INVENTORY MANAGEMENT AT WACHUSETT

EARTHDAY, INC.

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Abstract

Wachusett Earthday Inc. is a local nonprofit operating the Wachusett Watershed Regional Recycling Center in West Boylston, MA. They do not track their inventory for their Recycled Resource building. The goal of our project was to develop an inventory management system. We conducted interviews, site visits, and created a decision matrix of criteria for an inventory management system. We identified a system for Wachusett Earthday, and created an appropriate implementation and training plan for its successful integration.

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Executive Summary

In light of technological advances in the past several decades, many larger organizations have incorporated information management technology to increase their effectiveness. However, it is sometimes difficult for smaller organizations to take advantage of computer based systems due to the limited availability of human and physical resources. Information management is critical to a business' productivity, performance, and ability to properly manage their information.

Wachusett Earthday, Inc. is an organization that promotes recycling and reuse in their local watershed area. This organization would benefit from an increased ability to track information and manage their volunteer staff. Currently, they are using outdated processes to track inventory.

The goal of this project was to provide Wachusett Earthday with a plan to improve their inventory management. To meet this goal, we developed the following five objectives. First, we determined the organization's requirements for tracking inventory. Second, we identified the volunteers that would be trained most successfully in using a new system. Third, we identified inventory management systems used by other organizations to accomplish similar tasks. Fourth, we determined the suitability of identified systems for use by Wachusett Earthday. Fifth, we created an implementation strategy for Wachusett Earthday's volunteers so that benefits from our recommendation would be effective and sustainable. These objectives were met by employing specific social science methodologies.

The conclusions that we have made based on our research are as follows:

1. Wachusett Earthday requires a point of sale system that can export reports and is expandable.

2. Five volunteers could be trained successfully.

3. We identified seven inventory management as potential systems to be adopted by Wachusett Earthday.

4. ThriftCart and ShopKeep were found to be the two most appropriate inventory management systems for Wachusett Earthday and they ultimately chose ThriftCart.

5. In order to successfully implement ThriftCart, Wachusett Earthday needs to complete the following steps:

    1. Inform Wachusett Earthday visitors and volunteers about the installation of our recommended inventory management system, and any policy changes as a result of the installation.

    2. Rearrange the ReUse building's layout to address the installation of our recommended inventory management system.

    3. Purchase and install our recommended inventory management system and associated hardware.

    4. Train volunteers to use our recommended inventory management system.

    5. Incorporate our recommended inventory management system into Wachusett Earthday's workflow.

With the recommendation and implementation plan that we provided, Wachusett Earthday should be able to successfully integrate a point of sale system into their operation. The system will be able to provide data on the items that are leaving the ReUse Building. These data will provide evidence of their impact to potential donors, and could help the organization obtain more funding. In summary, a proper inventory management system should prove to be immensely beneficial to Wachusett Earthday.

1. Introduction

Modern technology allows organizations to implement more effective means of managing information. The benefits good data management have on an organization can be profound and improve its ability to operate effectively (Angeles, 2015). However, many organizations still struggle with implementing systems to adequately track and manage information. This means it can be harder for them to track inventory, other relevant information, and thus their progress. Small nonprofits, in particular, often have a difficult time using technology to its fullest potential.

Wachusett Earthday, Inc. is struggling to incorporate technology into their day-to-day operations. This organization manages a Recycled Resource building within its recycling center that takes in items that are still in good condition that can be used by other people (Wachusett Earthday, 2016). Currently, they are not able to track any of the inventory coming in and out of the Recycled Resource building, colloquially known as the ReUse building.

Current research in the general field of data management has focused mainly on large corporations and the systems they use to effectively track their information. Many organizations are known for having a large inventory and have nearly perfected systems of managing inventory including The Home Depot and Walmart (Tepper, 2016; Greenspan, 2015). These organizations generally use point-of-sale systems to accurately track inventory. In smaller organizations, inventory management programs like ThriftCart, ShopKeep, and NCR CounterPoint, among others, are used.

Research on how small organizations can utilize inventory management systems efficiently is limited (Trade Gecko, 2016). Few small organizations publish documentation describing the systems that they use for this task, or the amount they spend on these systems per year. Information on how these organizations can implement such systems and train their people

to operate them is also not available. In Wachusett Earthday's case, research on how the organization can properly track inventory in their Recycled Resource Building has not been performed. The fact that they use an all-volunteer staff, provide entirely free shopping, and routinely experience a high volume of items entering and exiting the building makes their situation especially challenging (N. Chanis, personal communication, November 9, 2016). As a result, Wachusett Earthday wants and needs to determine ways to better track the inventory that they have been trying to manage.

The goal of this project was to provide Wachusett Earthday with a recommendation that would allow them to improve their inventory management. To achieve our goal, we accomplished the following objectives:

1. Determine Wachusett Earthday's inventory tracking requirements;

2. Identify the most technologically able volunteers at Wachusett Earthday;

3. Identify appropriate inventory management systems for Wachusett Earthday;

4. Determine the suitability of identified systems for use by Wachusett Earthday;

5. Create an implementation strategy for Wachusett Earthday.

To meet these objectives, we employed interviews, direct and participatory observation, a thorough literature review, and a simple cost-benefit analysis. We evaluated potential systems and made a well-informed recommendation to Wachusett Earthday that should improve its ability to manage information more efficiently. If Wachusett Earthday incorporates technology into their data management, then they should be able to operate more efficiently and have more accurate data to present to funders. Furthermore, the results of this research could be extended to other small organizations and nonprofits facing similar problems.

2. Background

In order to help Wachusett Earthday improve its operations in West Boylston, this chapter provides information on ways to address and improve on inventory management. Specific software programs designed to track inventory and process sales are described along with information on the acceptance of new technologies by staff who may not be fully trained to do so. We discuss the methods other organizations use in order to manage their inventory as well as the difficulties they face trying to incorporate any new technologies to improve their systems. Overall, this chapter provides a theoretical framework for our project.

2.1 Inventory Management

An inventory is a "stockpile of goods stored in anticipation of future demands" and inventory management is "the process of managing the quantity and timing of the replenishment of stored goods, while satisfying demands adequately and economically" (Gürler & Berk, 2014, para. 1). Organizations that have complete inventory management systems are usually businesses that sell consumer goods, like a food market or department store (Johansson et. al., 2009).

Retail businesses today generally utilize a point-of-sale (POS) system to manage their inventory. Customers are directed to point-of-sale terminals where they can check items out of a business' facility (Johansson et al., 2009). These terminals are typically equipped with a barcode scanner and deck area to hold items temporarily. The presence of the barcode scanner is primarily due to the prevalence of the Universal Product Code (UPC). This coding system was largely adopted in the United States by 1980 after International Business Machines (IBM) performed a cost-benefit analyses on the adoption of UPC by businesses (Milne, 2013). The Universal Product Code and its European counterpart, the European Article Number (EAN), are

barcode symbols that assign unique numerical identifiers to items (Reilly, 2003). They are currently maintained by the international, non-profit organization Global Standards One (GS1) (2016) and are widely accepted throughout the world. A point-of-sale terminal would recognize an EAN/UPC label, determine what item it is associated with, and increase or decrease the recorded quantity of that item in the store's inventory, as needed.

Organizations can use their own methodology for item identification, which is known as a stock keeping unit (SKU). Like EAN/UPC, a SKU is a symbol that assigns a unique identifier to each item (Agarwal, Shroff, & Malhotra, 2013). Unlike EAN/UPC, it is only standardized by individual organizations and therefore can only assign identifiers to their respective inventories. Because a specific stock keeping unit is maintained by a single organization, that organization can not only associate a SKU identifier with an item's name, but also the item's manufacturer, cost, and other item attributes that they may want to keep track of.

Documented research on how inventory management is performed by nonprofits is insubstantial. While several large nonprofits, such as Habitat for Humanity, Goodwill, and The Salvation Army have effective inventory management systems in place, literature explaining specifics about their procedures is not available. What is known, however is that these organizations tend to use commercially available systems (Goodwill uses NCR Counterpoint, Habitat for Humanity uses ThriftCart) and supplement additional needs with programs such as Microsoft Excel and Google Drive (D. Hoak, personal communication, January 23, 2017).

2.2 How Modern Organizations Manage Inventory

There are a number of different processes and software that companies use to manage their inventories. Companies like The Home Depot and Walmart are on the cutting edge of this field (Soni, 2015). This is because these companies have hundreds of stores across the United States, all with large inventories and a need to avoid stock outs and eliminate slow moving items.

The Home Depot adopted a new inventory management system in 2015, with the goal of decreasing the amount of time and energy spent processing and moving new inventory (Tepper, 2016). In 2015 a year-long pilot of the new supply chain software, nicknamed Project Sync, was launched. This software allows The Home Depot's warehouse workers to more efficiently move inventory from delivery trucks to their final shelves. Workers log into a database via desktop or mobile device and can then see what is on every inbound truck. The program reports exactly how many cartons and pallets are necessary for bringing the inventory from the trucks into the store. It also provides the workers with a diagram of how to place the carts and pallets to reduce employee footsteps. According to Marc Powers, Executive Vice President of U.S. Home Depot Stores, over the year the system was in a pilot phase, it reduced 90 miles of walking for each receiving associate.

Several crucial benefits came with this improvement in inventory management. Because the software reduces the touches and movement of each product, the number of damaged goods decreased (Tepper, 2016). The Home Depot is also hoping that this software will allow them to increase their inventory turns from 4.8 times to 5.7 times by the end of fiscal 2017, according to Carol Tom, Chief Financial Officer and Executive Vice President of Corporate Services. An inventory turn refers to the number of times a retail location replaces its entire inventory. Overall, this decreases the company's costs, which allows the company to pass the savings on to their customers. The Home Depot is also ahead of the industry when it comes to their inventory outflow. They use a highly customized point-of-sale system that is a combination of technology from Microsoft, NCR, Fujitsu, and 360 Commerce. Additionally, they provide options of mobile payments in partnership with PayPal, to increase speed and efficiency.

Walmart is another company that is a leader in the retail world, and many experts believe that advanced inventory management is the core reason for this leadership position (Greenspan,

2015). The company employs a vendor-managed inventory system, which means that the vendors are the ones that decide when to send additional goods to Walmart stores and warehouses (Frahm, 2003). Walmart provides an information system to their vendors, who can then use the data to see current inventory levels and the rate at which certain items are selling. Once the vendors decide what items to send, Walmart controls the actual delivery of goods from warehouses to their stores. This system helps to limit delays in inventory movement as well as cut costs for Walmart, as they do not need to spend time managing each supplier's goods. Instead, the suppliers assume these costs. In addition to their inventory stocking systems, their new system, called the Walmart My Productivity App, is a comprehensive inventory tracking application. It allows store managers to perform all necessary tasks on the floor. This includes tracking real-time sales data and trends and even answering customer questions. Having this real-time sales data allows them to make necessary adjustments by manning particular store sections with employees to keep sections up to date and matching customer demands. With their effective inventory techniques, Walmart and The Home Depot are able to successfully meet the needs of their customers and receive the information they need to be successful.

While The Home Depot and Walmart have far more resources and very different needs than small nonprofits, they still provide a good example to examine. In the case of Walmart, their vendor controlled inventory management system, could be converted into a "donor" controlled system. This would mean that the donors would be responsible for reporting what they are bringing to the store and when they are bringing it. This could be accomplished via an online form or email. If, for any reason the donor cannot or does not want to fill out an online form, then a form describing the contents of their donation could be filled out on site. This on site completion would eliminate the possibility of knowing when the donation is coming, but it still helps to identify what is being donated.

In the case of The Home Depot, their system demonstrates the importance of organization and precision. While the actual system would be almost impossible to implement at a nonprofit receiving random donations, it could be used as a model to increase efficiency. By decreasing the number of moves an item makes, the organization would be reducing stress on their workers as well as saving time. The Home Depot's Project Sync proves that time spent in planning and organizing will pay dividends for an organization.

Organizations smaller than the Home Depot and Walmart have also adopted software to manage their inventories. Habitat for Humanity MetroWest/Greater Worcester is a local, volunteer-run affiliate of Habitat for Humanity International, which operates a thrift store known as the ReStore (D. Hoak, personal communication, January 23, 2017). This store is currently transitioning into using their new point of sale (POS) system: ThriftCart. The hardware used to support this software consists of touchscreen monitors, computers, label printers, and barcode scanners. The organization uses the system to manage the inflow and outflow of items at the store. First, donated items are brought into a specific area of the store only accessible to staff and volunteers. While in this area, volunteers sort items, determine their prices, and mark them in an appropriate manner. For items that are less than $10, a price gun is typically utilized to indicate the cost of an item. For items that are over $10, a barcode is printed for that item through the ThriftCart system, and the item becomes recorded in their digital inventory. For items that are similar in type but differ in content (e.g. books vs. magazines, different sized paints, etc.) signs are placed near the location of said items that indicate how the prices differ for them (e.g. large cans of paints costing more than smaller cans).

ThriftCart records all transactions when these items are sold, so that the information can be used later to analyze the building's outflow of items (D. Hoak, personal communication, January 23, 2017). If the item has a barcode label, it can be scanned using the barcode scanners.

Otherwise, the item can be manually selected in the ThriftCart program's inventory list. Currently, only the director of the ReStore, Deborah Hoak, and the owner of the ThriftCart software system, Michael Nehring, are able to change specifics within the program and access the analytical data. Other selected volunteers are trained to use the system only to process transactions.

The Clark Community Thrift Store is another small non-profit organization that is similar in situation to Wachusett Earthday. They collect donations from the community for which other members of the community can shop. Despite this overarching similarity, its situation is very different from Wachusett Earthday. First, they charge for their goods. Second, the flowrate of items is dramatically different from that at Wachusett Earthday. This latter difference is the reason The Clark Community Thrift Store can use Microsoft Excel as its POS and inventory management system. Since the flowrate is so much slower, they are able to afford the slightly slower and more manual workflow and use the generic and universal Excel software.

2.3 Change Management

Change management principles are important for businesses and organizations of all sizes to consider in order to properly and successfully implement a change in the way they operate. It is defined as a structured approach to shifting or transitioning individuals, teams, and organizations from a current state to a desired future state (Tamilarasu, 2012). Change management begins with systematic diagnosis of the current situation in order to determine both the need and capability for an organization to change. Once need and capability are ensured, an organization can begin to make a plan to implement a change. Most humans naturally prefer predictable and stable situations and therefore avoid situations that might upset their perception of order or threaten their self-interests. In the case of an organization making a policy change, a disruption of the flow of events they are used to, due to the implementation of new system, will

disrupt their perception of order, even though order is still in fact maintained. Additionally, if a new system is implemented that may take more time could threaten customers or employees self-interests. For these reasons, principals of change management must applied to make implementation of change as fluid as possible, with the least amount of adverse feelings from those involved.

It is critical that both the employees and the clients buy into a change in an organization and ultimately be able to implement the change. There are two main principals of change management that directly concern these matters (Tamilarasu, 2012). Firstly, effective communication should inform all stakeholders in the overall operation of various aspects of the change. This includes the reasons for making the change and the benefits it will bring for both all parties. Additionally, the details of the change should be conveyed effectively including when the change will take place. Secondly, effective education and training must be provided to those that will be implementing the change. This ensures that the change will actually be able to be implemented. After an organization decides that there is a need to implement a change, understanding and applying these principals make this implementation more efficient and successful.

2.4 Training Older Adults to Use New Technology

Although technology is becoming more accessible, it can be difficult for older adults to learn how to use this technology (Aberton, 2006). Adult learners have different needs than younger individuals. As the demographic of "over 45 or 50 year old beginners" has grown, research in training older adults to use technology has become more extensive.

Older adults have certain limitations in learning about technology (Heaggans, 2012). Older adults learning new technologies may be prone to computer anxiety (Bikson & Bikson,

2001).   Therefore, these adult learners may initially perceive themselves to be incapable of performing tasks with technology.

As we age, our cognitive processes become slower. In computer learning classes, older students had more difficulty performing previously learned tasks if it included 3 or more keystrokes and also had more difficulty remembering previously viewed pages. This can be attributed to decreases in working memory (Mayhorn et al., 2004). Working memory is a series of cognitive functions that temporarily stores and manipulates information gathered from immediate observations. A person uses working memory to follow instructions, but if their working memory is limited, they will have trouble remembering what tasks they have performed before in order to fulfill the next one. Some software addresses deficiencies in working memory by employing human-computer interaction principles. These principles include minimizing information access cost, where frequently accessed information should be easily assessable, and the proximity compatibility principle, where similar information should be associated with each other (Wickens et al., 2004).

If older adults reach out to instructors to learn new technologies, these instructors should not assume the extent of the learners' abilities; instead, they should identify and support the diversity of their skills (Aberton, 2006). When instructors teach older adults in a classroom setting, the social aspect of learning should be emphasized and encouraged though group learning and interaction. Instructors should have extensive knowledge of appropriate methods for skill development and apply them to the learners individually based on their current experience, knowledge, and skill. Teachers must also be sensitive to these individuals' experiences and abilities and recognize that emotional responses can occur during the learning process. Adult novices also respond well to rewards throughout the program. Lastly, trainers should be very careful to not include an extensive amount of technical jargon. The students and teachers should

naturally develop a shared collection of resources, routines, and vocabulary. When everyone is on the same page, explanations and learning becomes much more efficient.

Two librarians from the Worcester Public Library who teach computer education classes to novices, Ms. Howley and Ms. LeMay, provided several important items regarding adult education. One of the most common difficulties encountered by those who teach senior novices how to use unfamiliar technologies is lack of education. In the modern day, students are being taught basic computer skills as early as elementary school. Older adults, however, were not provided this educational experience in their youth. This gap in experience between older individuals and today's youth can result in older individuals developing inferiority complexes, making them feel illiterate when compared to today's more technologically fluent youth (V. Howley, personal communication, February 8, 2017). Due to this lack of self-confidence, adult learners become more averse to technology and don't believe that they are able to learn the skills required to use it.

When talking to the librarians at the Worcester Public Library (WPL), we also learned that a large amount of the effort they put in to teaching adults was overcoming this fear. One of the most basic techniques implemented by these training experts was keeping it simple when first beginning training (V. Howley, personal communication, February 8, 2017). This allowed individuals to become more comfortable with the technological medium they were using before they began to perform more complicated tasks. A strategy recommended by the representatives at the WPL was allowing adult learners to play games on the device they are learning to use. By starting off with a more engaging and less complicated task, the librarians were able to assist many individuals in taking their first step into using technology and becoming less averse to it.

A consistent stream of communication was also something that was deemed necessary in adult education (J. LeMay, personal communication, January 30, 2017). This includes both

recognizing when individuals have made progress in learning and allowing them to ask questions whenever they feel the need to. This constant communication allows for clarifications to be made and instills more confidence in the student. The students are then able to develop a better understanding of the task at hand. Additionally, it was emphasized to us that we should assume nothing when conducting training. We are not aware of the extent of someone's knowledge and should treat every individual in the same fashion by ensuring that all instructions are detailed and suited to the most basic level of learning.

2.5 Technology Adoption

Given how frequently new innovations in technology are appearing each year, researchers have tried to define and refine the technology adoption life cycle. Moore (1999) describes it as "a model for understanding the acceptance of new products" (p. 9). Moore also claims that potential adopters of a technology can be categorized into five groups: innovators, early adopters, early majority, late majority, and laggards.

Small organizations tend to fall within the latter three groups, because they often do not have extensive experience working with the technology they are looking to adopt and/or they do not have trusted references to acquire support to operate the technology (Moore, 1999). This creates a gap between early adopters and the early majority within Moore's revised technology adoption life cycle. Figure 1 below is a visualization of Moore's revised technology adoption life cycle; it depicts the rate at which customers adopt a technology over time. As you can see, the rate drops when early adopters are adopting the technology. Only when more support for the technology has been acquired (e.g. more thorough documentation, developers addressing problems reported by innovators) does the rate of adoption begin to rise again.
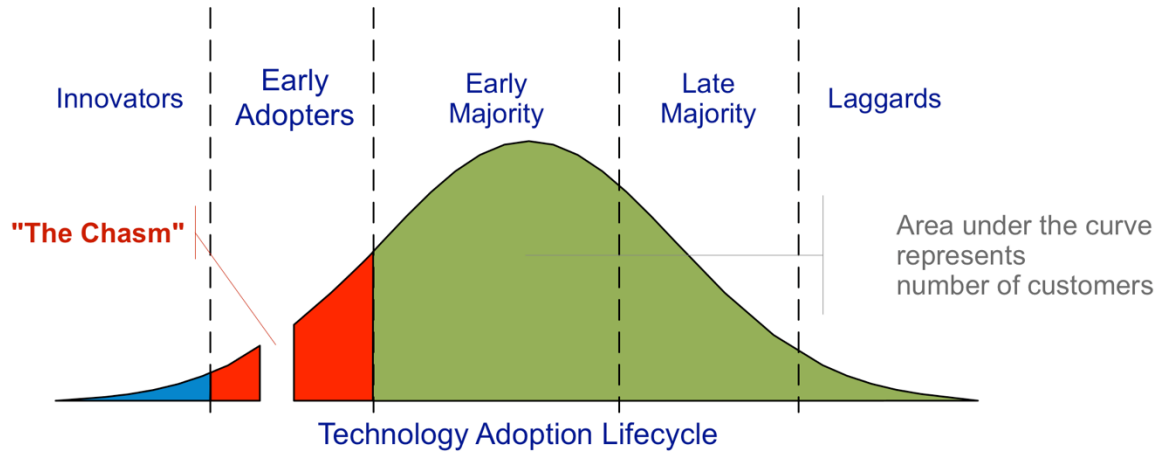
Figure 1: Moore's Revised Technology Adoption Lifecycle (Chelius, 2009)

The financial resources a group has also may play a big role in how quickly individuals and organizations adopt new technologies. In section 2.5 we mention this lack of capital is what generally holds small organizations back from adopting new technologies.

Research has been conducted on identifying what factors determine whether an individual or organization adopts a technology. Davis (1989) proposes that individuals and organizations will usually determine the perceived usefulness of a technology as well as its perceived ease-of-use before adopting it. Some researchers have gone further to suggest that certain demographics have additional criteria to determine whether they will adopt a technology. For example, Lee and Coughlin (2015) list an additional eight criteria that seniors may use when determining whether they will actually adopt a new technology: affordability, accessibility, available technical support, social support from family and peers, emotion, how the technology affects the public perception of the recipient, prior experience with the technology, and confidence.

Affordability is often a factor when adopting new material and processes into one's life (Lee & Coughlin, 2015). If someone cannot afford the price, then the technology cannot be adopted regardless of the other factors. Accessibility is also a factor because the technology

needs to be convenient for them to use in their lives. As many senior workers are less familiar with modern technology, availability of technical support is critical because they will need to be trained and assisted if troubles with the technology arise. Having an appropriate support system from their social lives is also a factor. If the technology at hand is something their friends, children, or grandchildren may be using, they are more prone to adopt it themselves. Emotion is a less straightforward factor but is important when considering technological adoption. In order to have successful adoption, the user must be emotionally pleased with the experience of using the technology, from the interface itself to the communications that accompany it. Prior experience with technology is also critical, as the more familiar users are with the technology, the more likely they will adopt it. Lastly, confidence is a variable in senior technology adoption. Potential users must be confident in their ability to use the technology in order for it to be the most effective. They must also be confident in the technology's ability to do the expected tasks and help the users in their lives.

2.6 Obstacles to Modern Technology Adoption for Small Organizations

Small organizations, especially nonprofits, face difficulties when introducing new technology into their organizations; however, if small organizations can successfully utilize new technology, they can improve their operations considerably. Nonprofit organizations are working at a time of heightened scrutiny, higher demands, fewer resources and increased competition (Hackler & Saxton, 2007). They have limited financial resources at their disposal, which makes obtaining new technologies difficult as the cost of these systems is always increasing. Challenges also come from having a predominantly volunteer staff, which makes finding workers with the ideal skill sets more challenging (Salamon, 2015). This also makes acquisition of new systems difficult because training people to use them can be time consuming (Lee & Bhattacherjee, 2011). In general, this lack of expertise and resources discourages many

organizations from pursuing more modern systems even before exploring the feasibility, possibilities, and benefits of using technology (Kim, Mankoff, & Paulos, 2014). Smaller organizations often feel the threshold for adopting new technologies is too high, and this acts as a barrier to its implementation.

Adoption of technology can enhance organizational capacity and empower nonprofits to provide better services to clients, fundraising, raising awareness, and conducting outreach (Kim et al., 2014). However, nonprofits have been slow in adopting emerging technologies despite the potential benefits. Currently, data is often collected by small nonprofits using a combination of pen and paper and information technology. Pen and paper are commonly used because of volunteer familiarity, but this method of data collection is flawed for several reasons. First, this method is time consuming, as the data must be organized or imported into another database to be useful. Second, it is prone to human error. Handwritten notes can be difficult to read and can be entered into databases incorrectly. Information technology allows nonprofits to address these issues, but improving an organization's technological infrastructure is a considerable undertaking. Successful implementation of information technology increases administrative effectiveness and can reconfigure a nonprofit's structure and working relationships (Hackler & Saxton, 2007). Having more information at an organization's disposal to share within the organization and with other external constituents provides them with more opportunity than if this information were not present.

2.7 Inventory Management at Wachusett Earthday

The current system for managing inventory at Wachusett Earthday starts at the drive-in entrance (N. Chanis, personal communication, November 14, 2016). Patrons are asked what town they are from and what items they have as they head towards the Reuse Building. The more important information recorded about items is the price to dispose of materials that require

special disposal methods. Wachusett Earthday records this information to determine which towns are using the organization's services the most. They present this data to the partnering towns to receive appropriate and fair funding based on the numbers. All of this information is currently recorded using paper and pencil. The written data is later entered into an Excel spreadsheet. The Wachusett Watershed Regional Recycling Center did not house a computer at the time of our research; therefore, data input has been done off-site.

