promising solutions, a dashboard display with a stylus and a mobile application. Overall, this paper highlights the importance of PD in developing technological solutions that meet the needs of users and contribute to their productivity and success.

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