Wachusett Earthday's current systems for managing item flow have some major drawbacks (N. Chanis, personal communication, November 14, 2016). When examining the method used to track donations of goods, there are many details that can be seen as inefficient. For example, having to re-record paper data into an off-site computer is very time consuming, and the data can easily be misplaced in the transition from physical to digital form. Personally asking patrons what items they have when entering the facility is also a flawed process and has been recognized as such by the organization. Some individuals who donate things hide items (e.g. small appliances and electronics) under larger pieces to avoid the additional costs charged for materials that require more involved disposal processes.

Although the organization is aware that their system could be improved, they have not had the time or resources to remedy the problem (N. Chanis, personal communication, November 14, 2016). With their limited staff, Wachusett Earthday is unable to fully serve the public throughout the week. The volunteer staff mainly consists of those between the ages of 40 and 70. Due to the center's limited hours, the workers' priorities focus on serving the hundreds of customers who flow through the facility during operating hours and on the work required to clean up and sort items after hours. With the amount of time they are putting into keeping the facility running in the most efficient manner they can, they don't feel they have the time for a

revamp of their current systems without the help of a third party. As a result, they contacted the Worcester Community Project Center to receive the assistance of WPI students.

2.8 Summary

It is important to be aware of inventory management as a concept and how specific organizations accomplish it, especially in nonprofits. The cycle and process of technology adoption, particularly in the cases of small organizations and nonprofits, is important to consider, as this was the current situation at Wachusett Earthday during the time of our project. Additionally, understanding the key points in adult training is important in being able to create a strategy in regards to learning new technology. In the next chapter, we will describe how we achieved our goal of helping Wachusett Earthday improve their inventory management.

3. Methodology

The goal of this project was to provide Wachusett Earthday with a recommendation that would allow them to improve their inventory management.

Our measurable objectives were:

1. Determine Wachusett Earthday's inventory tracking requirements;

2. Identify the most technologically able volunteers at Wachusett Earthday;

3. Identify appropriate inventory management systems for Wachusett Earthday;

4. Determine the suitability of identified systems for use by Wachusett Earthday;

5. Create an implementation strategy for Wachusett Earthday.

The methods described below were designed to help us achieve these objectives.

3.1 Determine Wachusett Earthday's Inventory Tracking Requirements

Wachusett Earthday explicitly stated that they wanted a way to track items in their ReUse Building, but we needed to determine the requirements any proposed system would need to meet. To accomplish this, we observed how Wachusett Earthday's recycling center operated during open hours, tracked the numbers of visitors and items entering and exiting the store, and conducted interviews with members of Wachusett Earthday. Ultimately, this would provide us with a reference to refer to when selecting inventory management systems to evaluate.

We went to the ReUse Building within the Wachusett Watershed Regional Recycling Center and observed how it operated when open to the public. We examined how items were checked into the ReUse Building and tracked the number of visitors and items entering and exiting the store. To accomplish this, one member was stationed at the center's check in counter and recorded on a spreadsheet the number of items each customer donated. A second group member was stationed at the exit and surveyed the customers leaving the building to get an

estimate of the number of items each left with. We performed these observations on three separate days, which allowed us to obtain a sufficient amount of data. By focusing on this facet of Wachusett Earthday's operations, we determined the scale of the inventory management system that we should propose, ensuring that someone could process items with appropriate speed and sufficient volume.

Our group also participated as volunteers at Wachusett Earthday. As we performed the duties of a volunteer, we held conservations with actual Wachusett Earthday members and asked them to share their thoughts on the organization. To gather more information on the specific needs of Wachusett Earthday, we interviewed Ms. Norma Chanis and Mr. Mark Koslowske. The protocol for these interviews can be found in Appendix F.

We took notes on our observations and conversations and compiled them into a Word document where we could reference them in the future. By storing these notes in a Word document, we had a digital file that all group members could access and update at any time to ensure that our recommendations were necessary and adequate.

3.2 Identify the Most Technologically Able Volunteers

Wachusett Earthday's capability to implement our recommendations ultimately depended on their volunteers' ability to operate our recommended inventory management system. The average age of the volunteers inside the ReUse Building is 65 and the volunteers' proficiency in using information technology might therefore have been less than that of younger individuals. To determine how comfortable the volunteers were with using technology, we contacted volunteers who worked inside the ReUse Building and held interviews with them.

We interviewed 20 volunteers who work inside the ReUse Building and asked questions concerning the volunteers' technical abilities. The protocol for these interviews is outlined in Appendix D. Notes on each interview were recorded in a Word document and analyzed to

identify the most technologically able volunteers. These qualitative data were analyzed using content analysis. To do this, we transferred our data into comprehensive interview notes. These notes were compiled in individual Word Documents labelled with a number corresponding to a specific volunteer in order to maintain anonymity. We coded our interview data and segmented key phrases into specific categories: Programs, Platforms, and Experiences.

These categories were considered equally necessary in our attempts to quantify a volunteer's technological aptitude or capacity. The programs category objectively let us determine the volunteers' previous exposure to using specific applications. Keywords in the Programs category included any technology based application with the caveat that the Word, Excel, and PowerPoint bundle was regarded as a single program. Other programs included email, and special applications used in the work place. The number of keywords in this category determined the magnitude of each individual's category score.

The Platforms category was out of three points with a point given for each hardware platform to which the volunteer had been exposed to out of computer, tablet, and smartphone. This category was important to us because our recommendation may be used on any of these platforms and possibly evolve from one to another throughout its time in use.

The Experiences category recorded the number of unique education and career oriented experiences the volunteer has had. If these education and career oriented experiences were technology based, each counted as double. The experiences category was important because it showed us the amount of professional learning experiences an individual had, which may increase a volunteers' ability to learn a new program or system for Wachusett Earthday.

The number of keywords in each category for each interviewee was totaled and divided by the maximum score in each category. This ensured that each category was weighted equally with the maximum category score being one in each category. All category scores were added

together for each person where the maximum score an individual could obtain was a 3. The individuals with the highest overall scores were determined to have the greatest technological aptitude and would be more able to learn and use technology in the work place.

3.3 Identify appropriate inventory management systems for Wachusett Earthday

Many organizations have employed systems to track inventory. We identified some of those systems and determined how they were appropriate for each organization's needs, so we would be able to identify an inventory management system that was appropriate for Wachusett Earthday. In order to do this, we scheduled visits with organizations similar to Wachusett Earthday and analyzed what systems they had in place, how they were employed, and how effective they had been.

We reached out to the following organizations: the Clark Community Thrift Store, Habitat for Humanity's ReStore in Greater Worcester, the Goodwill Store in Worcester, and The Salvation Army. These organizations were selected because, like Wachusett Earthday, they take donations from the community and then offer the donations as products for their customers. They differ from most organizations, as they receive a large and entirely unknown inventory that must be sorted and processed before going on the shelves. These specific organizations gave us insight into the challenges of managing such an inventory. Additionally, the information we gathered detailed the requirements of a system necessary to manage this inventory.

We interviewed representatives of those organizations who oversaw the operation their respective inventory management systems. We asked questions that were meant to evaluate their inventory management systems, including the exact software that was being used, why it had been selected, how easily the employees/volunteers could operate it, and the initial and annual costs incurred. The protocol for these interviews can be found in Appendix C. Information

gathered from our interviews was entered into an Excel spreadsheet, allowing the systems at each organization to be compared in a single location. The columns on this spreadsheet included: name of organization, name of software, initial hardware cost, annual cost, average employee training time, and user interface. By examining this information, we were able to determine which systems could be appropriate for Wachusett Earthday's needs.

Additionally, we performed a literature review on inventory management systems that are commercially available to small businesses. Systems were identified and researched online, and similar information that was collected during our site visits was recorded. This information was collected through product websites, customer reviews, and by contacting the companies that develop the products. This information was then entered into the same excel spread sheet in order to provide a larger base from which to choose a single system.

3.4 Determine the suitability of identified systems for use by Wachusett Earthday

To determine the suitability of the inventory management systems we identified, we created a decision matrix. This matrix included categories that were ranked 1 through 10 based on how important we determined they were. Each system was then ranked 1 through 10 in each of these categories. To determine the final score for each, the category scores were multiplied by each categories' respective multiplier and then all of these numbers were totaled together. The two highest scoring programs were then selected to be recommended to Wachusett Earthday.

The categories included annual cost, hardware platform options, user interface, customer service, customer rating, and features. User interface ranked the highest with a score of 10, because any proposed system would have to be intuitive and easy to use so that it could be implemented quickly at Wachusett Earthday. The better the user interface, the faster items can be processed out of the store, which is a critical criterion for Wachusett Earthday. The scores for

each software were based on live demos we watched, free trials and testimonials from actual customers.

The second highest ranked was "Customer Service", which scored a 7, as Wachusett Earthday will need reliable support if they ever encounter an issue with the system, have a question on how to perform an operation, or wish to expand the system capabilities. The ratings for each of the programs was determined on customer testimonials, the amount of online resources available, and our personal interactions with each company. We recorded how long it took for them to answer our emails, how well they addressed our questions and concerns, and whether or not we were able to speak with associates.

The next category was "12 Month Cost" with a rating of 6. This cost represents the price incurred by a company for the software over the first 12 months. To determine the software scores in this category, we implemented a scale where $1000 per year scored 0 and $0 a year scored 10. For example, our most expensive system was $990, so to calculate its score this price was subtracted from $1000, yielding $10. This number was than divided by $100. This gave us the final score for the system, which was .10. The generic formula we developed to calculate each system's score can be seen below in Figure 3. In this equation, a represents a system's cost during the initial 12 months, and A represents the system's category score

$$\$\frac{1000 - a}{100} = A$$

Figure 2: Equation to Calculate "12 month Cost" Score

The next category was features which was also rated at 6. This category examined how many usable features a software had. Specifically, we looked at features that would be used by Wachusett Earthday both immediately and in the future as the organization grew their inventory management. Features that we looked for were barcode printing and scanning, customer

tracking, inventory creation and tracking, automatic reporting, and donation drop-off scheduling. Each of these features was worth two points

The final categories were hardware platform options and customer rating, which were both ranked at 5. The hardware platform options category represented how versatile the programs were in terms of what platforms they could be used on. A system that could operate on any computer and any tablet received a rank of 9. Systems that could operate on either tablets or desktops on only one operating system, scored a 6. Systems that could only operate on one hardware platform and one operating system received a 3.

The customer rating category was chosen because we thought it was important to review current and past operators' experience with these systems. Some systems, however, had more user reviews than others. The score was limited to 5 so that it would not skew the results heavily. The ratings for each system were determined by taking their average rating out of 5 stars and multiplying it by 2 so that it would be on a 10 point scale.

Once all of the scores were calculated and the ratings for each systems were totaled, the two highest scoring were selected. All of the research was compiled on each system into a single packet. This research included description of the software, key features, price, hardware compatibility, customer testimonials, and screenshots of the user interface. These packets were then presented to our sponsor, along with a live demo of the system, so that they could determine a system with which they wanted to move forward. These information packets can be found in Appendix P.

3.5 Create an Implementation Strategy for Wachusett Earthday

In order for our chosen system to be successfully implemented, a proper plan and training strategy was required. In order to determine what to include in this implementation plan, we performed direct and participatory observations, interviews, and literature reviews.

We performed direct and participatory observation to see if any changes would be necessary in the overall customer flow at Wachusett Earthday. We performed these observations with the expectation that a new check out system would require more time and therefore increase congestion in comparison to the current process in place. The direct observations included watching the current entry and exit point and seeing where congestion occurred. We also observed how items were brought in and out, and the difficulties with Wachusett Earthday's process at that time. We performed participatory observations as volunteers to understand how these issues affected the workers, as well as how future changes would address this. Additionally, we interviewed Ms. Chanis and Mr. Koslowske of Wachusett Earthday to gather their thoughts on the process a new checkout system might entail. The protocol for these interviews can be found in Appendix F.

To evaluate the data we collected, a two-column table was created to indicate the pros and cons of Wachusett Earthday's current method for item processing. This table allowed us to more easily view what aspects of the current system should be retained and what areas needed to be addressed in the new plan.

Additionally, literature review on organizations implementing new systems into their daily operations was performed to see if there were any strategies to making a transition to a new system as smooth as possible. Research on change management is extensive and reviewing this information allowed us to take into account the necessary principles on the matter. This literature review can be found in Section 2.3.

To understand overall themes and to provide a theoretical framework on adult learning, we reviewed literature on adult training programs. Because most of the volunteers inside the ReUse Building are over 65, it was important for us to determine how senior novices could be successfully trained to use information technology. To gather additional reputable information

on this matter, we contacted three organizations dealing with adult education and attempted to schedule interviews with their expert representatives. The organizations we reached out to were the Worcester Public Schools' Night Life division, Worcester State University's Continuing Education division, and the Worcester Public Library. These organizations offer courses on using information technology specifically tailored to senior novices. We conducted interviews with two of the Worcester Public Library's librarians. The protocol for these interviews, including more detailed criteria for the selection of our experts, can be found in Appendix E.

After completing our interviews with the adult training experts, we listed the most prevailing techniques we learned in regards to adult learning. This list, along with the information received as a result of the literature review, was used to create an effective training strategy for Wachusett Earthday.

3.6 Summary

The methods discussed above were used to achieve our goal of providing Wachusett Earthday with a recommendation on how to improve its inventory management. Through these methods, we gathered crucial data on Wachusett Earthday, its volunteers, several inventory management systems, and how to successfully implement change at an organization. In the next chapter, we present the results of our research as well as an analysis of these results that explain how we came to our specific conclusions and recommendations.

4. Results and Analysis

The goal of this project was to provide Wachusett Earthday with a recommendation that would allow them to improve their inventory management. To accomplish this, we focused on the following objectives:

1. Determine Wachusett Earthday's inventory tracking requirements;

2. Identify the most technologically able volunteers at Wachusett Earthday;

3. Identify appropriate inventory management systems for Wachusett Earthday;

4. Determine the suitability of any identified systems for use by Wachusett Earthday;

5. Create an implementation strategy for Wachusett Earthday.

This chapter contains the results of the research we performed in order to complete these objectives, as well as the analysis of these results.

4.1 Identifying Wachusett Earthday's Inventory Tracking Requirements

During our interview with Ms. Chanis and Mr. Koslowske, we identified Wachusett Earthday's inventory tracking requirements. We learned that they wanted the capability of being able to report on items entering and exiting their ReUse Building. Ms. Chanis explained that they would be able to use this information to justify their impact as well as gain additional funding. She was not particular on how this data be collected, (e.g. total category weights, or total number of items) but just that it could be collected accurately. They also wanted to be able to expand upon our initial recommendation, with system features that Wachusett Earthday may not use in the present, but may use in the future.

Through our observations at the ReUse Building, we were able to determine the number of items any potential system would have to process, as well as the rate at which transactions would have to be performed. When we visited the Wachusett Watershed Regional Recycling

Center on January 25th, 2017, to observe how volunteers working in the ReUse Building performed their tasks, we saw that volunteers were unable to keep up with the number of donated items that were entering the building. Volunteers rarely had time to rest during the center's open hours due to the rapid arrival of both items and customers.

Table 1 and Table 2 depict the total numbers of donating visitors, items donated, visitors taking items, and items taken from the ReUse Building during operating hours. According to Wachusett Earthday, the amount of customers on January 18th was less than normal, but the other two days were representative of an average operating day.

Table 1: Incoming Donations at Wachusett Earthday's Reuse Building

Date of visit	Number of donating visitors	Number of items donated	Minimum number of items donated	Maximum number of items donated	Average number of items donated per visitor
1/18	82	1426	1	300	17.4
1/25	117	1870	1	150	16
1/31	130	2201	1	120	16.9
Averages	109.67	1832.33			16.77
Average/Minute	0.91				

Table 2: Items taken from Wachusett Earthday's Reuse Building

Date of visit	Number of item-taking visitors	Number of items taken	Minimum number of items taken	Maximum number of items taken	Average number of items taken per visitor
1/18	75	713	1	100	9.5
1/25	118	968	1	30	8.2
1/31	144	1171	1	60	8.7
Averages	112.33	950.67			8.8
Average/minute	0.94				

The important takeaways from this data were the average number of items taken and donated per visitor, and the visitors per minute taking items. This data was important for several reasons. First, the average numbers of items per visitor was important because it told us that despite varying fluctuations in the traffic per day, the average number of items visitors take and donate remain fairly constant. Therefore, the expectation that visitors take an average of 8.8 items and donate an average of 16.77 items was a valid assumption for determining system requirements.

Based on the average number of items donated per visitor, and the fact that volunteers work in the ReUse Building for two hours when the recycling center is open for a day, volunteers would have to restrict themselves to 3.75 seconds to carry an item to the backroom, inspect its condition, and carry it out of the backroom if they wanted to prevent unprocessed items from piling up in the backroom. Before we began our research, we assumed that we would be able to identify an inventory management system that would enable Wachusett Earthday to track items immediately upon arrival and departure. However, our observations at the ReUse building

showed that the organization cannot track incoming items immediately, because the additional task would take too long to perform, worsening their backlog issue. We decided that it was okay for Wachusett Earthday to not track incoming items, because not all of these items actually make it back to the community, some are thrown away or recycled. Therefore, the data of the items leaving their ReUse Building more accurately reflects their impact in the community. For this reason, we focused only on tracking outgoing items for the remainder of our research.

4.2 Identify the Most Technologically Able Volunteers

We analyzed the data from our interviews with volunteers at Wachusett Earthday and segmented keywords into one of the following categories: Programs, Platforms, and Experiences. When we asked the volunteers which computer or software programs they felt they are comfortable using, the responses ranged from one program/suite to as many as five programs. Upon asking how many hardware platforms they were comfortable using between a computer, tablet, and smartphone, answers ranged from only having had experience in one platform to having used all three platforms. Lastly, when we asked how many education and career related experiences volunteers have had, answers varied from one to six. The results of this content analysis can be seen in Figure 2 below.
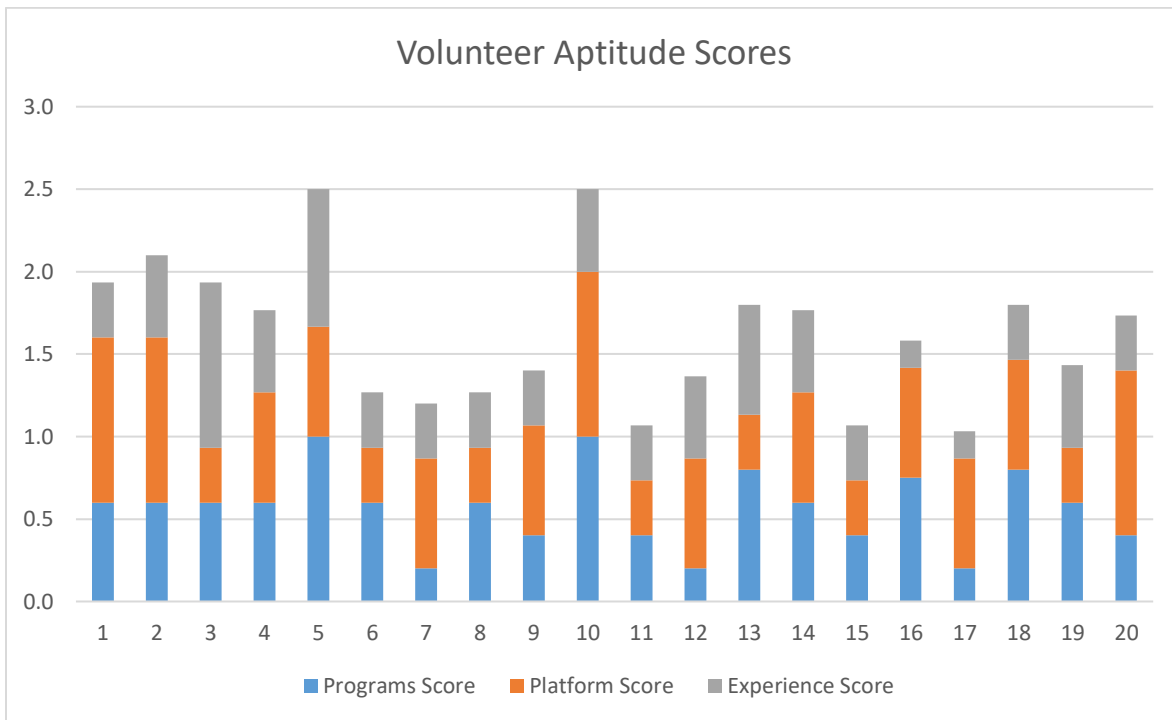
Figure 3: Volunteer Aptitude Scores

This chart shows that volunteers 5, 10, and 2, were determined to have the highest technological aptitude with scores of 2.5, 2.5, and 2.1 respectively. Additionally, volunteers 1 and 3 have a suitably high technological aptitude. The raw data we created this chart from is located in Appendix M and the procedures for analyzing the data is in Section 3.2. Additionally, we calculated the averages from the top five overall scores. This provided us with the average experience and ability of the people who would be using the program, allowing us to tailor our recommendation and strategy to a specific ability level. The average program usage number was 3.80, the average platform usage number was 2.20, and the average number of education and career experiences was 3.60.

Identifying the most qualified and experienced computer users among the volunteers at Wachusett Earthday was important to our ultimate recommendation. We used this information to confidently identify for Wachusett Earthday the individuals who would be most likely to be

successfully trained to operate a new inventory management software system. This information effectively determined the technological ability level of the volunteers at Wachusett Earthday who are most likely to use the system.

4.3 Identification of Inventory Management Software

We reached out to the following five organizations: the Clark Community Thrift Store, Worcester Free Store, Habitat for Humanity's ReStore in Greater Worcester, the Goodwill Store in Worcester, and The Salvation Army. This helped us fulfill our third objective: identify inventory management systems used in other organizations that may be appropriate for Wachusett Earthday. Although not every organization had representatives that were available to meet with us, we were able to learn about a variety of inventory management systems and how they were appropriate for the Clark Community Thrift Store, Habitat for Humanity's ReStore in Greater Worcester, and the Goodwill Store in Worcester. Information detailing all of the systems discussed in this chapter can be found in Appendix N. This information includes system descriptions, pricing, features, customer testimonials, and more information pertinent in viewing these systems as potential options for Wachusett Earthday.

The Clark Community Thrift Store is a volunteer-run organization at Clark University in Worcester, MA. From an interview with a representative of the thrift store, we learned that most of the volunteers there are Clark University students, and so the organization's volunteer demographic leans toward those between the ages of 18 and 22. Young people are not likely to be susceptible to the cognitive and perceptual limitations that can be prevalent in older adults, as mentioned in section 2.5. Therefore, this organization is open to inventory management systems that have steeper learning curves. Because the volunteers are mostly students, it is likely that the majority of them were already familiar with Excel before they began using it inside the Community Thrift Store. This would greatly reduce training time compared to teaching someone

how to use an entirely new system. Also, the rate of donation intake over time is less than that of Wachusett Earthday's. Therefore, transactions can be processed more slowly. It is for these reasons, as well as the low cost of the software, that the Clark Community Thrift Store uses Microsoft Excel to manage its inventory.

Microsoft Excel is a computer application that organizes data into tables. This form of inventory tracking allows users to generate reports of what items are entering and leaving the store. However, all the data entry must be done manually, and therefore is prone to human error. Also there is no automatic system that will analyze the data that is entered. This means that if a user wants to understand what items are selling the most, or which items are sitting on the shelf the longest, they must analyze their data and generate a result themselves. While Microsoft Excel is a viable inventory management option for people who are competent with the system. It can be extremely difficult for a new user to become comfortable with. It also lacks the data analysis and automatic features that come with off the shelf point of sale (POS) systems.

Habitat for Humanity in MetroWest/Greater Worcester operates a thrift store known as the ReStore. Summaries of interviews with this organization can be found in Appendices G, H, and I. Unlike the Clark Community Thrift Store, ReStore's volunteer demographic ranges from high schoolers to retirees, with 30 to 40 percent having some sort of disability. Because they cannot assume that their volunteers have the same general level of technological proficiency due to their wide age range and backgrounds, Habitat for Humanity must accommodate the lowest level of technological proficiency that is demonstrated among its volunteers.

Habitat for Humanity's ReStore has adopted ThriftCart as their current inventory management system. ThriftCart addresses the cognitive and perceptual limitations of Habitat for Humanity's less knowledgeable volunteers by fulfilling several principles of human-computer interaction, which we mentioned in Section 2.4.

Screen shots of ThriftCart can be seen in Appendix P. The system has a row of buttons at the top of all of their screens, which demonstrates ThriftCart's goal of minimizing information access cost; the buttons lead to frequently accessed pages. Placing the items to be purchased in a table, as well as grouping payment options together demonstrates ThriftCart's goal of complying with the proximity compatibility principle. By fulfilling those principles of human-computer interaction, ThiftCart is able to reduce Habitat for Humanity volunteers' reliance on working memory. Frequently used information can be accessed in one step/click, and a group of related information can be stored as a single entity in working memory.

This system is worth considering for Wachusett Earthday because it is designed specifically for businesses that accepts consigned or donated items and sells them to the public. The inventory item creation tool allows Wachusett Earthday to track very specific items or larger categories. The option to use or not use printers and scanners allows room for the organization to grow their inventory tracking system and increase their data collection. However, while the cash register interface is easy to use, with large clear buttons, not every operation in ThriftCart is so straightforward. The process of actually creating a new inventory item and adding it to the cash register interface is rather difficult. It requires going through several menus that are not intuitive to the user. While this is an inconvenience, it does not rule out the system as it is not necessary for every user to know how to perform these operations. Also, the system is web browser based, meaning it cannot be operated without an internet connection. Another drawback to ThriftCart is that there is a bit of a lag on the cash register interface between when a button is pressed and when it appears in the item cart. Overall, ThriftCart would meet all of Wachusett Earthday's needs, but is not the smoothest off-the-shelf POS system.

The Goodwill Store in Worcester is a thrift store that sources items for sale from its neighboring donation sites, as well as the 23 million pounds of goods donated to Goodwill

locations in eastern and central Massachusetts. This organization is operated by paid employees, which suggests that any Goodwill employee, regardless of age, who is hired to operate the store's registers will be qualified to do so.

The Goodwill Store in Worcester is a member of Morgan Memorial Goodwill Industries, and Morgan Memorial Goodwill Industries supplies the store with a paid license to use NCR Counterpoint, another inventory management system. NCR Counterpoint provides features that are necessary for the store such as receipt printing and inventory reports so that the store can contact Goodwill suppliers for items that are almost out-of-stock.

This system is particularly relevant to Wachusett Earthday, as it is able to comprehensively track inventory and generate customizable sales reports. Even if Wachusett Earthday does not track incoming inventory, they will still be able to accurately report what items are leaving the ReUse Building. The inventory list is entirely customizable; Wachusett Earthday would be able to add any items to the list and checkout interface. However, according to customer reviews, NCR Counterpoint has a steep learning curve that would not be conducive to brand new point of sale users, as is the case for Wachusett Earthday. The user-interface is not as simple and streamlined as some of its competitors, and new users can be overwhelmed from the multitude of menus. Current users have also claimed that the system can be unstable and unreliable at times. For example, one customer specifically stated that the program will sometimes crash when it runs as a background task on a computer. This means that any current work on a customer checkout or inventory management module would be lost. NCR Counterpoint is a professional inventory management solution, however the complexity of the system would make it difficult to train the Wachusett Earthday volunteers to be proficient.

When we visited The Habitat for Humanity ReStore, the organization also identified several other inventory management systems they considered before choosing ThriftCart. These

systems were Unify, ShopKeep, RetailEdge, and TransAct. We conducted research on these systems and evaluated them as additional possibilities for Wachusett Earthday.

Unify by Webgility is a comprehensive software suite designed for businesses that work across multiple platforms, selling inventory online and/or in multiple stores. It allows owners to manage all of their sales data, inventory, marketing, orders, and shipping on one convenient dashboard. While this system is designed primarily for retail businesses, it is still applicable to small non-profit organizations. Because it is designed to track inventory across multiple channels and synthesize this information into one report, it is certainly able to track the movement of inventory inside of a single store. Unify also has capabilities that offer room for smaller organizations to grow. For example, the order management feature could be used to coordinate with donors to figure out what items will be coming to the store ahead of time. It also has an abundance of features for these organizations to begin listing items online.

However, because it is designed to do much more than simply track items in a single store, the system is more complicated and not as user friendly as a system that is designed for point of sale transactions. This means it would take much longer to train employees to use the system. Also, because there is no point of sale system included with Unify, another purchase would be required for in store checkouts to be recorded automatically. Over all, this is a very capable system but possibly too advanced for the needs of an organization such as Wachusett Earthday.

ShopKeep's cloud-based iPad POS system was designed for small business environments. The program itself is very user-friendly, and all of the menus and buttons are clearly labeled. This makes it very easy for individuals to use the system to process transactions. Not only that, but the training time required to learn how to utilize the application is expected to be minimal because of the interface's ease of use. ShopKeep's other functions (inventory management,

customer marketing, and sales reporting and analytics) are also easily mastered by someone with experience using online software. This is because the menus that contain these functions are all properly labeled, and do not leave the user guessing where the features can be accessed. For example, in order to export a sales report the user goes to the reporting menu, export report, and then chooses the report and the file type they would like to export. Aside from being user-friendly, ShopKeep is extremely customizable. This allows organizations to be able to create the cash-register interface that they want and report the data that matters to them. This system offers the most intuitive interface that we found, and it appears to be a very polished product. However, the price of $69 per month per register would limit Wachusett Earthday's ability to expand with the system.

RetailEdge's cloud-based POS software program can conduct three functions highly desired by Wachusett Earthday: transactions, inventory management, and analytical reports. RetailEdge is an extremely versatile program and is well suited to a professional retail environment. Yet, despite how much the system meets the needs of Wachusett Earthday, it may not be the best fit for the organization. This is because of the complexity of the system and the difficulty navigating through the user interface. While the system provides a multitude of options to the user, this large quantity of items may be too much for users who are less experienced with technology. In order to master the functions offered by RetailEdge, a sufficient amount of training time is required. While RetailEdge is excellent in a professional retail environment, it may be too complicated for a volunteer-run organization such as Wachusett Earthday.

TransAct also offers a variety of features desired by Wachusett Earthday. The system is compatible with many general POS hardware platforms including barcode scanners, receipt and label printers, and other standard products. Additionally, their Inventory Control module has several unique features. Among these are pricing, stocking, and sales history. TransAct and its

modules provide its customers with a highly customizable and personal set of features for their own needs. However, similar to RetailEdge, we found that the program may be too complex for use inside the ReUse Building. TransAct was also developed for more professional retail environments. Therefore the interface is less intuitive and requires more training time to be able to utilize it to its full potential for the less technologically adept. Therefore, TransAct may not be the best fit for organizations that have volunteers with a wide spectrum of technological backgrounds.

4.4 Suitability of Identified Software and Methods

After we identified potential inventory management systems for Wachusett Earthday, we compiled our research into a decision matrix, which can be seen below in Table 3. A bar graph representation of this information can be seen in Figure 4. This bar graph provides a visual representation of each weighted category in terms of each system's overall score in our decision matrix. This makes it easy to see each category in relation to other systems as well the overall scores.

Table 3: Decision Matrix of Inventory Management Systems

System	ThriftCart	NCR Counter Point	RetailEdge	TransAct	Unify	Microsoft Excel	ShopKeep
Annual Cost (6)	4	0.1	5.5	3.6	5.3	9	1.3
Hardware Platform Options (5)	9	3	3	3	6	9	3
User Interface (10)	7	7	4	6	5	2	9
Customer Service (7)	7	6	6	5	7	5	8
Customer Rating (5)	8.8	6.4	8.6	5	8.8	8.4	8.6
Features (6)	10	8	6	6	4	0	8
Total	292	207.6	209	192.6	228.8	196	259.8
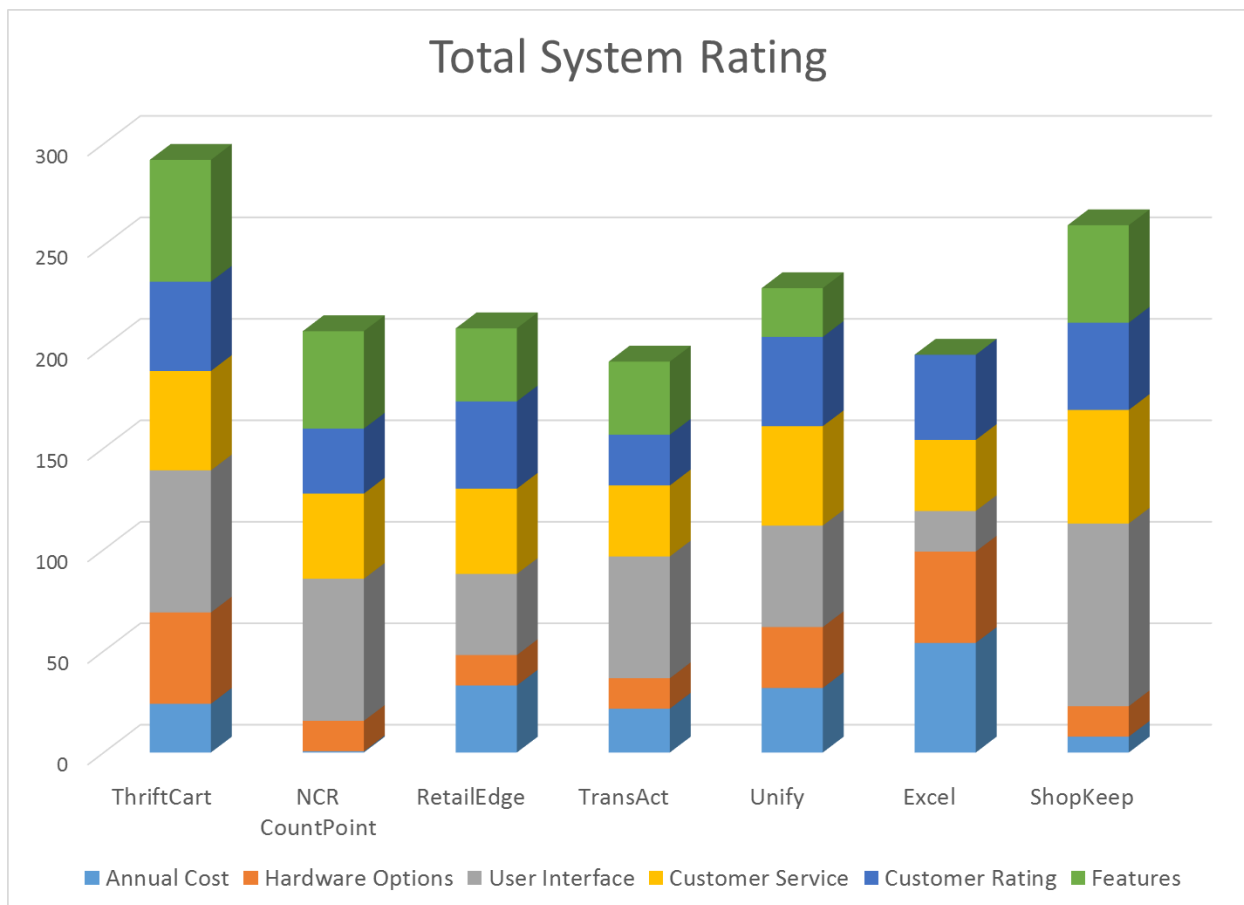
Figure 4: Total System Rating

The categories included in this decision matrix were 12 Month Cost, Hardware Options, User Interface, Customer Service, Customer Rating, and Features. Explanations on how these categories were selected can be found in Section 3.4. This decision matrix allowed us to compare all of the systems that we identified as being possible solutions for Wachusett Earthday in a single place. The scores and detailed reasoning for all values contained within the decision matrix can be found in Appendix O.

Once all the metrics had been calculated, total numerical scores were attributed to each system. These scores allowed us to eliminate all but two systems: ThriftCart and ShopKeep. ShopKeep was not eliminated for scoring lower than ThriftCart, because the two scores differed by less than six percent, and we had determined that ShopKeep's user interface would be an extremely good match for Wachusett Earthday.

To fully understand how these systems could be used by Wachusett Earthday, we obtained free trials of both systems. We set up these systems with inventories that would be similar to that of the ReUse Building and completed the tasks that would be necessary for the organization to successfully manage their inventory. During this testing we gained valuable information on both systems. Overall, ShopKeep was determined to be a much more polished and intuitive system. Functions were in easily identifiable places, and we never struggled to find the right menu to accomplish a task. The cash register interface was very responsive and allowed us to organize our inventory very neatly. ThriftCart on the other hand was more difficult to learn. It took us two hours to understand how to add a new inventory item to the cash register. This was mainly due to an abundance of vague menus. While all the menus were labeled clearly, tasks that we thought we would find in one menu were often hidden in another. Also we noticed a lag on the cash register interface between when a button was pressed and when the function was

performed. We suspect that this is likely due to the fact that ThriftCart is a browser based program, and therefore every button press needs a response from the internet.

While ShopKeep was found to be the easier to use system, we were not able to identify it as the most suitable system because of Wachusett Earthday's unique needs. Ms. Chanis indicated that the organization wished to eventually expand the selected system to incoming item tracking as well as processing cars arriving on site. This meant that more registers would be required, and if ShopKeep were chosen this would also mean a higher monthly rate. For this reason, we presented both systems to Ms. Chanis and Wachusett Earthday to allow them to select a system based on their financial restrictions and their own personal preferences.

In order to provide them with a complete understanding of these two systems, we created information packets that included a description of the software, key features, price, hardware compatibility, customer testimonials, and screenshots of the user interface. These information packets can be found in Appendix P. We then showcased demos of the systems to them and provided the user logins of the free trials to Ms. Chanis. This allowed them to evaluate the systems personally in order to make a final decision.

Ultimately, Wachusett Earthday decided to move forward with ThriftCart as their chosen system. The largest factor in this decision was price. With a single register, ShopKeep's $69 per month versus ThriftCart's $50 per month can be justified as the consumer is receiving a more polished product. However, the organization is considering expanding to three registers, meaning ShopKeep's price would be $209 per month while ThriftCart would still only be $50 per month. With both systems having the same features and capabilities, Wachusett did not see the investment in ShopKeep as being the right one for their organization. Also, ThriftCart is used by Habitat for Humanity in the Metro West/Greater Worcester area, an organization that Wachusett

Earthday works with often. Ms. Norma Chanis believed this would offer Wachusett Earthday additional support in establishing the system at their site.

While ThriftCart is a great option for Wachusett Earthday, it is not without flaws. The biggest concerns of the system for Wachusett Earthday moving forward are the less than intuitive user interface and the system's reliance on an internet connection. ThriftCart's user interface will require additional time to fully train volunteers. We expect user's will be able to master the cash register interface almost as quickly as could have been accomplished with ShopKeep, however we anticipate longer training times for manager tasks such as exporting reports, item management, and cash register creation. These obstacles will be addressed in our training plan, and we are confident that they will not impede Wachusett Earthday's overall ability to successfully use the system. However, the concern of ThriftCart's need for an internet connection is not one that we can address through our project. According to Ms. Chanis, though, Wachusett Earthday is willing to increase their internet package in order to accommodate ThriftCart's needs. While this means the system will be supported and stable during normal use, it is still possible for network outage to occur and render the system inoperable. For this reason, we will create an emergency procedure that can be used to track items if ThriftCart is down. With the main concerns of ThriftCart being addressed, we are confident that the system will meet Wachusett Earthday's inventory management needs.

4.5 Create an Implementation Strategy for Wachusett Earthday

The next stage of our project was to create an implementation strategy to recommend to Wachusett Earthday. The strategy we recommended to Wachusett Earthday consists of five steps and is outlined in detail in the following sections.

4.5.1 Informing Stakeholders

Through literature review on change management discussed more extensively in Section 2.4, we learned several key steps to proper implementation. The two primary principals of change management we found to be most relevant for Wachusett Earthday were effective communication and training. Both the details of the change and its benefits should be communicated to the stakeholders of the operation. In this case, the stakeholders are the volunteers and customers at Wachusett Earthday.

The purpose behind the change needs to be explicitly stated to the stakeholders, so that they understand why they need to accommodate the changes. The purpose of the change is to allow Wachusett Earthday to collect data on their ReUse items, as well as improve efficiency inside their ReUse Building. The details of the change include: when the change will be taking place, what exactly the change will be, and how this change will affect each individual. The customers will be affected because the normal procedures of taking items in and out of the ReUse Building will be different. To bring items in, they will have to go to a separate door, and to take items out they will have to process through a checkout counter. The volunteers will also have to facilitate these changes by taking on new roles and performing different tasks than before. This includes sorting and taking in donations in the same room, not running donations on to the floor as they come in, and operating a checkout terminal.

These changes should be communicated to the stakeholders through the following media: announcements on the Wachusett Earthday Facebook page, the Organization's website, newsletter, and emails, signage and flyers at the facility and in the local communities, and face to face interactions at Wachusett Earthday. Customers and volunteers should begin to be informed of these changes four weeks prior to the planned date that the system will be used in daily

operations. This informing should continue through these four weeks to ensure that every stakeholder is properly informed.

4.5.2 Building Layout and Process Changes

During our research, we determined that although there were many good aspects of Wachusett Earthday's current process for handling items inside the ReUse Building, there were also many areas for improvement. Through our direct and participatory observations, and subsequent creation of a pros and cons table that can be found in Appendix Q, we were able to specify what changes should be made. Due to having only one shared entrance and exit, a bottleneck effect occurred in the ReUse Building's front hallway. This caused too much congestion and traffic in one area, which also created a safety hazard to clients who entered and exited with cumbersome items. Due to the fact that adding a checkout procedure would increase the time it takes customers to exit, we determined that this congestion would become even worse if left unaddressed in our recommendation.

Therefore, we determined that Wachusett Earthday should separate their entrance and exit in order to minimize congestion. This also gives the benefit of separating inflow and outflow, making it easier to see which customers are leaving with items, and ensuring that all outgoing items are tracked. An image of the floor plan of the ReUse Building at the time of our project can be seen below in Figure 5.
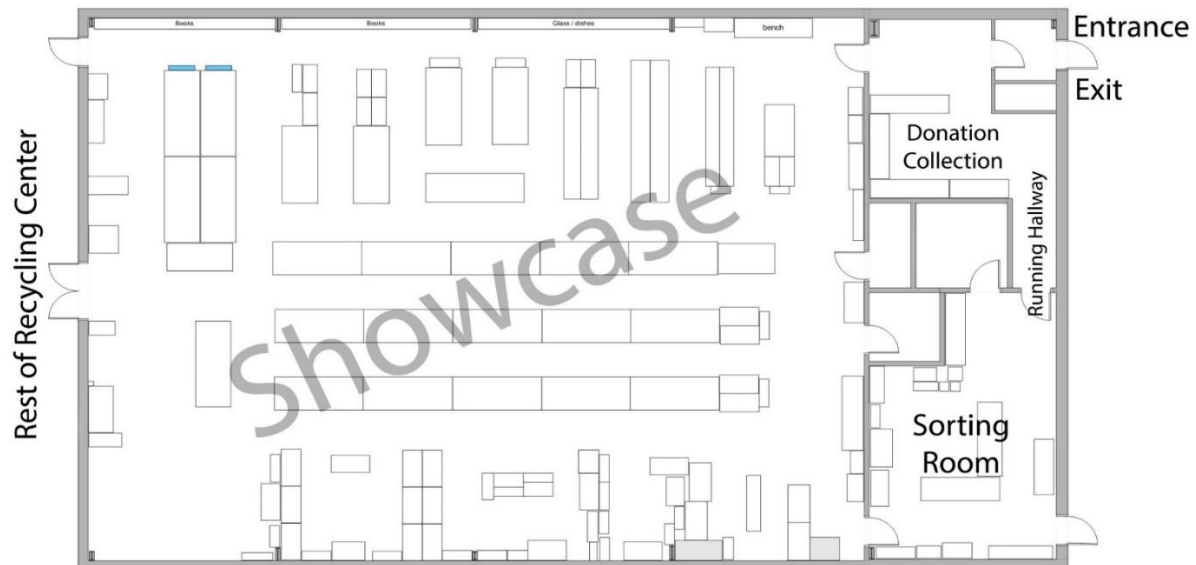
Figure 5: Current Floorplan of Recycled Resource Center

Through our interview with Ms. Chanis and Mr. Koslowske, several restrictions on which doors could be used were mentioned. Having the doors on the other side of the building, opposite the parking lot would not be ideal as customers would have to walk longer distances with items. Therefore, putting the exit and entrance on the same side of the building was the only option. Our new proposed layout can be seen below in Figure 6.

Figure 6: Proposed Floorplan of Recycled Resource Center

Additionally, since the current sorting room provides the most space to collect and sort donations, designating the outside door to this room as the entrance and donation drop off location is the most time and effort effective option.

4.5.3 Purchasing Hardware and Software

The next step of the implementation plan is to make the purchases required to establish their inventory management system. This includes ThriftCart and the necessary hardware components. We recommended that Wachusett Earthday purchase two hardware devices in order to increase the efficiency of their customer checkout process. The fact that each customer will have to take the time to stop and check out before leaving will increase congestion near the exit. Our observations and data regarding customer outflow per minute suggested that this congestion would occur. Having two devices available for checkout will allow two customers to check out simultaneously, decreasing congestion in the area. Additionally, if one device experiences technical difficulties, volunteers will still be able to perform customer checkouts on the second device.

We suggested that Wachusett Earthday purchase two computer stations dedicated to ThriftCart checkout inside the ReUse Building. The components of this station would include: a desktop computer, a monitor, a mouse, and a keyboard. The total cost of these components starts at $130, assuming that Wachusett Earthday buys all of its components. Wachusett Earthday could lower the cost by using some of the donated hardware within the ReUse Building. Additionally, using computer stations would facilitate the process of expanding the system to include card readers, barcode scanner, and receipt printers.

After the hardware is purchased, a ThriftCart license must be purchased from Nabadab LLC. Then Wachusett Earthday can create user accounts and customize its interface to fit the needs of their inventory. Our accompanying Software Reference Guide details how this can be accomplished.

4.5.4 Training Selected Volunteers

After the setup is complete, the volunteers who will be using the system must be trained. These individuals' identities are not included in this report, but have been provided to the staff at Wachusett Earthday.

The second principal of change management that is directly applicable to Wachusett Earthday is training and education of the volunteers who will be implementing the change. In order to understand how to properly train the volunteers to use ThriftCart, we contacted local adult training experts. We interviewed two librarians from the Worcester Public Library (WPL) about training adults and the difficulties involved with teaching senior novices how to use unfamiliar technology. Transcripts from these interviews can be found in Appendices J and K. Both librarians taught classes that focused on teaching individuals how to use computers, troubleshooting technological problems, and using unfamiliar software. While the average age range of these classes was lower than the average age of a volunteer at Wachusett Earthday, their

experiences were nearly the same. Both the volunteers at the ReUse Building and the individuals taking classes at the WPL have had little to no background in the technologies they needed to be trained in. We felt that the similarities between the librarians' experiences and Wachusett Earthday's situation made the information we received from the WPL relevant to the ReUse Building volunteers. The information we gathered on adult training from these experts as well as our literature review can be found in Section 2.4. We used this information to help us develop a training plan tailored to the volunteers identified as being the most technologically competent at Wachusett Earthday. This plan consists of three steps, which are detailed below.

Step 1: Establishing Comfort with the System

We recommended that the members of Wachusett Earthday be able to use the desktop computer with ThriftCart during training. This allows them to be comfortable with the device and begin to learn some of the features in addition to calming some of the user-anxiety. It also makes the training more engaging for volunteers, which results in a more enjoyable experience overall. Making the process more interactive also allows for a better understanding of how to use the hardware and higher knowledge retention.

Step 2: Learn Relevant ThriftCart Tasks

Once volunteers who are being trained have become comfortable with using computers in which ThriftCart will be accessed on, they should be instructed on these ThriftCart tasks: adding and removing items from ThriftCart's shopping cart, performing a purchase transaction with cash payment, suspending and recalling a purchase transaction, and adding new and returning customers to an order. As per the results of our research and interviews with the librarians from WPL, we created a software reference guide for ThriftCart that has instructions on how to perform these tasks. To train volunteers on these processes, instructors should help volunteers go through each task's steps to perform it while referring to the software reference guide. Each step

has a corresponding screenshot within the guide that shows the result of performing the step on a computer. Instructors should make sure that volunteers are able to replicate each screenshot on a computer after performing the corresponding step.

By referring back to the guide during training, a volunteer will be aware of its content and remember to refer back to it if they cannot remember how to perform a task. The guide will also help instructors if they also cannot remember how to perform a task; unless ThriftCart receives an interface overhaul, the guide will always depict the correct process for performing a task. This software reference guide can be found in Appendix R.

Step 3: Practice ThriftCart with Scenarios

Next the volunteers should carry out various checkout dry runs to familiarize themselves with realistic situations. These situations include the following five checkout scenarios, plus any additional scenarios Wachusett Earthday chooses. A member of Wachusett Earthday should pretend to be checking out with these items to see how the volunteer is able to process customer checkouts in a realistic scenario. If they respond successfully, and are able to check out these customers with ease and succession then the final stage of implementation can be accomplished. These scenarios include:

1. 10 Books, 3 Toys
2. 5 Plates, 4 Glasses, 4 mugs
3. 2 Wooden Baskets, 5 School binders
4. 2 Electronics, 3 sports equipment items
5. 1 roll of fabric, 2 sewing kits

These provided scenarios can be supplemented with any other situations deemed appropriate in training.

4.5.5 Implement System in Daily Operations

Once Wachusett Earthday has completed these four steps, they will be able to implement ThriftCart and the new process of tracking outgoing items into their daily operations. It is crucial that once ThriftCart is used during open hours, every customer is accurately checked out. This means that customers cannot be allowed to leave the store without having their items processed at the checkout counter. This will allow Wachusett Earthday to accurately record and report the items that they are saving from the trash and giving back to the community. As the librarians from the Worcester Public Library mentioned in our interviews, we recommend the volunteers have a copy of our ThriftCart Reference Manual accessible while they are working the checkout station. Additionally, when volunteers are implementing ThriftCart, there should be an expert nearby to assist them if any difficulties arise. This should continue until no problems arise while working.

4.6 Summary

Our research has provided us with very valuable data and information that allowed us to make an appropriate recommendation to Wachusett Earthday. We used various methods to complete our five objectives and ultimately completed our project goal of providing Wachusett Earthday with a recommendation to improve their inventory management. We were able to identify what requirements Wachusett Earthday had for inventory management and identified the most technologically able volunteers. We then proceeded to identify several potential systems that Wachusett Earthday could employ, and with the help of Wachusett Earthday, we narrowed the list of systems down to one option: ThriftCart. Lastly we were able to provide Wachusett Earthday with a conclusive recommendation and implementation plan.

5. Conclusion and Recommendations

This chapter summarizes our final recommendation to Wachusett Earthday. It includes the system components we recommended, which encompassed procedures, software, hardware and training. This chapter will conclude with our recommendations to Wachusett Earthday moving forward with the development of their organization and what problems they or another research group could address in the future.

5.1 Recommendation to Wachusett Earthday

Our recommendation includes a five-step implementation plan that will allow for successful implementation by Wachusett Earthday. These five steps are outlined below.

Step 1: Informing Stakeholders

In order to have the transition to a checkout system be as smooth as possible, informing both their customers and volunteers of the policy change is imperative. Four weeks before implementation, the organization should begin posting to a variety of outlets and informing these stakeholders of the policy change will. Firstly, Wachusett Earthday should post on their official Facebook page, website, and newsletters. Secondly, they should put physical signage at their site and around the communities they serve. Lastly, they should communicate these changes in face-to-face interactions at their site.

Step 2: Making Appropriate Building Layout and Organizational Changes

Next, Wachusett Earthday should make the necessary building layout adjustments to streamline processes as much as possible. These layout changes include separating the entrance and exit and connecting them with a walkway for customers. Items should be sorted by categories in the backroom in sections or in bays, but should not be placed onto shelves to limit the amount of traffic entering the main floor.

Step 3: Purchase and Setup of Necessary Hardware and Software

Once these layout changes are made, Wachusett Earthday should purchase the hardware and software necessary to execute our recommendations. These include the license to ThriftCart as well as two complete desktop computers with the necessary peripherals including: monitors, mice, and keyboards.

Step 4: Training Volunteers to use the System

After Wachusett Earthday makes these purchases, they should begin to train their volunteers to use the system successfully. They should incorporate the strategies included in our detailed training plan in Section 4.5.4. These strategies include the full training process, starting with simple tasks with the aim of familiarization, to slowly working through the necessary processes, to realistic scenarios. To facilitate training we created a ThriftCart Reference Guide to walkthrough all necessary tasks.

Step 5: Implement System in Daily Operations

After the volunteers are trained thoroughly in accordance with our Training Strategy the system should be implemented into the day-to-day activities of Wachusett Earthday. The Software Reference Guide, with any additional mark-ups the Wachusett Earthday staff desire, should be at the registers as something tangible for the volunteers to reference if any issues come up during the work day. At the start of the implementation process, an expert should be nearby to help if any major difficulties arise.

5.2 Impact on Wachusett Earthday

This project should prove to be very beneficial to Wachusett Earthday. If our recommendations are followed, it will allow the organization to collect valuable data that they were previously unable to capture. These data will provide evidence of Wachusett Earthday's impact in its communities as well as equip the organization with new tools with to gain

additional funding. Also, these new data can be used to adjust the intake of items into the ReUse Building. Lastly, this project would make it easier for Wachusett Earthday to later make improvements in other areas. After our recommendation, a transition into tracking inflow or incorporating barcode scanners would be more fluid than if trying to incorporate these aspects all at once.

5.3 Future Recommendations

Throughout the course of this project, we encountered several areas of potential future growth for Wachusett Earthday. While Wachusett Earthday made us aware of some of these areas at the beginning and during our project, some other concerns were raised during the course of our research. While interviewing the volunteers and observing operations in the ReUse Building, it became clear there were a few major areas for change. One issue is that volunteer outreach is lacking. This results in Wachusett Earthday being understaffed. With more volunteers, workloads would not be as heavy and volunteers would be less stressed while working. This would create a better experience for the volunteers and allow them to work more efficiently for the organization.

Additionally, public education of Wachusett Earthday's services is also a concern. Too often shoppers enter the store with material that should not be donated to the ReUse Building, which should instead be thrown away or recycled curbside. Educating the community on the services Wachusett Earthday actually performs could limit this inflow of poor quality items and reduce the time volunteers spend sorting and cleaning donations.

Another area where Wachusett Earthday could potentially grow is the process of managing cars entering the site. Currently, this process is done entirely by hand and the data is later entered into an Excel sheet for tracking purposes. Cutting out this secondary action would greatly increase the efficiency of the organization. Therefore, automating the car tracking, item

inventory, and payments would be highly beneficial to Wachusett Earthday and provide them with as much, if not more, data and information with substantially less work.

Lastly, a frequently discussed topic with our sponsor Wachusett Earthday during the course of our project, is the expansion of the organization to include ability to accurately track inflow of items to the ReUse Building. This could be done in a variety of ways ranging from manually inputting items into a system to barcoding and scanning items.

The areas of volunteer outreach, public education, and further automation are the most important remaining areas of growth for the organization. We believe addressing them could have profound results on the organization and should be looked into by Wachusett Earthday, potentially in partnership with another research group in the future.

5.4 Summary

Throughout the course of this research project, we hoped to address Wachusett Earthday's lack of inventory management. Through our research, which included extensive literature review, interviews, site visits, and a decision matrix, we were able to provide Wachusett Earthday with a comprehensive recommendation to address their problem. If Wachusett Earthday follows our implementation and training plan, then we are confident that they will be able to track all outgoing items and be able to formally report on this data.

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Appendices

Appendix A: Background on Wachusett Earthday, Inc.

Wachusett Earthday Inc.'s (2016) mission is "To promote recycling and reuse for a healthy watershed community through the Wachusett Watershed Regional Recycle Center" (About us, Wachusett Earthday Inc., 2016). The organization was formed in Holden, Massachusetts, in 1992 and has since worked with other groups and expanded to serve 7 towns including, Boylston, Holden, Paxton, Princeton, Rutland, Sterling, and West Boylston. The organization holds year-round collections of recyclable and reusable materials within these towns as well as hazardous waste materials. The center is open from 5-7 p.m. on Monday's, 9-11 a.m. on Tuesdays, and 2:30-4:30 p.m. on Wednesday's. Additionally, they are open on the third Saturday of each month from 8-11 a.m. Accepted items range from textiles to electronics to chemical products, with many being available for swap and reuse.

Wachusett Earthday Inc. (2016) is a 501(c)3 nonprofit, all-volunteer organization. They have an ongoing partnership with the towns they serve and the Massachusetts Department of Conservation and Recreation (DCR). The DCR is a major partner, providing the land for the site and Partnership Matching Grants for developing the Wachusett Watershed Regional Recycling Center. Besides the grants given to the organization, a large amount of Wachusett Earthday's funding relies on donations from the member towns and individuals who live in these towns. Please refer to Appendix B for detailed budgetary information.

The organization's officers consist of a president, treasurer, and clerk (Wachusett Earthday Inc., 2016). The rest of their structure consists of their board members, of whom there are currently five. Most important to their workforce as a non-profit are their volunteers, whose numbers vary periodically. The group that will most likely have the biggest impact on our project, however, are the volunteers and donors. The donors, those who take advantage of the

recycling and disposal opportunities provided by the organization, would have the most interaction with a system used to track item flow, and the volunteers themselves are the most relevant when considering a volunteer tracking system.

Appendix B: Operational Budget of Wachusett Earthday

Wachusett Watershed Regional Recycle Center
Town Representative Team
Meeting Agenda for November 30, 2016
8 to 9 am at DCR Offices, 180 Beaman Street, West Boylston

1. Review of annual operations statistics and finances: July 1, 2015 through June 30, 2016

2. Review collection schedule, items collected and brochure count for calendar year 2017.

3. Approve level budget at last year's figures for Recycle Center operations for July 1, 2016 through June 30, 2017.

4. Update by DCR – John Scannell

5. Updates/Questions from Town Representatives for WWRRC operations/Wachusett Earthday.

6. Updates for Wachusett Earthday – Vanya Seiss: outreach/downstream partners; Norma Chanis: recycling barriers; Mark Koslowske: grants and site improvements

11/30/2016

Wachusett Watershed Regional Recycling Center
July 2014 through June 2015

Collections 155
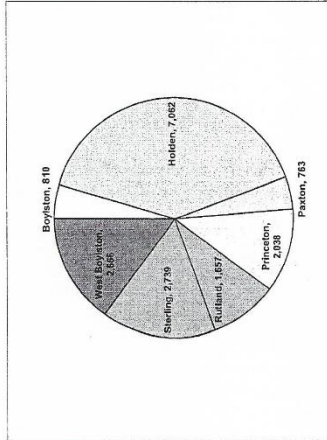
Cars		Participation %	Population %
Boylston	810	4.6%	8.0%
Holden	7,062	39.8%	34.0%
Paxton	763	4.3%	8.0%
Princeton	2,038	11.5%	7.0%
Rutland	1,657	9.3%	15.0%
Sterling	2,739	15.4%	15.0%
West Boylston	2,666	15.0%	13.0%
Total	17,735		

HHP (Gallons)

Resins, Adhesives	1,211
Paints	5,285
Organic liquids	825
Flammable liquids	0
Pesticides, Oxidizers	1,030
Acids, Alkalis	605
Aerosols	635
Total Gallons	9,591

Recyclables (Pounds)

C & D / Furniture	605,560
Waste	12,980
Scrap Metal	143,500
Other Metal	9,590
Paper	82,940
Corrugated	65,940
Document Shredding	18,000
Bulky Rigid Plastics	34,580
Mixed Recyclables	24,180
PCB Ballasts	253
Fluorescents	3,084
Lead Acid Batteries	5,323
Alkaline Batteries	3,978
Other Batteries	716
Clothing	1,240
Electronics	19,097
Total Pounds	1,030,961
Total Tons	515

Other Items Collected

Refrigerants	535
Tires	899
Propane tanks	477
Fire Extinguishers	50
Mercury	800
Televisions & Monitors	1,983
Mattress	0
Returnable Bottles & Cans	12,336

Wachusett Watershed Regional Recycling Center

July 2015 through June 2016

Collections 158

Cars

		Participation %	Population %
Boylston	1,072	4.2%	8.0%
Holden	9,208	36.1%	34.0%
Paxton	988	3.9%	8.0%
Princeton	2,445	9.6%	7.0%
Rutland	2,337	9.2%	15.0%
Sterling	6,317	24.8%	15.0%
West Boylston	3,145	12.3%	13.0%
Total	25,512		
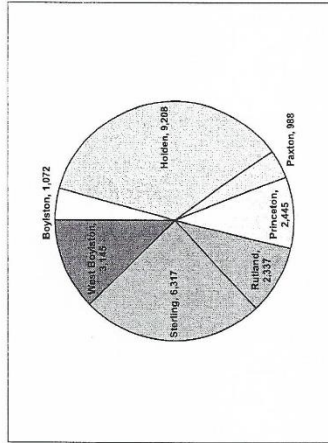
HHP (Gallons)

Resins, Adhesives	0
Paints	8,700
Organic liquids	385
Flammable liquids	0
Pesticides, Oxidizers	1,727
Acids, Alkalis	525
Aerosols	825
Total Gallons	12,162

Recyclables (Pounds)

C & D / Furniture	893,400
Waste	19,220
Scrap Metal	230,580
Other Metal	3,725
Paper	89,900
Corrugated	93,840
Document Shredding	24,060
Bulky Rigid Plastics	39,740
Mixed Recyclables	12,820
PCB Ballasts	239
Fluorescents	4,530
Lead Acid Batteries	4,940
Alkaline Batteries	4,365
Other Batteries	1,005
Clothing	6,040
Electronics	64,796
Total Pounds	1,493,200
Total Tons	747

Other Items Collected

Refrigerants	833
Tires	1,190
Propane tanks	724
Fire Extinguishers	62
Mercury	200
Televisions & Monitors	3,610
Mattress	189
Returnable Bottles & Cans	8,145

Wachusett Watershed Regional Recycling Center - Revenue/Expense

	July 2014 through June 2015			July 2015 through June 2016		
	Revenue	Expense	Net	Revenue	Expense	Net
HHP	$28,549	-$38,182	-$9,633	$26,977	-$39,416	-$12,439
Electronics	$19,335	-$594	$18,741	$26,781	-$7,305	$19,476
Refrigerants	$5,350	$0	$5,350	$8,682	-$630	$8,052
Metals	$17,319	$0	$17,319	$13,322	$0	$13,322
C & D / Furniture	$32,301	-$22,709	$9,592	$49,896	-$33,503	$16,393
Mattress	$0	$0	$0	$0	$0	$0
Tires	$2,190	-$1,263	$928	$2,647	-$1,869	$778
Propane Tanks	$971	-$224	$747	$1,562	-$151	$1,411
Fire Extinguisher	$300	-$210	$90	$432	-$287	$145
Lead Acid Batteries	$1,220	$0	$1,220	$885	$0	$885
Alkaline Batteries	$0	-$2,027	-$2,027	$0	-$1,765	-$1,765
Fluorescents	$0	-$1,086	-$1,086	$0	-$1,767	-$1,767
PCB Ballasts	$0	-$101	-$101	$0	-$54	-$54
Paper & Corrugated	$2,605	$0	$2,605	$2,942	$0	$2,942
Mixed Recyclables	$0	$0	$0	$0	$0	$0
Bulky Rigid Plastics	$0	$0	$0	$0	$0	$0
Cans	$308	$0	$308	$204	$0	$204
Total (non HHP)	$81,900	-$28,212	$53,687	$107,353	-$47,331	$60,021
Total (including HHP)	$110,449	-$66,394	$44,055	$134,330	-$86,747	$47,583

Wachusett Watershed Regional Recycling Center - Revenue/Expense
July 2016 through September 2016

	Collection Revenues	Collection Expenses	Net
HHP	5,140	-7,863	-2,723
Electronics	7,502	-3,482	4,020
Refrigerants	3,485	-288	3,197
Metals	2,154	0	2,154
Scrap Metal	0	2,279	2,279
Other Metal	0	0	0
C & D / Furniture	14,606	-9,508	5,098
Mattress	0	0	0
Tires	753	0	753
Propane Tanks	515	53	568
Fire Extinguisher	184	-96	88
Lead Acid Batteries	0	0	0
Alkaline Batteries	0	-1,154	-1,154
Other Batteries	0	0	0
Fluorescents	0	-1,862	-1,862
PCB Ballasts	0	0	0
Paper	0	362	362
Corrugated	0	356	356
Mixed Recyclables	0	0	0
Bulky Rigid Plastics	0	0	0
Returnable Bottles & Cans	0	0	0
Total (non HHP)	29,199	-13,340	15,859
Total (including HHP)	34,339	-21,203	13,136

Wachusett Watershed Regional Recycling Center - 5 Year Recap

	FY 2011-2012	FY 2012-2013	FY 2013-2014	FY 2014-2015	FY 2015-2016
Number of Collections (Bulk)	63	71	122	155	157
Number of Collections (HHP)	4	4	4	4	5
Number of Collections	63	71	122	155	158

Recap - Cars

	FY 2011-2012	FY 2012-2013	FY 2013-2014	FY 2014-2015	FY 2015-2016
Boylston	309	303	396	810	1,072
Holden	2,327	2,930	5,059	7,062	9,208
Paxton	233	263	581	763	988
Princeton	694	899	1,442	2,038	2,445
Rutland	513	577	1,131	1,657	2,337
Sterling	652	1,032	1,814	2,739	6,317
West Boylston	1,002	1,186	1,993	2,666	3,145
Total Cars	5,730	7,190	12,416	17,735	25,512

Recap - HHP (Gallons)

	FY 2011-2012	FY 2012-2013	FY 2013-2014	FY 2014-2015	FY 2015-2016
Resins, Adhesives	1,873	808	1,101	1,211	0
Paints	770	1,284	2,147	5,285	8,700
Organic liquids	715	935	990	825	385
Flammable liquids	770	440	715	0	0
Pesticides, Oxidizers	620	735	707	1,030	1,727
Acids, Alkalis	400	440	555	605	525
Aerosols	520	465	390	635	825
Total Gallons	5,668	5,107	6,605	9,591	12,162

Recap - Pounds

	FY 2011-2012	FY 2012-2013	FY 2013-2014	FY 2014-2015	FY 2015-2016
Waste	12,460	8,080	11,380	12,980	19,220
C & D / Furniture	404,940	432,960	480,100	605,560	893,400
Scrap Metal	104,160	83,900	145,840	143,500	230,580
Other Metal	5,961	3,767	4,079	9,590	3,725
Paper	29,440	44,180	51,520	82,940	89,900
Corrugated	14,660	27,840	41,480	65,940	93,840
Document Shredding	3,500	15,820	18,980	18,000	24,060
Bulky Rigid Plastics	5,080	19,780	25,060	34,580	39,740
Mixed Recyclables	42,880	45,920	14,080	24,180	12,820
PCB Ballasts	535	0	644	253	239
Fluorescents	1,538	1,621	1,646	3,084	4,530
Lead Acid Batteries	4,005	2,915	2,682	5,323	4,940
Alkaline Batteries	2,169	1,726	1,878	3,978	4,365
Other Batteries	1,183	629	890	716	1,005
Clothing	230	2,113	2,510	1,240	6,040
Electronics	164,239	60,468	62,027	19,097	64,796
Refrigerants	29,335	10,583	19,000	36,485	76,585
Total Pounds	796,980	751,719	864,796	1,030,961	1,493,200
Total Tons	398	376	432	515	747

Recap - Other Items Collected

	FY 2011-2012	FY 2012-2013	FY 2013-2014	FY 2014-2015	FY 2015-2016
Refrigerants	354	448	447	535	833
Tires	903	664	949	899	1,190
Propane Tanks	363	258	335	477	724
Fire Extinguishers	30	30	48	50	62
Mercury	0	150	0	800	200
Televisions & Monitors	1,680	1,517	1,619	1,983	3,610
Mattress	0	0	0	0	229
Returnable Bottles & Cans	7,530	17,384	9,331	12,336	8,145

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WACHUSETT EARTHDAY

Wachusett Watershed Regional Recycle Center

2017

Serving the towns of: Boylston, Holden, Paxton, Princeton, Rutland, Sterling, and West Boylston.

NEW 2017 HOURS

Tuesdays 9 to 11 am
Wednesdays 2:30 to 4:30
Thursdays 5 to 7pm (Mar-Nov)
3rd Saturdays 8 to 11am
1st Saturdays 8 to 11am (Jan, Feb & Dec)

HOLIDAY CLOSINGS

July 4, November 22 and 23, December 26

LOCATION

131 Raymond Huntington Highway, West Boylston MA

For updates, please check www.wachusettearthday.org or our Facebook page or call 978-464-2854

WACHUSETT EARTHDAY

Our mission is to promote recycling and reuse for a healthy watershed community.

Earthday Logo   DCR Logo

We are an all-volunteer, 501(c)(3) non-profit operating the year round at the Wachusett Watershed Regional Recycle Center at 131 Raymond Huntington Highway in West Boylston MA.

Wachusett Earthday has an on-going partnership with the Massachusetts Department of Conservation and Recreation (DCR) and seven Wachusett towns: **Boylston, Holden, Paxton, Princeton, Rutland, Sterling, and West Boylston.**

DIRECTIONS

I-190, Exit 5, north 0.2 miles on Route 140 to light, left on Legg Road and travel 0.8 mile to the entrance on the right. Or Laurel Street, West Boylston or Manning Street, Holden to Raymond Huntington Highway (parallel with I-190 at Holden/West Boylston town line), and travel 0.9 mile to the entrance on the left.

Mailing Address: Wachusett Earthday PO BOX 593, Holden, MA 01520

ADDITIONAL SERVICES

HOUSEHOLD HAZARDOUS WASTE PAINT AND CHEMICALS COLLECTIONS

In 2017 we'll hold 6 collections from 8am to noon on the following 4 days: April 15, June 17, September 16, and November 18. The rest of the site will also be open.

On the following 2 days HHP ONLY collection from 8am to noon: May 5 and October 6. The rest of the site will be closed.

Please separate items so they can be easily counted/evaluated and removed from your vehicle. Please remain in your car at all times. The fee is $4 per gallon or pound.

Materials accepted: paints, thinners, solvents, pesticides, herbicides, automotive products, pool chemicals, cleaners.

NOT accepted: explosives or ammunition

FREE PAPER SHREDDING

In 2017 we'll hold collections from 8am to 11am on the following 3 days: March 18, May 20, and October 21.

COMPOST BINS AVAILABLE

Earth Machine Compost Bin $38

Sure-Close Kitchen Composter $4

	July 1, 2015 to June 30, 2016 expense	July 1, 2016 to June 30, 2017 budget
Wachusett Watershed Regional Recycling Center		
Operations Budget—Town Allocation		
		Budget
Heat for building	1,758	3600
Electricity	4,354	3000
Phone	327	300
Operation Supplies/Volunteer services	3,536	2700
Maintenance building	3,233	1000
Education/outreach brochure	2,275	2200
Set-up fee, solid waste container for HHP collection	4,730	12,000
Insurance	3,229	2200
Accounting and fees	1,835	2000
Site signage	225	900
Total operations cost	25,502	29,900

Wachusett Watershed Regional Recycling Center
Town Allocations: FY 2017

Population	Town	%age	Operations Allocation
4385	Boylston	7.9%	$ 2,367
18838	Holden	33.8%	$10,106
4806	Paxton+	8.6%	$ 2,571
3447	Princeton	6.2%	$ 1,854
8800	Rutland	15.8%	$ 4,724
7808	Sterling	14.0%	$ 4,186
7699	W Boylston*	13.8%	$4,126
55,783			$29,934

+ does not include AMC students

* does not include inmates

Current Partnerships

Salvation Army
Habitat for Humanity/Restore
Worcester FreeStore
Lions Club
Department of Children & Families
Veterans, Inc
Montachusett Veterans Outreach Center
Toys for Tots/State Police
Worcester Animal Rescue League
Sterling Animal Shelter
Doctors w/out Borders – related
Holden Grange
American Legion
Oakdale Methodist Church
Local Police Departments
Bancroft School
Worcester Polytechnic Institute
Sheriff's Community Service Program
Early Childhood Center – Wachusett District

Future Partnerships

Christopher House of Worcester
Ingenuity Hub/Leominster
Towns' Libraries
Towns' Schools
Artists
Hands-on Repair persons (one just started with Sewing Machines)
Craft/Up-cycling
Any community-based needy organizations/individuals with demonstrated need

Appendix C: Interview Protocol for Experts in Inventory Management

Email Protocol
We primarily contacted experts via email but when email was not available we contacted them via phone and followed the same script.

Dear [Expert's name],
We are a group of four students from Worcester Polytechnic Institute who are working with a local nonprofit recycling and reuse organization, Wachusett Earthday. This organization is currently having difficulty tracking their inventory and our project aims to make recommendations to remedy these problems. We understand that you are involved in the operation and management of what we believe to be a similar organization, and we would like to ask you a few questions in regards to your organization. With this information, we hope to gain a better understanding of the problems that Wachusett Earthday faces, as well as some possible solutions. If you are willing to be interviewed, please let us know your availability in the coming week to speak in person or over the phone. Thank you for your consideration. We look forward to hearing back from you.
Respectfully,
Jacob Bryant, Steven Huynh, Tommy Trieu, Zachary Walsh

Interview Protocol
- Semi-Standardized structure
- Interview will be conducted by 1-2 team members.
- Dress: will vary based on who and where we are interviewing. Business Casual will be the bare minimum.
- Before interview, ask if we can record him/her. If we would like to quote him/her, we will ask at the end of the interview.
- Maintain appropriate eye contact and general courtesy throughout

What kind of experts should we be asking?
- Reuse experts that work in the field of operation\l management
- Members of a mostly volunteer nonprofit organization

Opening Script and Procedures:
Good morning/afternoon [experts' names]. [If in person, shake hand] Thank you for taking the time to talk with us. I'm [first interviewer], [if there is a second person] and this is [second interviewer]. As we mentioned in our email, we are part of a research team at Worcester Polytechnic Institute working with a local reuse and recycling center. The goal of our project is to provide a better method of tracking inventory for Wachusett Earthday Inc. We have a few questions for you in regards to your organization and how you operate.

Questions to Ask (these are subject to change depending on whom we are interviewing)
- What is your role in the organization and what are your responsibilities?
- Could you please give me an overview/background of your organization?
- What are some of the difficulties with inventory management that your organization encounters?
- How often and for how many hours is your organization open to the public?

- How much traffic does your organization get?
- How do you manage that traffic?
- How many workers do you have? Are they paid or volunteer or a combination?
- How do you track inflow and outflow of materials, and what do you do with this information? Is it useful?
- Have you ever had trouble tracking inflow and outflow of items? Please explain why or why not.

Appendix D: Interview Protocol for Volunteers at Wachusett Earthday

Interview Protocol for Wachusett Earthday Volunteers

These protocols were used when interviewing volunteers working inside of the Recycle Reuse Building, to ensure that interviews were executed properly. We conducted these interviews over the phone or in person, depending on the volunteer's preference. We collected their contact information while they were on duty slightly prior to or immediately following the opening of the Reuse Building. This was to minimize inconvenience for the volunteers during the center's working hours. During these phone interviews, we used the script below as a basis. It was a semi structured interview, so we did not repeat it verbatim with each person, but used it as a guide when speaking with the volunteers.

Good morning/afternoon (volunteer name), my name is _____ and I am one of the students from Worcester Polytechnic Institute working with Wachusett Earthday. Our primary goal is to provide Wachusett Earthday a recommendation for an improved inventory management system. As you are one of the volunteers who works inside of the ReUse Building, you would be affected by the changes that we might recommend. For this reason, your opinion is very valuable to us, and we would be very pleased if you would be willing to be interviewed. (Wait for response, if yes proceed). Thank you very much. Is there a date and time and place that works best for you? (Wait for response) That sounds great, I look forward to meeting with you.

Dress Code for Interviews:
- If we are at Wachusett Earthday for any reason other than participatory observation, we will be dressed in business casual (button down shirt, slacks, and belt).
- If we are interviewing with someone offsite, we will wear business casual attire.
- If we are performing participatory observation, we will be wearing clothing similar to that of other volunteers (jeans, sneakers, sweater, etc.).

Interview Proceedings:
- Semi-standardized structure
- Interviews will be conducted by one group member with one volunteer at a time.
- Prior to the interview, ask if it would be alright if we took notes. If we would like to quote them, we will ask for permission at the end of the interview.
- Maintain appropriate eye contact and general courtesy throughout.

Questions to Ask:

Opening questions to ease communication:
- How long have you been volunteering at Wachusett Earthday?
- What made you want to begin volunteering with the organization?

Pertinent Questions (their responses will dictate the questions asked, so not all of these questions will be relevant to every volunteer)
- Please give us your overall thoughts about volunteering at Wachusett Earthday.
  - What do you like about your time volunteering?
  - What do you dislike about your time volunteering?
- What are the biggest difficulties facing Wachusett Earthday, with regard to managing the inventory in the Reuse Building
- What changes do you think would make Wachusett Earthday operate more effectively?
- What have you done for work in the past? Did you use technology often?
- Do you have a computer at home?

If yes:
- How often do you use it?
- What are software programs you have used in the past? To what extent?

- On a scale of 1-10 how would you rank your comfort level with operating a computer?
- On a scale of 1-10 how would you rank your ability level with operating a computer?
- Do you have any interest in becoming more competent with a computer?
- Would you be comfortable with primarily operating a computer while volunteering at the center? Why or why not?
- Have you ever used a tablet?
- If yes, did you feel that the tablet was more or less intuitive than a computer? Why or why not?

Appendix E: Interview Protocol for Experts in Adult Training

Interview Protocol for Training Experts

Email Protocol
We primarily contacted experts via email but when email was not available we contacted them via phone and followed the same script.

Dear [Expert's name],
We are a group of four students from Worcester Polytechnic Institute who are working with a local nonprofit recycling and reuse organization, Wachusett Earthday. This organization is currently having difficulty tracking their inventory, and our project aims to make recommendations to remedy these problems. When we offer a potential solution, however, we will also need to provide training plans to support the volunteers moving forward. We believe from your experience that you have extensive knowledge in the field of adult training, and we would like to ask you a few questions regarding effective training methods. With this information, we hope to be able to create appropriate training procedures and information for the Wachusett Earthday volunteers. If you are willing to be interviewed, please let us know your availability in the coming weeks to speak in person or over the phone. Thank you for your consideration. We look forward to hearing back from you soon.
Respectfully,
Jacob Bryant, Steven Huynh, Tommy Trieu, Zachary Walsh

Interview Protocol
Dress Code:
- Will be a minimum of business casual, and business formal will be worn when appropriate.

Interview Proceedings:
- Semi-Standardized structure
- These interviews will be conducted in person when possible. If interviewers are too far to meet in person, a phone interview will be conducted.
- Interview will be conducted by 1-2 team members.
- Before interview, ask if we can record it. If we would like to quote him/her, we will ask for permission to do so at the end of the interview.
- Maintain appropriate eye contact and general courtesy throughout

What kind of experts should we be asking?
- Employees/managers who are responsible for training subordinates on a technological system.
- People who have experience training elderly people to use information technology.

Opening Script and Procedures:
Good morning/afternoon [experts' names]. [If in person, shake hand] Thank you for taking the time to talk with us. I'm [first interviewer], [if there is a second person] and this is [second interviewer]. As we mentioned in our email, we are part of a project team at Worcester Polytechnic Institute working with a local reuse and recycling center. The goal of our project is to provide a better method of tracking inventory for the organization. We have a few questions for you that will hopefully give us more insight into successful adult training techniques.

Questions to Ask (these are subject to change depending on whom we are interviewing)
- What is the primary age group whom you have had experience training?
- What are the primary activities that you have trained others to do?
- What are some of the most successful techniques that can be implemented when training adults?
- What are the most common difficulties with training adults?
- Do you think there are additional difficulties in training volunteers rather than paid employees? Why or why not?
- Do you believe any different or additional steps should be taken when training a volunteer? If so, what are they?
- Have you ever trained anyone to use technology, such as a modern cash register system or inventory management system? If so, please explain how you did this.
- How long do you believe a training regimen should last? Please explain.
- Have you ever been involved with the development of a training manual? If so, what was it for and what were some of the important things to include in its contents?

Appendix F: Interview Protocol for Ms. Norma Chanis and Mr. Mark Koslowske

As Ms. Norma Chanis and Mr. Mark Koslowske were officers of Wachusett Earthday, we were confident that with their expertise in Wachusett Earthday's operations, they would be able to clarify what the organization's inventory tracking requirements were.

We reached out to Ms. Chanis and Mr. Koslowske to schedule this interview through email, Ms. Chanis' preferred method of communication. Below is the body of the email we sent her to schedule the interview. Note that at the time we sent her the email, we had established a working relationship with Ms. Chanis, and she told us to address her by her first name.

> Hello Norma,
>
> Our team had some questions regarding the deliverables/outcomes that your organization had requested us to fulfill. We understand you are expecting us to provide a way to track what items people bring in or take home for reuse at the Recycled Resource Building. However, we were wondering if you had any specific ideas in mind to track items after reading our project proposal. If you don't mind, we would like to schedule an interview with you and your colleagues to discuss how your expectations for our project may have changed. Please reply with the times you are available this week, and whether you would like to meet at the recycling center. Our office in downtown Worcester is also a viable location to hold our interview.
>
> Sincerely,
> Jacob Bryant
> Steven Huynh
> Tommy Trieu
> Zachary Walsh

The interview procedure was as follows:

- Dress code was business casual (e.g. polo shirts, slacks)
- Interview was semi-standardized; although we had questions prepared for Ms. Chanis and Mr. Koslowske, their purpose was to probe more discussion regarding what are Wachusett Earthday's inventory tracking requirements.
- All four team members will conduct the interview and ask follow-up questions
  - One team member will lead the interview and ask our prepared questions
  - One team member will record responses to all questions asked
  - All will maintain appropriate eye contact and general courtesy throughout the interview

Just before we conducted the interview, each participant in the interview introduced themselves and engaged in small talk. A team member would provide a lead-in to the interview with this opening statement:

> Hello all, if you don't mind my team and I would like to begin the interview. As you know, we are conducting this interview to determine whether you have any specific ideas

in mind to track items within the Recycled Resource Building after reading our project proposal. Your responses will help us determine what exactly are Wachusett Earthday's inventory tracking requirements. We will begin this interview by asking questions that are intended to encourage more broad discussions.

Our prepared questions for this interview were:

- Do you have a preference now, as to whether items from the Recycled Resource Building should be tracked individually or by weight?
- After observing that a bottleneck occurs at the Recycled Resource Building's only point of entry and exit, we have considered including a plan to designate an additional point of entry and exit as part of our recommendation to Wachusett Earthday. Do you think that there should be an additional entrance or exit for the Recycled Resource Building?
- What does Wachusett Earthday hope to gain by learning more about items from the Recycled Resource Building?

Appendix G: Summary of Interview with the Goodwill Store in Worcester

Date of interview: February 8, 2017
Organization representative that we interviewed: a retail supervisor (no name given)

- the supervisor's responsibilities include opening/closing the store, leading sales associates, and performing transactions
- the Goodwill Store used to accept volunteers until a couple years ago; all store workers are now employed
- the Goodwill Store does not track donations extensively
  - they only track the number of donations they receive daily
  - they do not employ software to track donations and their attributes
- the Goodwill Store uses NCR Counterpoint to track purchased items
  - it is used to track purchased items by department (e.g. clothing, books)
  - also does purchase and return transactions
  - NCR Counterpoint is installed on hardware specifically designed for the point-of-sale system
  - the store uses information gathered with NCR Counterpoint to determine which departments are almost out-of-stock, so that they can contact Goodwill suppliers to restock
  - the store is satisfied with their current system of tracking inventory; they do not have any problems with using NCR Counterpoint
  - Goodwill Industries purchased NCR Counterpoint for the store

Appendix H: Summary of Interview with Molly Pietrantonio from the Habitat for Humanity ReStore

Date of Interview: November 30, 2016
Interviewer: Tommy Trieu
Interviewee: Molly Pietrantonio, Habitat for Humanity MetroWest/Greater Worcester, Volunteer Coordinator

- Volunteer Coordination
  - IQP group came in and recommended they switch to the online volunteer tracking program Cervis
  - Currently using both paper tracking and online tracking of volunteers through Cervis
    - Volunteers have the option of using either, with Cervis being highly encouraged
    - This is a method of allowing volunteers to become more comfortable with the program before it is implemented/piloted
    - Information on paper documents is manually entered into Excel by the volunteer coordinator
  - Volunteers required to attend orientation sessions before active participation
- Volunteer demographics
  - 8 paid staff
  - Remaining staff consists of volunteer
    - There are 1500 unique volunteers
    - 12 regulars amongst them
    - Volunteers consist of:
      - Retirees
      - Collegiate
      - Members from the department of transitional assistance
      - Disabled individuals
- Item Inventory
  - 3 different methods for pricing items
    - RFID
    - Pricegun
    - Signs indicating prices of specific items (e.g. different quantities of paint ranging from $12-$24)
  - POS system called Thriftcart
    - Able to track all items leaving center
  - Track items coming in through donation slips at the drop off area of the center
    - Not everybody fills out these slips so the information on incoming items so the information in 100% accurate
  - Organization of store is based off of the information on what items are being taken out the most
    - They measure both the tonnage and quantity of leaving items when making these measurements

Appendix I: Summary of Interview with Deborah Hoak, ReStore Director of Habitat for Humanity MetroWest/Greater Worcester

Date of interview: January 23, 2017
Organization representative that we interviewed: Deborah Hoak, ReStore Director

Habitat's inventory system
- For incoming items, they only track items that they purchase: soda, paint, and soap
  - They do not track incoming donations
- Track number of donations and revenue on a daily basis
  - During January, they expect 300 to 400 transactions ("drop-offs and pick-ups")
  - Number of transactions varies by season
- A study conducted by a WPI student group confirmed that for every 1.3 pounds they receive in donated material, they earn $1 in revenue
- For outgoing items, they track all items through a POS system known as ThriftCart
  - Their last POS system was custom-made
  - ThriftCart has been used since August 2016
    - Was chosen among 12 candidates
  - $50 per month to license ThriftCart's "Point of Sale and Inventory" module
    - Does not include mandatory setup fees
  - Initial setup cost of $10,000 for hardware such as registers, barcode printers and scanners, etc.
  - 3 to 4 software-caused errors occur every month
  - Cloud-based
    - Was seen as a disadvantage because the facility's internet connection was insufficient to handle a system that had to be connected at all times...
      - … but was overlooked after researching in-house systems, which would require them to maintain their own server, costing them $300 per month
    - If the facility cannot connect to the internet, they default to tracking items with paper and pen
    - Information gathered with ThriftCart is used to apply for grants
- They perform item identification
  - Large section of store blocked off from public that is dedicated to organizing donated items
    - After an item has been identified it goes onto the floor for sale
    - The process is overwhelming, as the amount of donations the center receives comes in much faster than they can price them
  - For items valued at less than $10, they only track their values with a "price sticker"
  - For items valued at greater than $10, they track their values and additional attributes with SKU barcodes
    - Tracked attributes are:
      - ID
      - Which department the item belongs to ("item category")
      - Description
      - Arrival date

- Price

Volunteers demographics
- Age ranges from high school to retirees
- 30 to 40 percent have disabilities
- Assigned tasks include:
  - Picking up and carrying items
  - Handing transactions at the check-out counter
  - Answering questions on the main floor

Miscellaneous
- 188 transactions on 1/21
  - On average, 2 people and 5 items per transaction
  - 942 items left the facility
- ~600 items left the facility on 1/19
- 3 people are usually in line for check-out
- Items are priced to compete with other sellers
- 3 to 15 volunteers are at the facility on a daily basis
- Deborah referred us to these organizations for further research
  - Southborough Transfer Station
    - Had a swap shop (closed indefinitely)
  - Leicester Recycling Center

Appendix J: Summary of Interview with Jessica LeMay, librarian at the Worcester Public Library

- Experience in teaching
    - Hosts open tech nights
        - People can come in and ask technology-related questions
    - Crafts
    - Age of students varies
- Difficulties in teaching adults
    - Having them show up on time
    - Lack of confidence
    - Dedication to learning
        - Volunteers may not be as dedicated as employees
- Teaching/training techniques
    - Having visual aids
    - Something tangible to facilitate teaching
    - Find a way to instill confidence into students

Appendix K: Summary of Interview with Veronica Howley, librarian at the Worcester Public Library

- Experience in teaching
  - Teaches older adults with lower technological abilities how to use computers and related programs (e.g. Microsoft office, internet, etc)
  - Average age of students is 40-65 years old
- Difficulties teaching adults
  - Adults didn't grow up with computers like a lot of today's youth
    - Feel computer illiterate in comparison, negatively affect ability to learn
  - Individuals don't have computers at home and can't afford connections
  - Language barriers
  - Mental illness issues
- Teaching/training techniques
  - Approach with a positive attitude; remove negative stigma
  - Having an orientation/training program with a maximum time of 1 hour
    - Any longer and it is hard to stay engaged
    - Find time that works for most people
  - Try to suit classes to individuals
    - Find out their wants and needs
    - Don't focus on only one person, however
      - Need the whole class to be engaged, not one student
      - Keep the difficulty the same and low so that no one is left out or confused
  - Start simple
    - Ease into learning about new technologies in processes, don't dive right in

Appendix L: Summary of Interview with Norma Chanis, Clerk of Wachusett Earthday, and Mark Koslowske, Vice President of Wachusett Earthday

Date of interview: January 25, 2017
Organization representative that we interviewed: Norma Chanis, Clerk, and Mark Koslowske, Vice President

- Volunteer demographics
  - most volunteers over 65
  - described as "grandmas"
  - 20 active volunteers that work in the Recycled Resource building
- Wachusett Earthday needs to track items in their Recycled Resource building
  - Track items from visitor to the building as well as affiliates
  - Would like our recommendation to allow future expansion
  - Wants to track items for grant applications
- Recycled Resource building layout
  - Entrance nearest to the recycling center's paved parking lot is meant for visitors who intend to donate or take items
  - Entrance in the sorting room is meant for all volunteers
  - Entrances in the showroom are meant for volunteers who are carrying large to and from the building
  - Wachusett Earthday may have offices in the showroom
- Wachusett Earthday wants to reduce their spending costs
  - Recently spent $35,000 to $40,000 for paving the parking lot
  - Looking into solar power to save money
- Wachusett Regional Watershed Recycling Center will receive 4G/LTE internet service in February

Appendix M: Content Analysis of Volunteer Interviews

Table 4: Content Analysis of Volunteer Interviews

Interviews Volunteer Number	Programs	Category Score	Platforms	Category Score	Experience	Category Score	Sum of Category Scores
1	3	0.6	3	1.000	2	0.333	1.933
2	3	0.6	3	1.000	3	0.500	2.100
3	3	0.6	1	0.333	6	1.000	1.933
4	3	0.6	2	0.667	3	0.500	1.767
5	5	1.0	2	0.667	5	0.833	2.500
6	3	0.6	1	0.333	2	0.333	1.267
7	1	0.2	2	0.667	2	0.333	1.200
8	3	0.6	1	0.333	2	0.333	1.267
9	2	0.4	2	0.667	2	0.333	1.400
10	5	1.0	3	1.000	3	0.500	2.500
11	2	0.4	1	0.333	2	0.333	1.067
12	1	0.2	2	0.667	3	0.500	1.367
13	4	0.8	1	0.333	4	0.667	1.800
14	3	0.6	2	0.667	3	0.500	1.767
15	2	0.4	1	0.333	2	0.333	1.067
16	3	0.8	2	0.667	1	0.167	1.583
17	1	0.2	2	0.667	1	0.167	1.033
18	4	0.8	2	0.667	2	0.333	1.800
19	3	0.6	1	0.333	3	0.500	1.433
20	2	0.4	1	1.000	2	0.333	1.733

Appendix N: Descriptions of Point of Sale Systems

ThriftCart

ThriftCart (2016) is a cloud based point of sale (POS) system that allows its users to handle sales and manage their inventory anywhere there is a computer with internet access. The system lets the operator post their inventory in real-time to a web page. This means that when a new item comes in, or an existing item is sold, the inventory on the web page is updated automatically to reflect this. By automatically updating, it reduces the risk of advertising inventory that is not actually in stock. This feature is meant to increase sales and donations by increasing market exposure. The donation pickup scheduling feature can integrate with the website as well, so that when someone fills out a pickup request form on the website, the information transfers into the system. Data is automatically created in the system about what inventory has sold, which items are selling the most, and which items are moving off the shelf the fastest. The system is designed to increase accuracy in inventory reporting as well as reduce time wasted on inventory management tasks.

The ThriftCart (2016) point of sale system is infinitely customizable, allowing its users to create any inventory item they wish, assign unique images to these items, create barcodes, add customers to the system, and create discount coupons. It can grow with the business that it is working for, allowing them to start off with a simple tablet or computer and only use the menus to check customers out. As the needs of the business grow, the owner can seamlessly integrate a barcode printer, barcode scanner, and receipt printer into the system. It also offers business owners a choice of operating system, as it is compatible with any device that can access the internet.

The system costs $50 a month with no annual contract or additional set up costs (ThriftCart, 2016). For businesses that charge for their items, there is also a $.01 fee for each

transaction, but this is not applied if the items are free. The ThriftCart point of sale system offers an affordable solution to any organization seeking a system to track inventory.

NCR CounterPoint

NCR Counterpoint (2016) is a retail management suite that includes point of sale, inventory management software, automated purchasing, and configurable reporting capabilities. This system can be used at a dedicated computer or checkout system running windows, or on an iOS or Android mobile device, allowing business owners to reach their customers anywhere. Prices and quantities are updated in the system automatically to items listed in store and online. Counterpoint also includes features such as email marketing which lets you contact customers based on their purchase history, and mobile alerts that keep the owner informed. The price of this system is $90 per month. This system is applicable to a non-profit looking to track outflow as it is able to comprehensively track inventory and generate customizable sales reports.

According to one NCR Counterpoint user, Lars Cabrera (2016), there is a learning curve when it comes to using this system, but it has become "an invaluable tool for our daily operations". Lars Cabrera is a corporate salesperson at Central Computer. Mr. Cabrera values that NCR Counterpoint is able to keep track of past retail sales tickets and invoices, as well as a way to display available inventory stock for a particular item across all of Central Computer's store locations. What prevents Mr. Cabrera from recommending NCR Counterpoint is its instability and user interface. NCR Counterpoint will sometimes crash when it runs as a background task on a computer, so any immediate work on a sales ticket would be lost. NCR Counterpoint's user interface is also a hindrance to performing work; for example, it will often ask the user to re-verify their credentials even after making just one order or quote.

RetailEdge

RetailEdge (2016) is a cloud-based POS software program that has been used for over 25 years. The software's capabilities deal with: transactions, inventory management, mobile accessibility, order and sales tracking, and analytical reports. The system also supports the use of multiple hardware items including: barcode scanner, receipt and label printer, POS scales, and cash drawers. The most basic version of RetailEdge is currently available in their store at a price of $495. The store also offers a variety of different versions of the software to suit their customers' needs (e.g. the RetailEdge 8.2 Point of Sale Software – Island Workstation for $450).

While RetailEdge's POS system offers a variety of features and capabilities, this quantity of options can also prove to be a limitation of the system. While the user interface has a more professional look to it, it can be very overwhelming to individuals who are not as technologically inclined with the variety of functions it provides. The interface is also difficult to customize, meaning that an organization would have a hard time tailoring the system to its workers' preferences. The training for learning how to use the program professionally also takes longer to learn, time that organizations may not have. This information only validates how much stress it can put on the individual attempting to operate it.

TransAct

TransAct (2016) is a modular POS application used for retail purposes. It is commonly used by stores that sell hardware, home goods, lumber, and building operations. This company offers several POS and Inventory modules. Their POS module is intuitive and highly configurable to specific organizations. Additionally, the system is compatible with many general POS hardware platforms including barcode scanners, receipt and label printers, and other standard products. Additionally, their Inventory Control module has several unique features. Among these are pricing, stocking, and sales history. TransAct and its modules provide its

customers with a highly customizable and personal set of features for their own needs. TransAct costs $54 per month and is available for Windows Operating Systems only.

By only being available on Windows machines, organizations that would like to implement the system could be hindered if they already utilize different operating systems. Not only that, but this restriction does not allow clients many options when they are considering hardware they would like to purchase. Additionally, the user interface associated with TransAct has its own limitations. The interface offers a variety of functions to the user, and while this quantity of functions may be preferred for professionals working with POS systems, individuals who are less comfortable with technology could find these feature to be overwhelming. This should be emphasized for a nonprofit organization like Wachusett Earthday, where technological competency is not consistent among all volunteers.

Unify by Webgility

Unify by Webgility (2016) is a comprehensive software suite designed for businesses that work across multiple platforms, selling inventory online and/or in multiple stores. It allows owners to manage all of their sales data, inventory, marketing, orders, and shipping on one convenient dashboard. For inventory management, users are able to keep track of all the items they have listed and on what sales channel they are on (Amazon, eBay, Shopify, etc.). Product prices and quantity can be automatically updated and Unify will reflect this new information across all sales channels. Unify costs $39 per month, but does not include a conventional point of sale check out system in this price.

According to one Unify user, Marc Vasquez (2016), the program is extremely user friendly. Marc Vasquez is a manager of information technology at Hydraulax Products. Mr. Vasquez states that Unify has allowed the company to streamline their operations and make staff more effective and efficient in their daily tasks. They specifically use the system to manage their

inventory across multiple sales channels. This inventory fluxes daily, and Unify is able to keep track of these changes and update this information on all of their sales channels automatically. With the use of this system, Hydraulax Products has eliminated any errors caused from double entry, reduced data entry time to zero, payment processing time to zero, and time to post back to webstores to zero. Mr. Vasquez also praises Webgility and the Unify system for having great customer service and informative webinars. One negative of the system he pointed out was the fact that there is a steep learning curve, and even members that have used inventory management systems in that past will need to be retrained to learn this new system.

While this system is designed primarily for retail businesses, it is still applicable to small non-profit organizations. Because it is designed to track inventory across multiple channels and synthesize this information into one report, it is certainly able to track the movement of inventory inside of a single store (Unify, 2016). Unify also has capabilities that offer room for smaller organizations to grow. For example the order management feature could be used to coordinate with donors to figure out what items will be coming to the store ahead of time. It also has an abundance of features for these organizations to begin listing items online.

However, because it is designed to do much more than simply track items in a single store, the system is more complicated and not as user friendly as a system that is designed for point of sale transactions (Vasquez, 2016). Also, because there is no point of sale system included with Unify, another purchase would be required for in store checkouts to be recorded automatically. Over all, this is a very capable system but possibly too advanced for the needs of an organization such as Wachusett Earthday. Further analysis on Unify's suitability can be found in chapter 4.

Excel

Microsoft Excel (2016) is a software application developed by Microsoft that allows the user to view, edit, and create spreadsheets. With these spreadsheets, the user is able to organize, formulate, and calculate data. Formulas can be used to facilitate calculations, and any data entered can be converted into a graph within the application. The Excel 2016 application is available on both Windows, Apple, and Android devices. The cost of Excel is $109.99 for Windows and Mac, and free for download on mobile devices. The mobile version of Excel, however, has limited functionality compared to its desktop counterpart.

Excel 2016 is a program that has been improving since 1982 and is one of the most commonly used spreadsheet programs today. Excel is not, however, a POS system application. Excel was not designed specifically to facilitate the point-of-sale process. While the application could be used to keep track of information relevant to inventory management (e.g. inventory management, donation tracking, managing sales), other systems have been designed to perform the same processes in a more efficient and organized manner.

ShopKeep

ShopKeep (2016) is a cloud-based iPad point of sale system. The system comes with a multitude of features: transactions, payment processing, inventory management, customer marketing, and reporting & analytics. Another key feature of ShopKeep is that users are able to access these features remotely and through multiple devices (e.g. obtaining a sales report on an iPhone or computer).

The interface of the iPad application was designed to be simplistic and easy to learn so employees can start their jobs with minimal training (ShopKeep, 2016). Items can be added to the system with a few simple clicks, but images cannot be assigned to them. Instead items can be given a unique color, and can be separated into larger categories that become separate "pages" on

the main menu. These "pages" are just like tabs on a web browser that can be traversed with one touch. For example, a wine retailer can separate their wine selection by country of origin, so on the main menu there may be "pages" for Spain, France, and Italy. Additionally, the user is able to receive a customizable report of their sales and inventory data. Information that the user is able to view includes but is not limited to: up-to-date inventory, the sales for a specific time period (e.g. day, month, year), and information on customers who have made purchases in-store. The cost of ShopKeep is $69 per month for a single register.

Since the system can only operate on iOS operating systems, ShopKeep does not allow for much variation in terms of hardware. This can make it harder for clients to implement the system if they already have technologies in place that aren't compatible with iOS applications. Additionally, ShopKeep's $69 a month per register charge reveals itself to be a problem for organizations who seek to implement multiple POS register locations at their sites.

Appendix O: Point of Sale System Scores in Decision Matrix

ThriftCart

ThriftCart scored a 4/10 in "12 Month Cost" because it costs $600 per year ($50 per month), and when this cost was plugged into the formula that we developed to calculate each system's annual cost score, discussed in Chapter 3.4, the final product was 4. It scored a 9/9 in "Hardware Platform Options" because it is compatible with a desktop, laptop, or tablet, as well as any operating system.

ThriftCart scored only a 7/10 for "User Interface" because while the cash register application is very appealing and easy to use, the abundance of menus in the rest of the system makes other tasks such as reporting, creating new items, and adding new items to the cash register difficult to learn. However, while the completion of these tasks is not as intuitive as some competitors, they are still done through a systematic process, and once this process is learned, they can be completed with minimal time.

"Customer service" was rated at a 7/10, because the company was extremely responsive and timely with answering any questions we had. However, ThriftCart is a comparatively small organization and is based out of California. We are not confident about how quickly they could address actual software issues, and for this reason we did not give the system a higher score. ThriftCart received an 8.8/10 in "Customer Rating", because it received an average of 4.4/5 stars in 14 customer reviews. It received a 10/10 in the final category, features, because it had all of the feature we thought would be appropriate for Wachusett Earthday. These categories were barcode printing and scanning, customer tracking, inventory creation and tracking, automatic reporting, and donation drop-off scheduling. The final score was calculated by multiplying each category weight by the respective score for that category. The final equation for ThriftCart can be seen below in Figure 7, yielding the total score of 292.

$$(6 * 4) + (5 * 9) + (10 * 7) + (7 * 7) + (5 * 8.8) + (6 * 10) = 292$$

Figure 7: Total Score for ThriftCart

NCR CounterPoint

NCR CounterPoint scored a .01/10 in "12 Month Cost" because companies incur a cost of $990 during the first 12 months of ownership, when this is plugged into the equation mentioned in Chapter 3.4, .01 is the result. It scored a 3/9 in "Hardware Platform Options" because it must be operated on a desktop running a Windows operating system.

CounterPoint scored only a 7/10 for "User Interface" because as it suffers from the same issues as ThriftCart. The cash register is extremely easier to use, with customizable colors and pictures for each button, but the rest of the system has too menus and sub categories to make it intuitive to use. "Customer service" was rated at a 6/10, because the company took several days to answer our emails, and we often had to ask questions multiple times to receive an answer. However, NCR Counterpoint is a larger corporation and services many large retailers including The Home Depot. We assumed from their size and experience that they would certainly have the capabilities to solve any problems with the software that may arise.

NCR CounterPoint scored a 6.4/10 in "Customer Rating", because it received an average of 3.2/5 stars in 8 customer reviews. It scored a 8/10 in the final category, features, because it is capable of barcode printing and scanning, customer tracking, inventory creation and tracking, automatic reporting. The final equation for NCR CounterPoint's final score can be seen below in Figure 8, yielding the total score of 207.6.

$$(6 * .01) + (5 * 3) + (10 * 7) + (7 * 6) + (5 * 6.4) + (6 * 8) = 207.6$$

Figure 8: Total Score for NCR CounterPoint

RetailEdge

RetailEdge scored a 5.5/10 in "12 Month Cost" because companies incur a cost of $450 during the first 12 months of ownership, when this is plugged into the equation mentioned Chapter 3.4, 5.5 is the final result. It scored a 3/9 in "Hardware Platform Options" because it must be operated on a desktop running a Windows operating system. RetailEdge received the lowest score in "User Interface" with a 4/10. This is because the system is not visually appealing, with gray and white making up the majority of the colors on almost every screen. There is also an abundance of menus and buttons cluttering the screens, which can easily overwhelm new users. Overall, the design of RetailEdge's user interface is reminiscent of a dialogue box from Windows XP.

"Customer service" was rated at a 6/10, because the company never directly answered any of our questions in our emails, and their helpline was extremely slow and layered with several automated responses and prompts. Similarly to NCR Counterpoint, however, RetailEdge is a successful name in the point of sale industry, and we assumed that once someone went through the tedious task of getting in touch with the company, they would receive the help they needed. RetailEdge scored an 8.6/10, because it received an average of 4.3/5 stars in 23 customer review. It scored a 6/10 in the final category, features, because it comes with barcode printing and scanning, inventory creation and tracking, and automatic reporting. The equation for RetailEdge's final score can be seen below in Figure 9, yielding the total score of 209.

$$(6 * 5.5) + (5 * 3) + (10 * 4) + (7 * 6) + (5 * 8.6) + (6 * 6) = 209$$

Figure 9: Total Score for RetailEdge

TransAct

TransAct scored a 5.3/10 in "12 Month Cost" because companies incur a cost of $642 during the first 12 months of ownership, when this is plugged into the equation mentioned in Chapter 3.4, 5.3 is the final result. It scored a 3/9 in "Hardware Platform Options" because it must be operated on a computer or running a Windows operating system. TransAct received a score of 6/10 in "User Interface". This is because it suffers from the same issue of having cluttered screens that RetailEdge did, however the screens are more polished and visually appealing than RetailEdge's. TransAct does incorporate some colors and images into the system screens to help differentiate between buttons.

"Customer service" was rated at a 5/10, because the company never answered our emails, but we were able to contact them through the customer service line listed on their website. The associates we spoke to seemed knowledgeable, but it took a long time on hold to actually be able to speak with someone. TransAct scored a 5/10 in in "Customer Rating", because it received an average of 2.5/5 stars in 10 customer reviews.

It scored a 6/10 in the final category, features, because it includes barcode printing and scanning, inventory creation and tracking, and automatic reporting. The equation for TransAct's final score can be seen below in Figure 10, yielding the total score of 207.8.

$$(6 * 3.6) + (5 * 3) + (10 * 6) + (7 * 5) + (5 * 6) + (6 * 6) = 192.6$$

Figure 10: Total Score for TransAct

Unify by Webgility

Unify by Webgility scored a 5.3/10 in "12 Month Cost" because companies incur a cost of $468 during the first 12 months of ownership, when this is plugged into the equation mentioned in Chapter 3.4, 5.3 is the final result. It scored a 6/9 in "Hardware Platform Options" because it can be operated on a computer or tablet running a Windows operating system. Unify

received a score of 5/10 in "User Interface". This is because although the system is very polished

and smooth, the program is clearly targeted at business professionals who have experience

operating computers and software. The system is designed to be tailored and adjusted to each

company's needs, and therefore it has several different options for most functions. This requires

many menus and, while they are clearly labeled, they are likely to overwhelm the average

Wachusett Earthday volunteer.

"Customer service" was rated at a 7/10, because the company quickly responded to our

emails, and we were able to speak with a live person every time we called. They took the time to

answer our questions even when it was likely that we would give them no new business. Based

on this, and the information we found in customer reviews, we are confident that they would

bring this same kind of helpfulness to their paying customers. Unify scored an 8.8/10 in

"Customer Rating", because it received an average of 4.4/5 stars in 55 customer reviews. It

scored a 4/10 in the final category, features, because it only includes inventory creation and

tracking and automatic reporting out of the features that we were looking for. The equation for

Unify's final score can be seen below in Figure 11, yielding the total score of 207.8.

$$(6 * 5.3) + (5 * 6) + (10 * 5) + (7 * 7) + (5 * 8.8) + (6 * 4) = 228.8$$

Figure 11: Total Score for Unify by Webgility

Microsoft Excel

Microsoft Excel scored a 9/10 in "12 Month Cost" because companies incur a cost of

$100 during the first 12 months of ownership, when this is plugged into the equation mentioned

in Chapter 3.4, 9 is the final result. It scored a 9/9 in "Hardware Platform Options" because it can

be operated on any computer or tablet running either a Windows or Apple operating system.

Excel received a score of 2/10 in "User Interface". This is because although the system is

extremely professional, and very capable once it is mastered, it is a difficult program to become

comfortable with. New users can easily change the function of a cell by deleting or adding an equation without even knowing it. For this reason, we found Excel to be a rather poor interface for the needs of Wachusett Earthday.

"Customer service" was rated at a 5/10, because there are a plethora of troubleshooting guides and online resources provided by Microsoft, but actually being able to speak with someone is extremely difficult. Also, if something is not working properly, it is most likely going to be caused by an input error in that specific spread sheet, and no Microsoft associate would be able to help with this. Excel scored an 8.4/10 in "Customer Rating", because it received an average of 4.2/5 stars in 41 customer reviews.

It scored a 0/10 in the final category, features, because none of the features that we were looking for can be automated through Microsoft excel. While new items can be created and tracked in the system, all of the tracking would have to be performed manually in a spread sheet, and then the total inventory would have to be updated after. The equation for Excel's final score can be seen below in Figure 12, yielding the total score of 196.

$$(6*9) + (5*9) + (10*2) + (7*5) + (5*8.4) + (6*0) = 196$$

Figure 12: Total Score for Microsoft Excel

ShopKeep

ShopKeep scored a 9/10 in "12 Month Cost" because companies incur a cost of $828 during the first 12 months of ownership, when this is plugged into the equation mentioned in Chapter 3.4, 1.3 is the final result. It scored a 3/9 in "Hardware Platform Options" because, while the Back Office site can be accessed on any device, the cash register app can only be operated on an Apple iPad. ShopKeep received a score of 9/10 in "User Interface" because it was the most visually appealing and intuitive system we interacted with. The menus were clear and concise,

the cash register app was extremely easy to use, and we could accomplish all operations in the Back Office site after a very short time with the system.

"Customer service" was rated at an 8/10, because there is an abundance of YouTube videos posted by ShopKeep detailing how to use the system, and we were able to speak with an actual person every time we contacted the company. All of the customer reviews we read also claimed that ShopKeep was very helpful with any issues users experienced. The system scored an 8.6/10 in "Customer Rating", because it received an average of 4.3/5 stars in 15 customer reviews. It scored an 8/10 in the final category, features, because it had all of the features we were looking for except donation drop-off scheduling. The equation for ShopKeep's final score can be seen below in Figure 13, yielding the total score of 259.8.

$$(6 * 1.3) + (5 * 3) + (10 * 9) + (7 * 8) + (5 * 8.6) + (6 * 8) = 259.8$$

Figure 13: Total Score for ShopKeep

Appendix P: ThriftCart and ShopKeep Information Packets

<u>**Thrift Cart**</u>
<u>Point of Sale Inventory Management System</u>

<u>Description:</u>
"ThriftCart is a cloud based point of sale system that allows its users to handle sales and manage their inventory anywhere there is a computer with internet access. The system lets you post your interesting inventory in real-time to your web page. That will increase foot traffic, brand awareness, donations, and sales. The Donation pickup scheduling feature can integrate with your website, so that when someone fills out your pickup request form on your website, the information transfers into the system. The system also has features for tracking purchased inventory if you decide to augment your donated/consigned inventory with purchased inventory. Data is automatically created in the system about what inventory has sold, which items are selling the most, and which items are moving of the shelf the fastest. The system is designed to increase accuracy in inventory reporting as well as reduce time wasted on inventory management tasks."

<u>Cost:</u>
- <u>$50 per month (additional $.01 per transaction for items that are sold for a dollar amount)</u>
- No additional upfront cost charged by ThriftCart
- Initial Hardware
  - Desktop computer (~$300-$$$)
  - or Apple iPad ($399)
  - room for expansion with the support of barcode printer, barcode scanner, and receipt printer (~an additional $150)

<u>Operating Systems:</u>
ThriftCart POS is compatible with the following operating Systems:
- Windows desktop/laptop OS
- Android Tablets
- Windows Tablets
- Apple iOS tablets

System Screenshots:

Select an item type

Furniture	Appliances	Cabinet	Door	Lighting	Plumbing	Window	Custom

Restart

Stainless steel chandelier (147 - Manage item inventory)
Price: $0.00
Category: Lighting
Reprint barcode

Upload an image for Stainless steel chandelier (147)

Browse... No file selected.   Upload
Upload an image with webcam

Black Electrolux freezer (146 - Manage item inventory)
Price: $0.00
Category: Appliances
Reprint barcode

Upload an image for Black Electrolux freezer (146)

Browse... No file selected.   Upload
Upload an image with webcam

Automatically printing barcodes

There is currently 1 barcode waiting to be printed. Printing barcode for item 147, Stainless steel chandelier

Reprint barcode
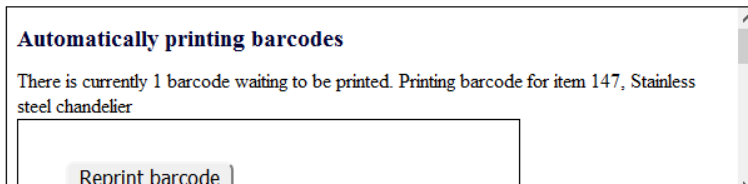
Figure 1: Main Menu Screen, where category of item is selected

Home | Cash Register | Cart Settings | Manage Discounts | Clear Navigation Buttons | Log Out

Add this item

Name	Price	Del	Img
Miscellaneous **1** at $15.00, 8% tax **Discount: 100% off**	**$0.00**	**X**	
Windows 1 at $30.00, 8% tax Discount: 100% off	$0.00	X	
Cabinets 1 at $10.00, 8% tax Discount: 100% off	$0.00	X	

No suspended transactions!

Recent transactions
Cloud City Store

No shopper ID currently set

Add customer

Sub total $0.00

Sales tax $0.00
$0.00 at 8%

Grand total $0.00

Payments made $0.00

cash | card |

Dejavoo | Poynt

Pink ticket

Green ticket

Red ticket

Donations

1 gallon Mike's Paint

No Sale

Empty Cart

Suspend Transaction

Item Lookup

Discounts

Record drawer balance

Figure 2: Customer Checkout Screen

Category name	Drop off	Purchased	Decon	Total sales	Total quantity sold	Unique items sold
Appliances	$0.00	$0.00	$0.00	$0.00	8	1
Cabinets	$0.00	$0.00	$0.00	$0.00	3	2
Donation	$0	$0	$0	$0	0	0
Donations	$0	$0	$0	$0	0	0
Doors	$0.00	$0.00	$0.00	$0.00	46	1
Flooring	$0.00	$0.00	$0.00	$0.00	6	1
Furniture	$0.00	$0.00	$0.00	$0.00	1	1
Home Decor	$0	$0	$0	$0	0	0
Lighting	$0	$0	$0	$0	0	0
Miscellaneous	$0.00	$0.00	$0.00	$0.00	2	2
Plumbing	$0.00	$0.00	$0.00	$0.00	44	1
Store Credit	$0	$0	$0	$0	0	0
Windows	$0.00	$0.00	$0.00	$0.00	1	1
Total before tax (excluding store credit)	$0.00	$0.00	$0.00	$0.00 $0.00 taxable $0.00 non-taxable		
Sales Tax				$0.00		
Store credit				$0.00		
TOTAL				$0.00	111	10
voids/returns				$0.00		

Figure 3: Sales/Inventory Report

Customer Testimonials:
"ThriftCart increased our efficiency by automating tasks that would have otherwise been done manually. It saves time at the end of the month when it's time to make reports. Just a couple of clicks and you're done. It also helps us provide better donor service. We can track our trucks and provide more accurate ETA's . . . and there are fewer missed pickups."

Jason Carter
Donations Coordinator
Chatham Habitat for Humanity ReStore

"ThriftCart helps us keep better track of our donors and allows us to provide better customer service through features such as confirmation emails, automatically generated donation receipts, and easily accessible reports that show who's donating on a regular basis. One of my favorite features is the donation scheduling, which allows us to schedule a pickup based on its proximity to the closest pickup already scheduled. No more checking the calendar to see which day we are in the area!"

Jessica Brandt
ReStore Business Analyst
Habitat for Humanity Charlotte ReStore

"ThriftCart saves us at least two hours a day scheduling pickups by integrating call logging, route optimizing, and GPS tracking features all into one system. The donor management database has even given us the capability to send out thank you emails to our donors!"

Natalie Chesson
Donation Procurement Manager
Habitat for Humanity of Wake County

ShopKeep
Point of Sale Inventory Management System

Description:
      ShopKeep is a cloud-based iPad point of sale system. The system comes with a multitude of features: transactions, payment processing, inventory management, customer marketing, and reporting & analytics. Another key feature of ShopKeep is that users are able to access these features remotely and through multiple devices (e.g. obtaining a sales report through the iPhone). The interface of the iPad application was designed to be simplistic and easy to learn so employees can start their jobs with minimal training. Items can be added to the system with a few simple clicks, but images cannot be assigned to them. Instead items can be given a unique color, and can be separated into larger categories that become separate "pages" on the main menu. These "pages" are just like tabs on a web browser that can be traversed with one touch. For example, a wine retailer can separate their wine selection by country of origin, so on the main menu there may be "pages" for Spain, France, and Italy. Through ShopKeep's backend office, the user is able to edit of the characteristics of the interface to add items to these pages and tabs. Additionally, they are able to receive a customizable report of the analytical data or their sales and inventory. Information that the user is able to view includes but is not limited to: up-to-date inventory list, the sales for a specific time period (e.g. day, month, year), and details on the amount of as well as details on customers that have made purchases in-store.

Cost:
- $69/month for a single register
- Processing fee of .35% plus 10 cents
- Initial hardware
  - iPads:
    - iPad Air ($350)
    - iPad mini ($250-$275)
    - iPad 4 ($225)

Operating Systems:
ShopKeep POS is compatible with the following operating systems:
- Apple iOS tablets
- Apple iOS phones

System Screenshots:
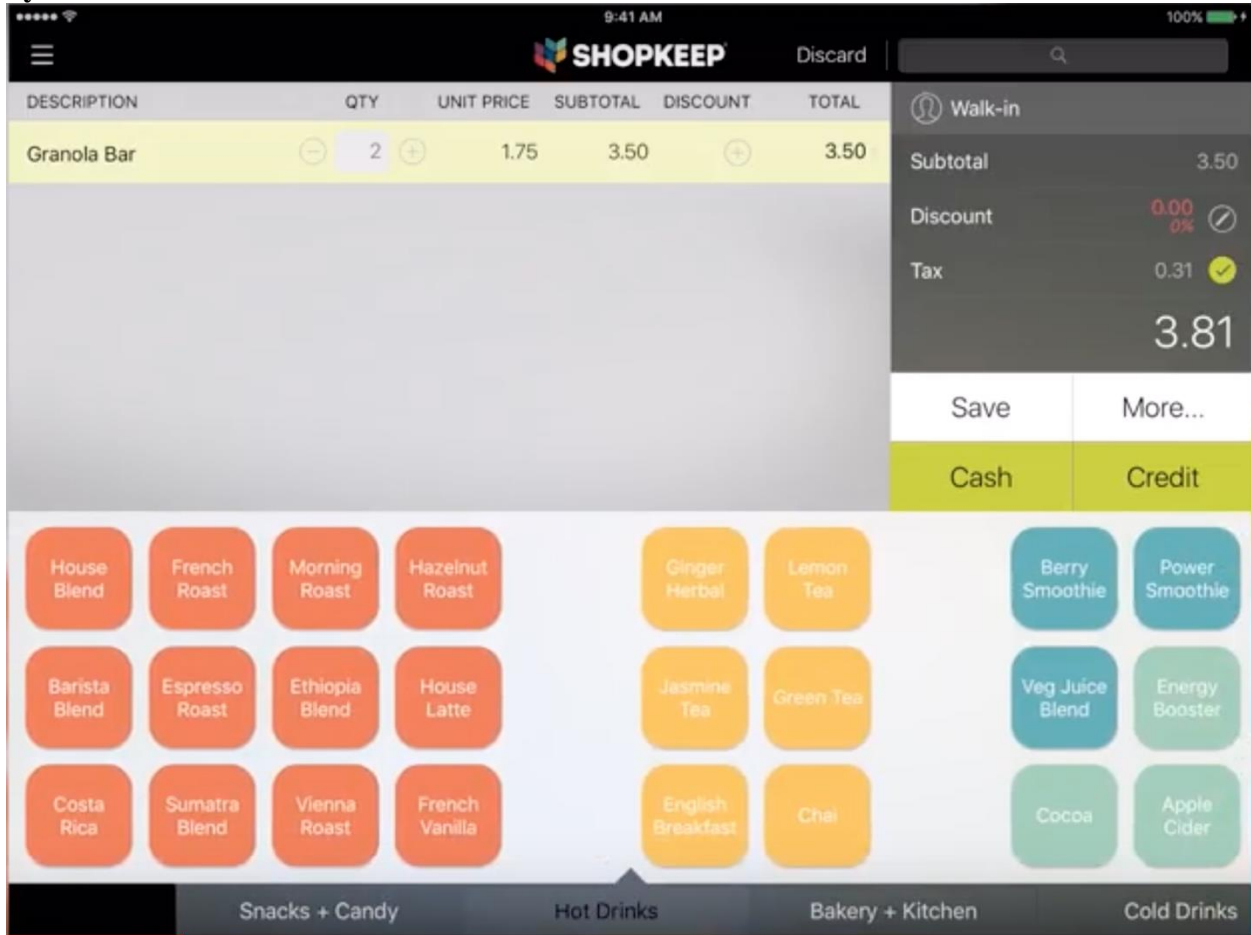
Figure 1: Customer Checkout Screen
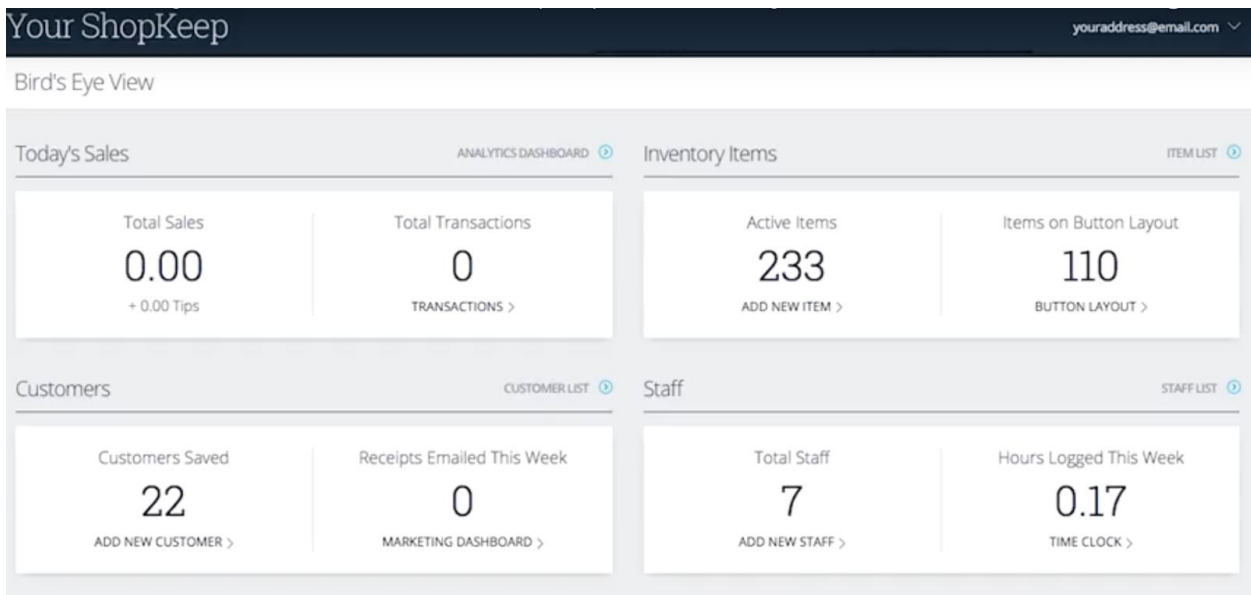
Figure 2: Sales/Inventory Data
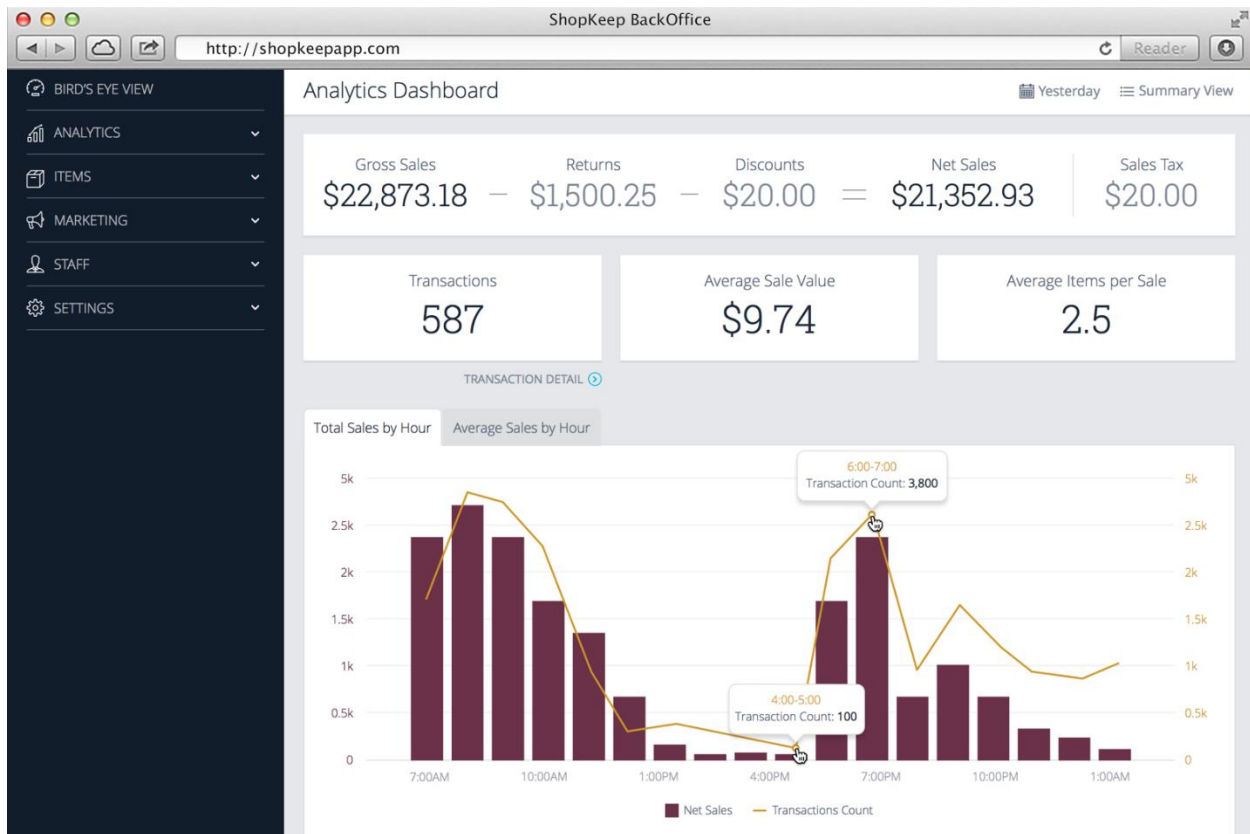
Figure 3: Sales Analytical Report

Customer Testimonials:

"I have a cafe and catering business. This app is easy to set up and extremely user-friendly. The reports are easy to run and as comprehensive as you need them to be."

Katie

RockHounds, Colorado Springs, CO

"Before ShopKeep, we couldn't even look and see what we sold yesterday, let alone last year. ShopKeep gives us our product mix, sales by item, and lets me know exactly what we need to focus on selling more."

Frank

Breukelen Coffee House

"ShopKeep is the perfect iPad POS solution for small businesses, including retail, the service industry and restaurants. It offers a fast, customizable and versatile register made specifically for iPads."

Top 10 Best POS Systems

Appendix Q: Wachusett Earthday Inventory Management Process Pros-Cons Table

Table 5: Pros and Cons of Inventory Management at Wachusett Earthday

Pros	Cons
• Accountability of volunteers; volunteers enjoy specific tasks within store • Item sorting process is split into sequential steps: drop off, sort, and shelf	• Some volunteers only willing to work in specific area of store • No current system in place to record inflow/outflow of items in ReUse Building • Shared entrance/exit causes congestion while trying to leave/enter building • Rate of items coming in is greater than the rate of items being sorted and placed on shelf • Difficult to control "floaters": customers that stay longer than the 30 minutes the volunteers would like them to

Appendix R: ThriftCart Reference Manual

This Appendix can serve as a reference exclusive of the rest of the report and begins on the next page.

ThriftCart Reference Guide

A GUIDE TO OPERATE AND TROUBLESHOOT THRIFTCART

THE WACHUSETT EARTHDAY IQP TEAM

INTRODUCTION

ThriftCart is a cloud point-of-sale system developed by Nabadab LLC. The system allows its user to conduct sales transactions, manage their inventory, and gather sales data anywhere there is a computer with internet access. ThriftCart is able to operate on multiple devices that can open a web browser (e.g. computer, iPad, Windows tablet, etc). The content of this manual explains, in detail, how to use specific features of ThriftCart and how to tackle and problems that may occur while using the system.

LOGGING IN AND OUT

LOGGING IN

To log in to ThriftCart, type the appropriate URL into the address bar. Once you are at your personal ThriftCart page, enter the appropriate username and password and press "Log In".

URL:

User name: [   ]
Password: [   ]

Log in

Don't have a log in? Sign up for an account!
User name: [   ]
Password: [   ]

Sign up!

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Page made in 0.0508 seconds (of which 0.0503 seconds was after the session loaded). It took the page 0.0000 seconds to be delivered.

LOGGING OUT
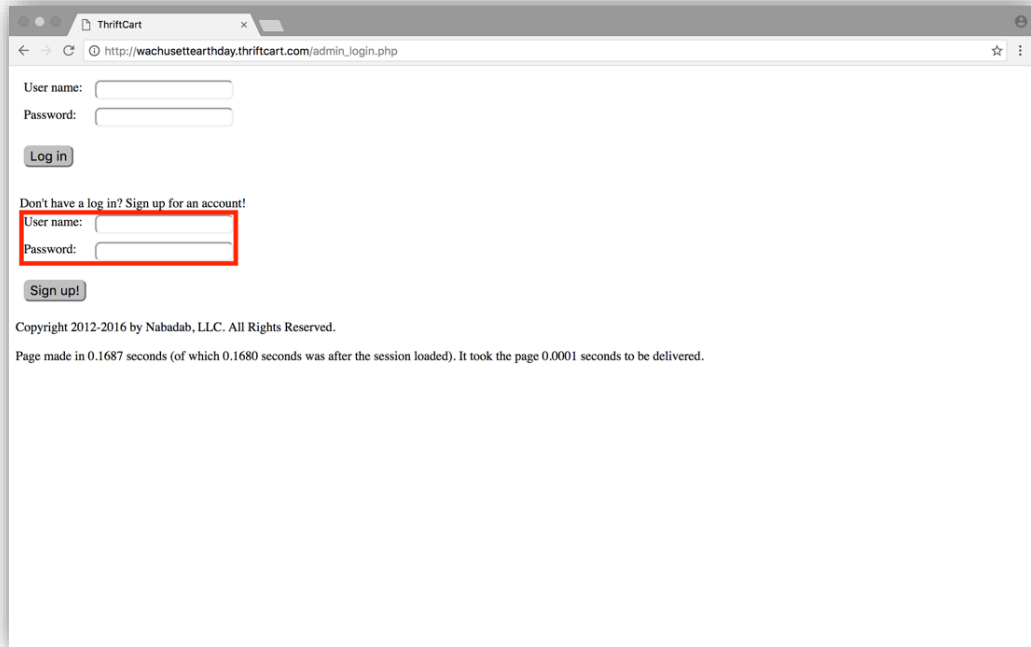
When the user is logged in to ThriftCart, they can log out by pressing the "Log Out" button on the upper section of any page.
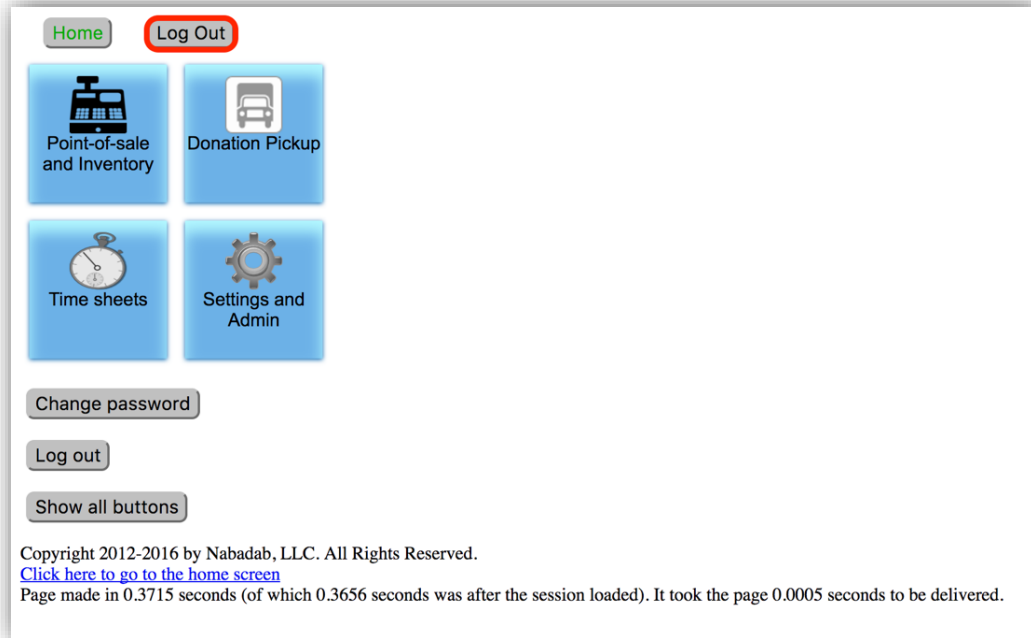
MANAGING USER ACCOUNTS

CREATE A USER ACCOUNT

Navigate to the login page in your web browser and fill out the "User name" and "Password" fields below "Don't have a log in? Sign up for an account!"

After filling out the field, click on the "Sign Up!" button, and you will be directed to this page:
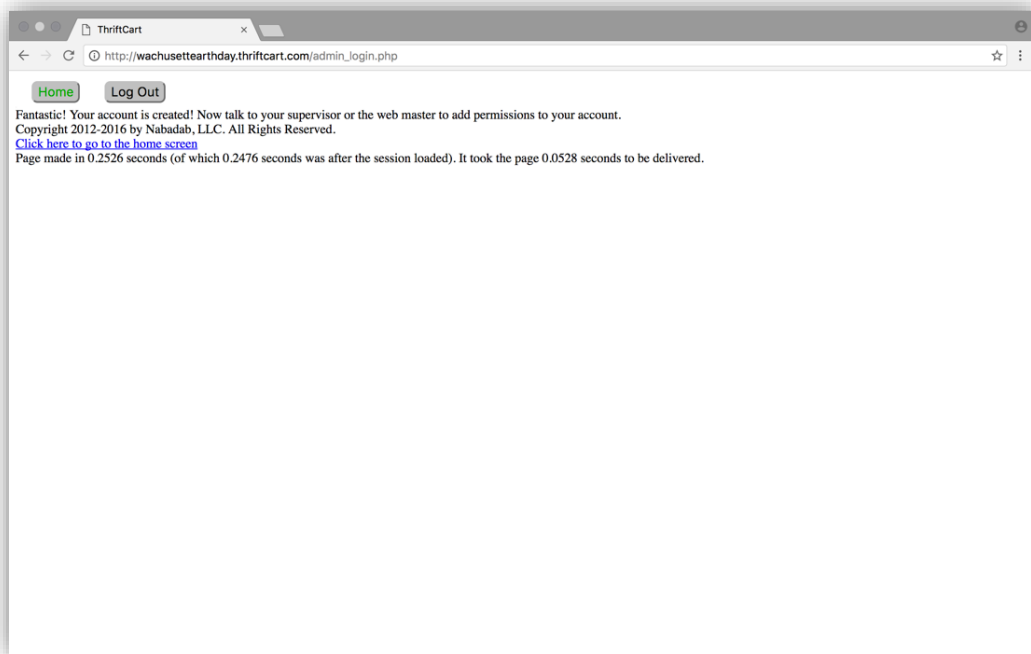
This page confirms that you have made an account. However, an administrator will have to give your account permission to log in. Changing account permissions is explained in the next section.

MANAGE USER PERMISSIONS

With an account that can manage user permissions, from the home page click on the "Settings and Admin" option.
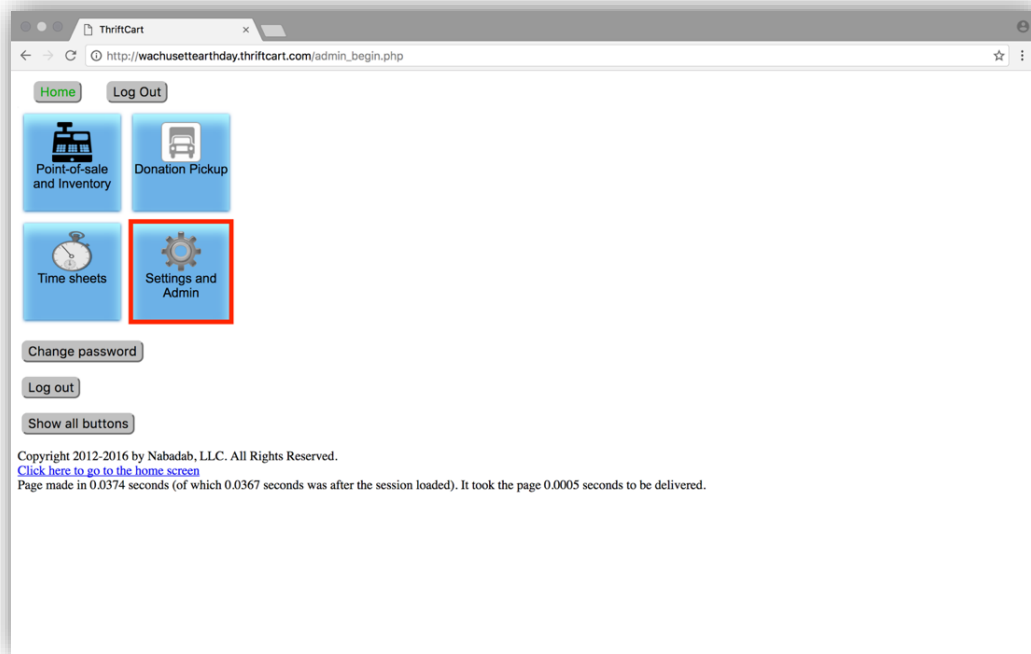
Then click on the "Manage Permissions" option.
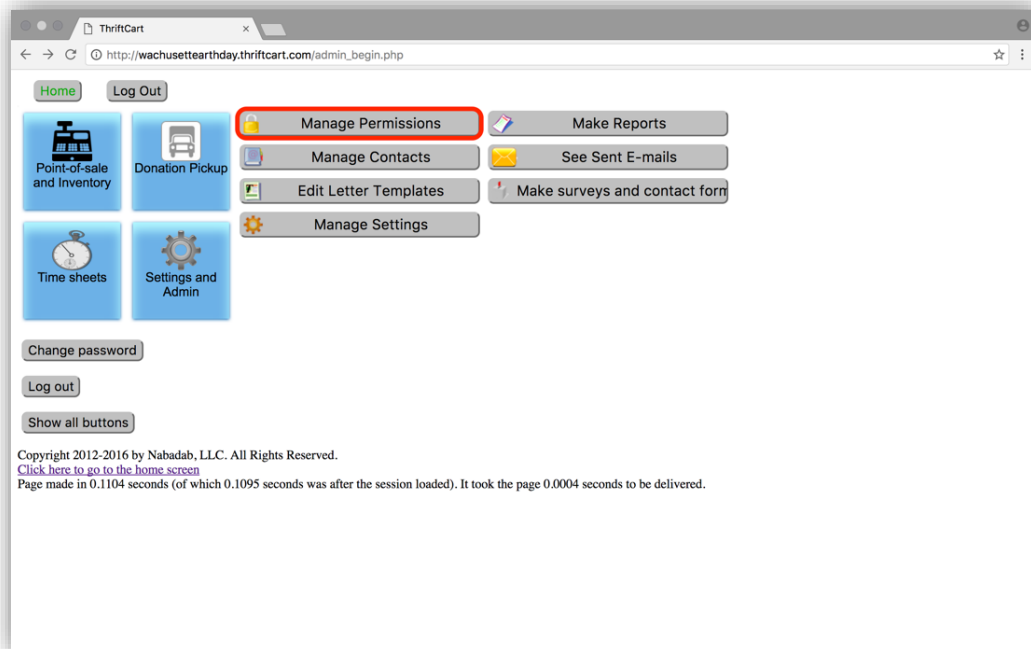
On the next page, select the user account that you want to change permissions for from the dropdown menu and click the "Edit permissions for this user" option.
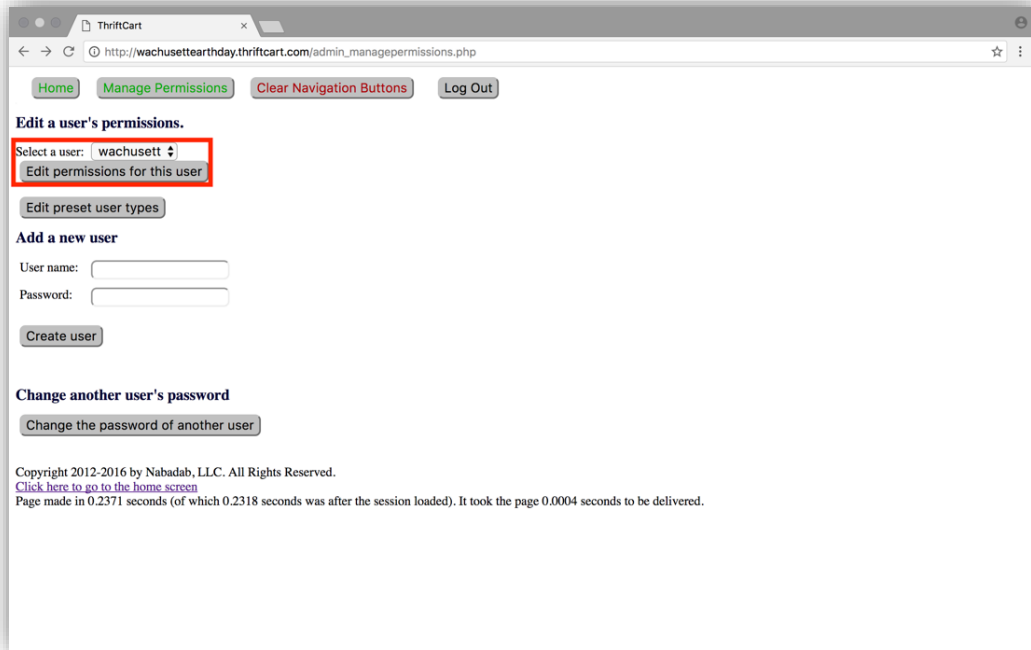
You'll be directed to a page that list each permission that you can alter.
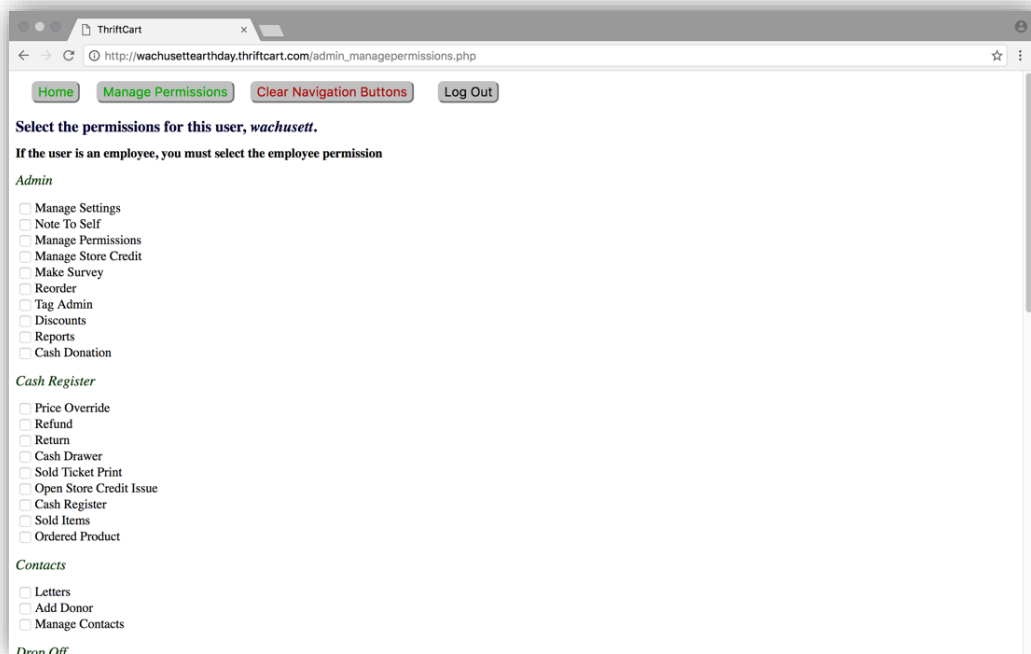
The full list of permissions is as follows:

- Admin
  - Manage Settings
  - Note To Self
  - Manage Permissions
  - Manage Store Credit
  - Make Survey
  - Reorder
  - Tag Admin
  - Discounts
  - Reports
  - Cash Donation
- Cash Register
  - Price Override
  - Refund
  - Return
  - Cash Drawer
  - Sold Ticket Print
  - Open Store Credit Issue
  - Cash Register
  - Sold Items
  - Ordered Product
- Contacts
  - Letters
  - Add Donor
  - Manage Contacts
- Drop Off
  - Add Drop Off Self Service
  - Manage Drop Off
  - Add Drop Off
  - Manage Drop Off Passwords
- General
  - Email
  - Employee
- Inventory
  - Move Category
  - Delete Category
  - Add Donation
  - Purchase Order
  - Add Item
  - Manage Categories
  - Ordered Product Admin
  - Add Pictures
  - New Category
  - Manage Items
  - Barcode Map
  - Print Barcode
  - Inventory
  - Delete Items
- Pickup
  - Delete Trucks
  - Call Logger
  - Manage Pickups
  - Edit Zones
  - Manage Trucks
  - GPS Tracking
- Timesheet
  - Timesheet
  - View Timesheets
  - Worker Enrollment
  - Timesheet Admin
  - Timesheet Name Search

Toggle permissions using the corresponding checkboxes. Then click on the "Edit permissions for this user" option at the bottom of the page to confirm your changes.
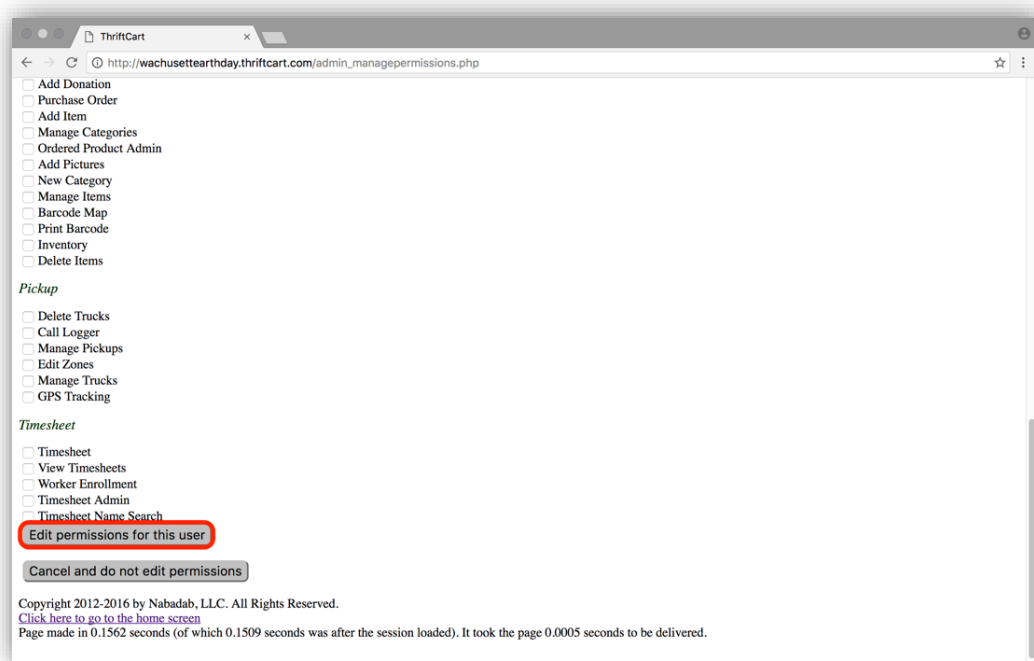
CHANGE YOUR PASSWORD

To change your own password, from the home page click on the "Change password" option.
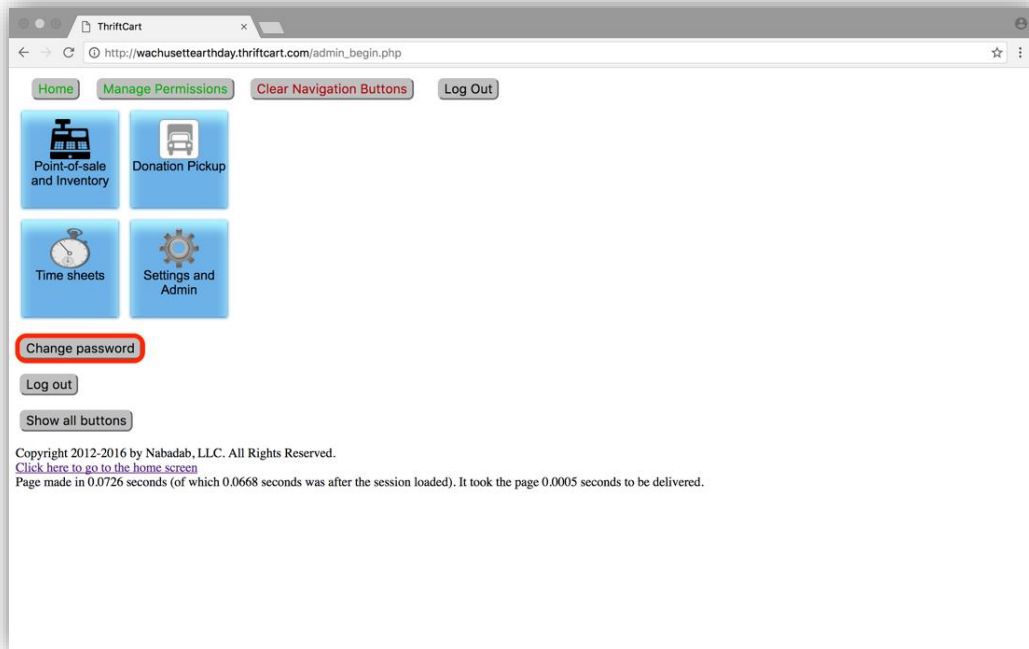
On the next page, fill out the fields as they are specified and click the "Change password" option.
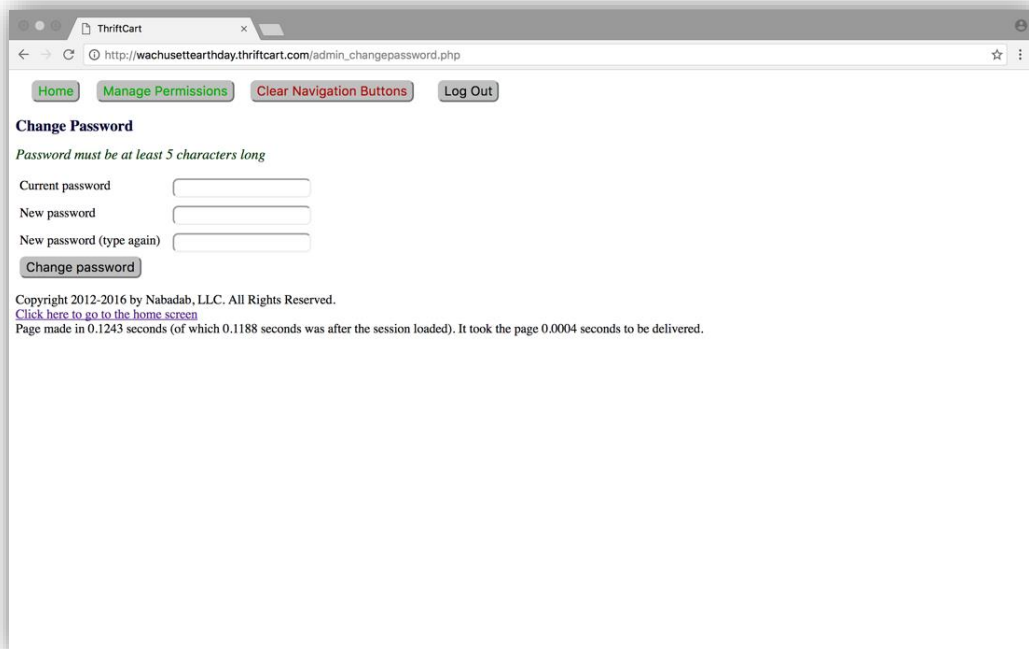
MANAGING CUSTOMERS

ADD A CUSTOMER

From the home screen, press the "Point-of-sale and Inventory" button.
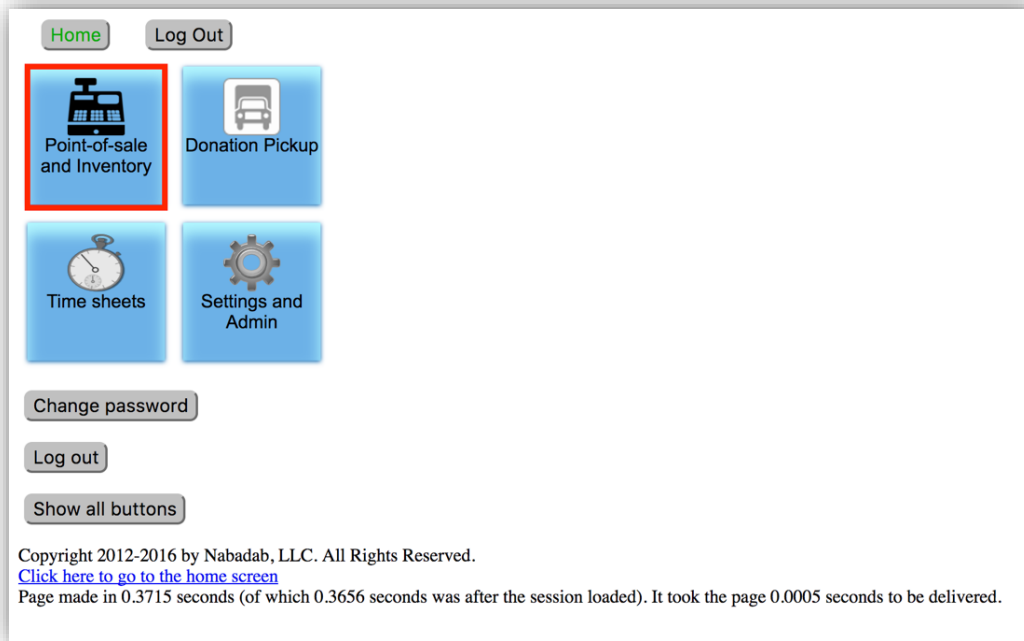
From the menu that appears on the right, press the "Manage Contacts" button.

Press the "Add a new contact" button.

In the fields provided, enter the information relevant to the contact that is being added. Note that not every field has to be filled. When finished, press the "Add contact" button.

EDIT CUSTOMER INFORMATION

From the home screen, press the "Point-of-sale and Inventory" button.
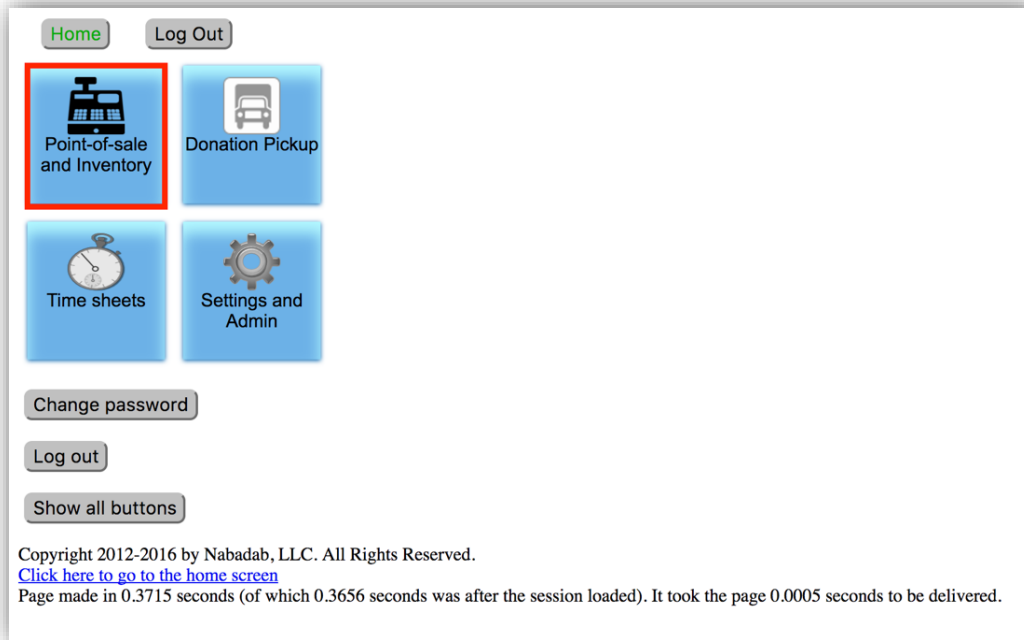
From the menu that appears on the right, press the "Manage Contacts" button.

Choose which customer whose information you wish to edit by clicking the "Edit/view" option to the left of their name.

Change the customer's information within the fields as desired. Note that not every field has to be filled. A custom field can also be created through the text boxes marked in red below. For example, a new attribute name could be labeled "Ethnicity" and the corresponding value field could be labeled as "Asian-American".

Press the save changes button to update the customer's information. Custom fields will be saved an viewable upon clicking this button. Custom fields can be removed by clicking the "X" that appears to their right.

| Home | Manage Contacts | Cash Register | Cart Settings | Clear Navigation Buttons | Log Out |

Contact edited!

Edit Contact. Go back

Name   Thomas
Preferred name (optional)   Tommy
(for example *Dr. Smith* or *Jim Bob*)

Address line 1

Address line 2

City

State

Zip

Phone 1

Phone 2

Phone 3

Email

Parent contact   No parent contact

Add a parent-contact (such as a business or supervisor)

Children contacts   None

Custom attributes

Ethinicity   Asian-American   X

New attribute name   *New attribute value*

ADD A CUSTOMER FROM REGISTER

From the register screen, press the "Add customer" button.
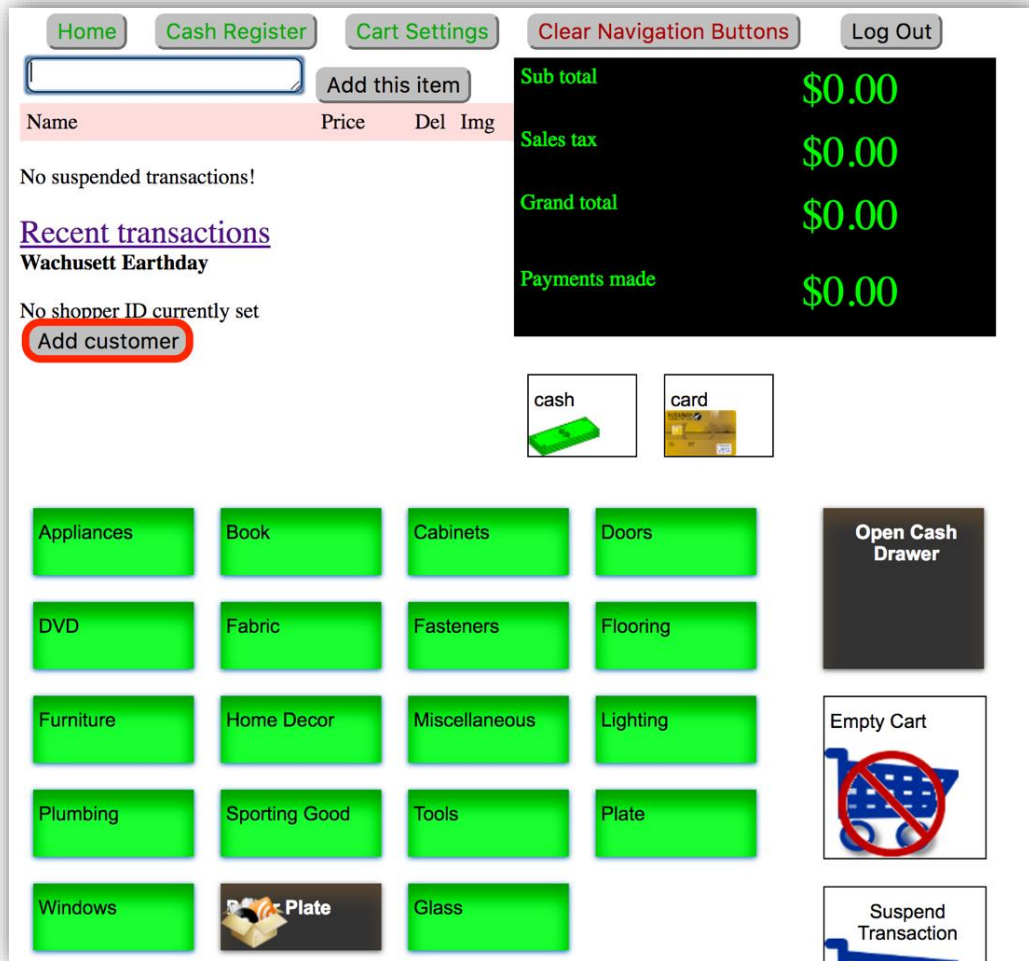
Type in the customer's information where appropriate in the fields provided.

Press the "Enter new customer" button that appears on the right after filling in some of these fields.

Filling in remaining fields as desired. Note that not every field has to be filled. When finished entering customer information, press the "Add contact" button.

If a dialog box appears, press "Cancel" to create the customer and "Okay" to continue to edit the customer's information.

SELECTING AN EXISTING CUSTOMER FROM REGISTER

From the register screen, press the "Add customer" button.
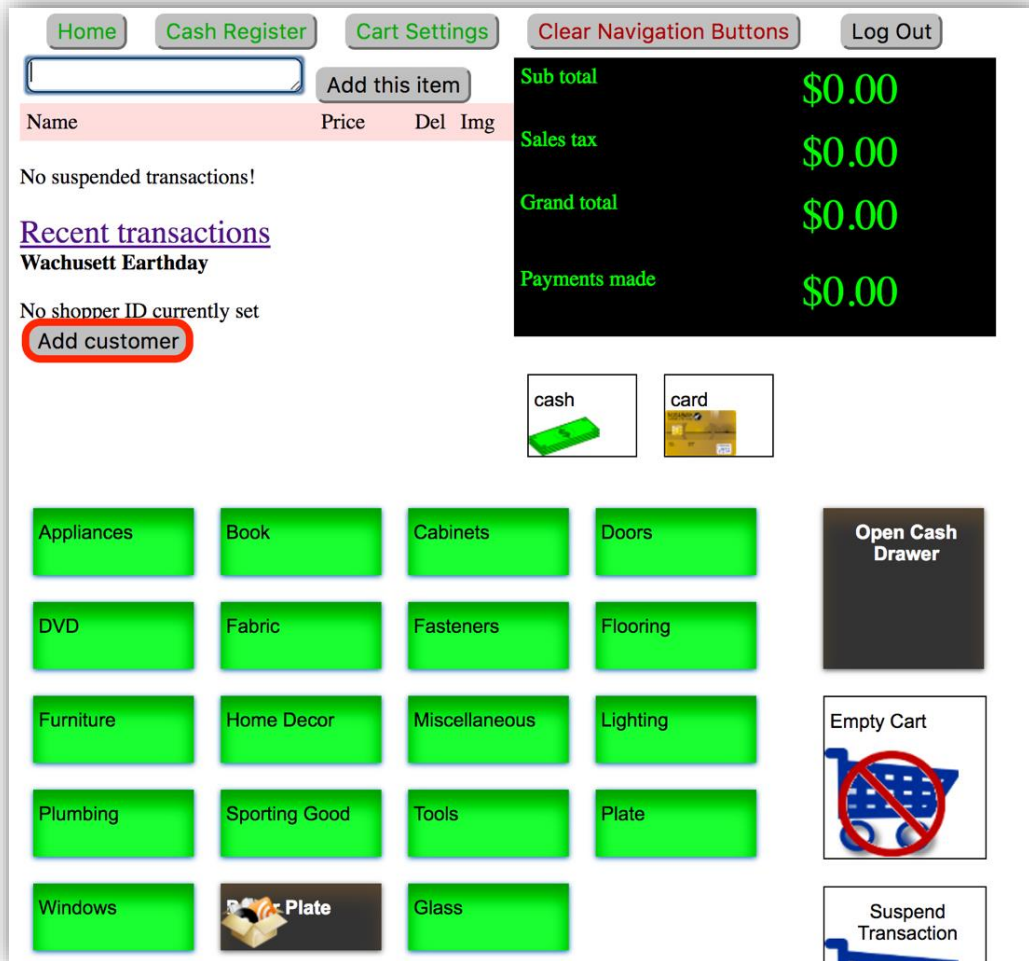
Type in the existing customer's information where appropriate in the fields provided.

Select one of the existing customers that appear on the right. If no customer appears on the right, the customer either does not exist or the information entered in the fields to the left was entered incorrectly. In this example, we selected "Zachary" as the existing customer.

PERFORMING TRANSACTIONS

ADD ITEM TO CART

On the register screen, press any item in the Item Zone (marked in the red box below) and the item will appear in the cart.

To remove an item from the cart, press the "X" to the right of an item.

DISCARD ALL ITEMS IN CART

From the register, press the "Empty Cart" button.

Confirm whether or not you wish to empty the cart. If you wish to empty the cart, press the "OK" button. Otherwise, press the "Cancel" button.
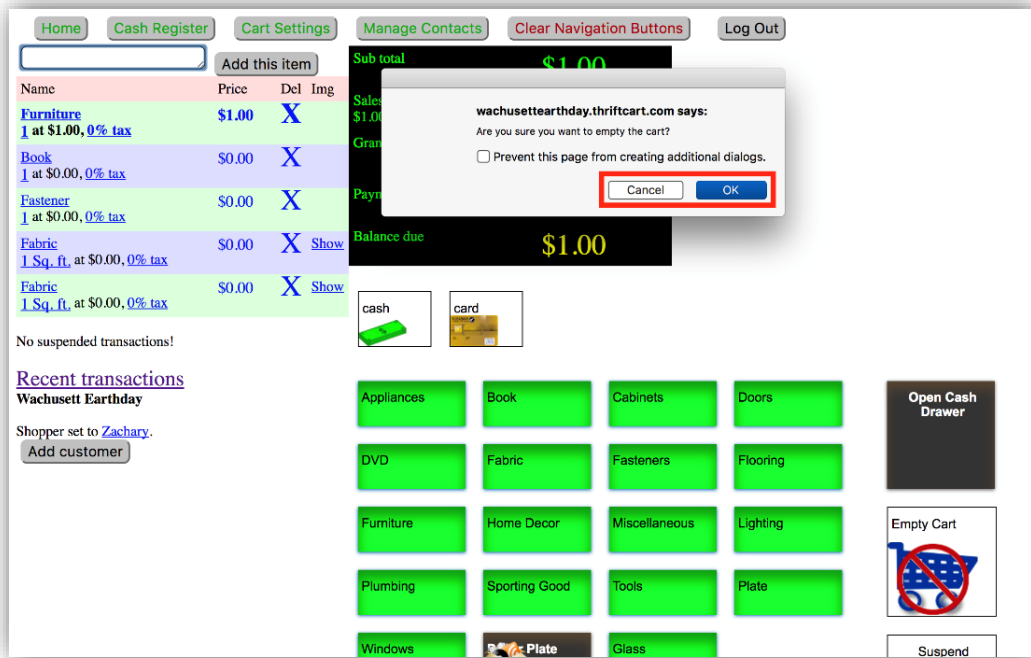
CASHING OUT WITH CASH

Once the appropriate quantity of items have been selected, press the "cash" button on the register screen.
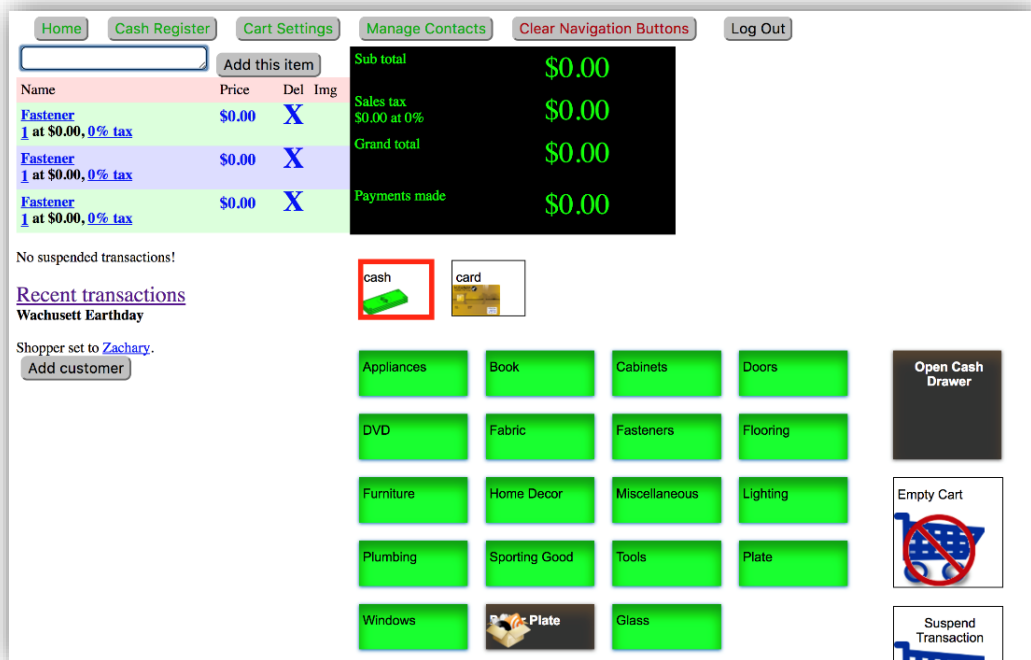
If necessary, collect money from the customer and enter the amount of money received on the number pad. Then press the green "GO" button.
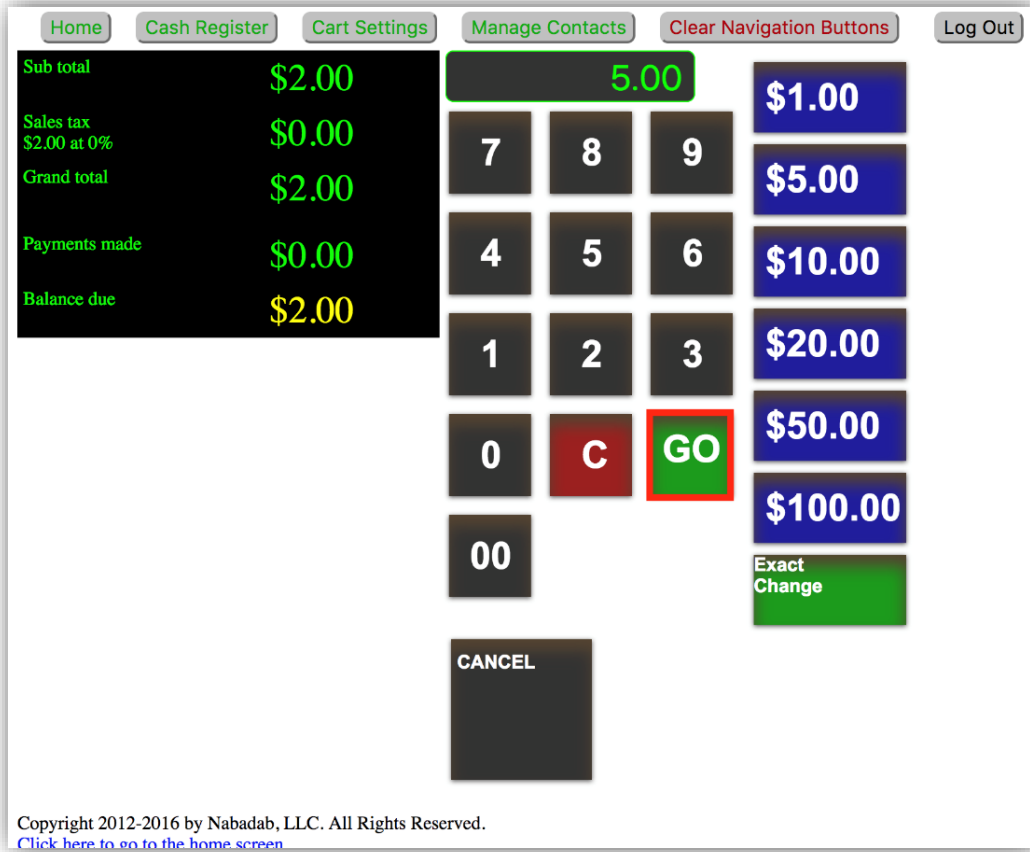
You should be brought to a page displaying the receipt for the transaction. If not, press the "Payments match amounts due. Complete purchase" button.

Click here to go to the home screen

CASHING OUT WITH CARD

Once the appropriate quantity of items have been selected, press the "Card" button on the register screen.
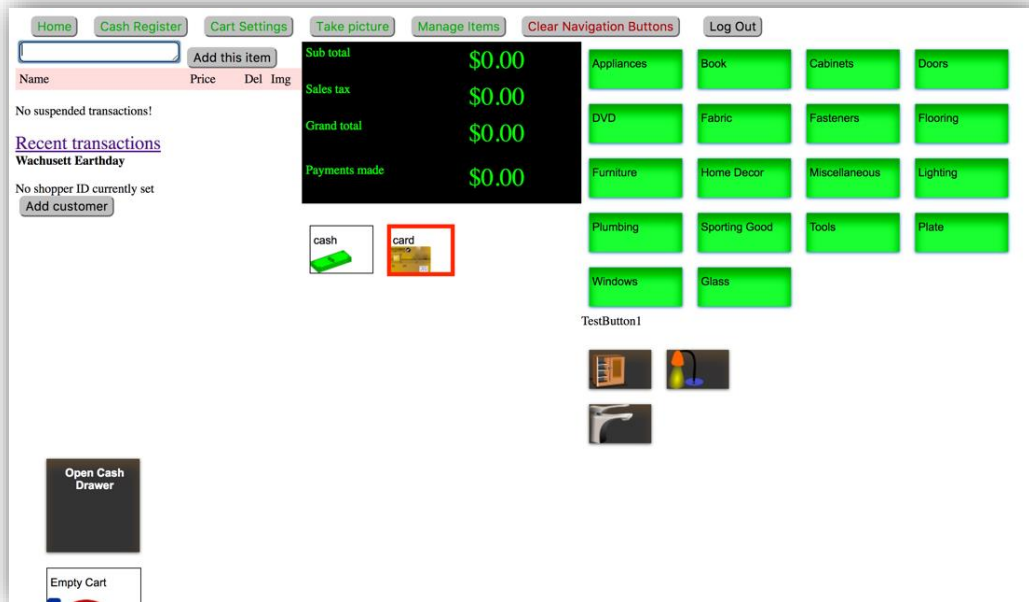
From the list of options presented multiple actions can be taken:

To return to the register screen, select the "Return to register" option.

Select payment type - $0.00

Sale

Split payment (change payment amount)

Return to register

Look for orphaned transactions

Review all recent transactions

To proceed with a sale using a card, select the "sale" option and proceed with the directions displayed on the screen and card reader.

Select payment type - $0.00

Sale

Split payment (change payment amount)

Return to register

Look for orphaned transactions

Review all recent transactions

To split the sale between multiple payment options, select the "Split payment (change payment amount)" option.

Select payment type - $0.00

Sale

Split payment (change payment amount)

Return to register

Look for orphaned transactions

Review all recent transactions

Indicate the amount the customer wishes to charge on the card in the field provided. Then press the "Use this amount instead" button.

Split payment amount

Override amount: $ 0.50

Use this amount instead

Proceed with the sale with the options provided.

SUSPENDING AND RECALLING PURCHASE TRANSACTIONS

You would suspend a purchase transaction if the person who is making the purchase cannot complete their transaction at the moment (e.g. they need to return to the showroom to get another item), but you do not wish to forget what was already added to the cart.

To suspend a purchase transaction from the "Cash Register" page, click on the "Suspend Transaction" option (which is indicated below with the red box).
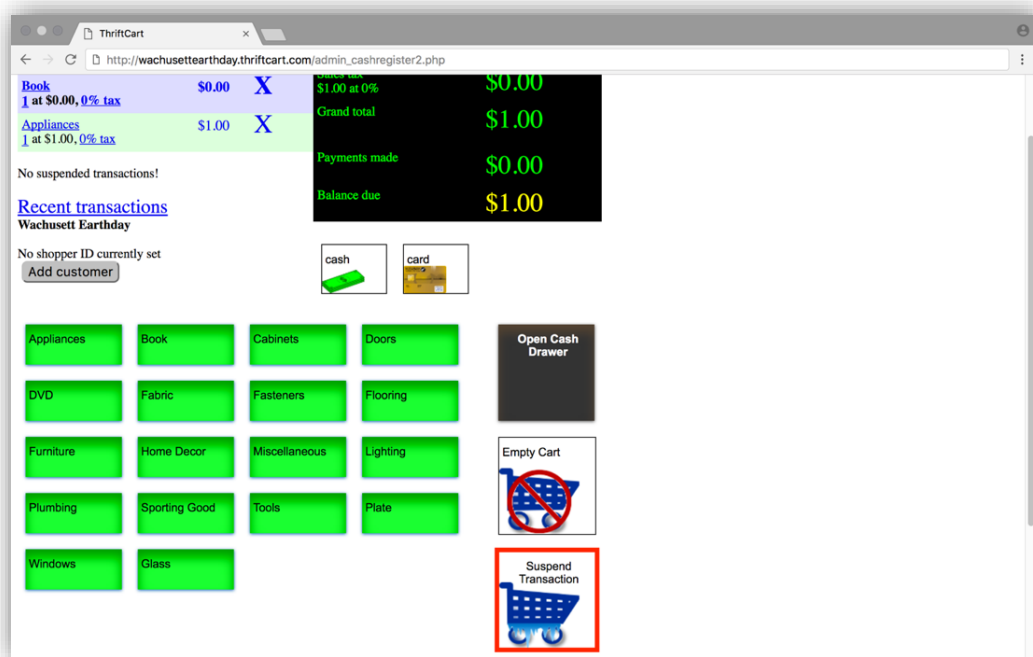
Note that depending on your computer's screen size, the position of the "Suspend Transaction" option will be not at this exact location.

After clicking on the "Suspend Transaction" option, a dialog window will appear.
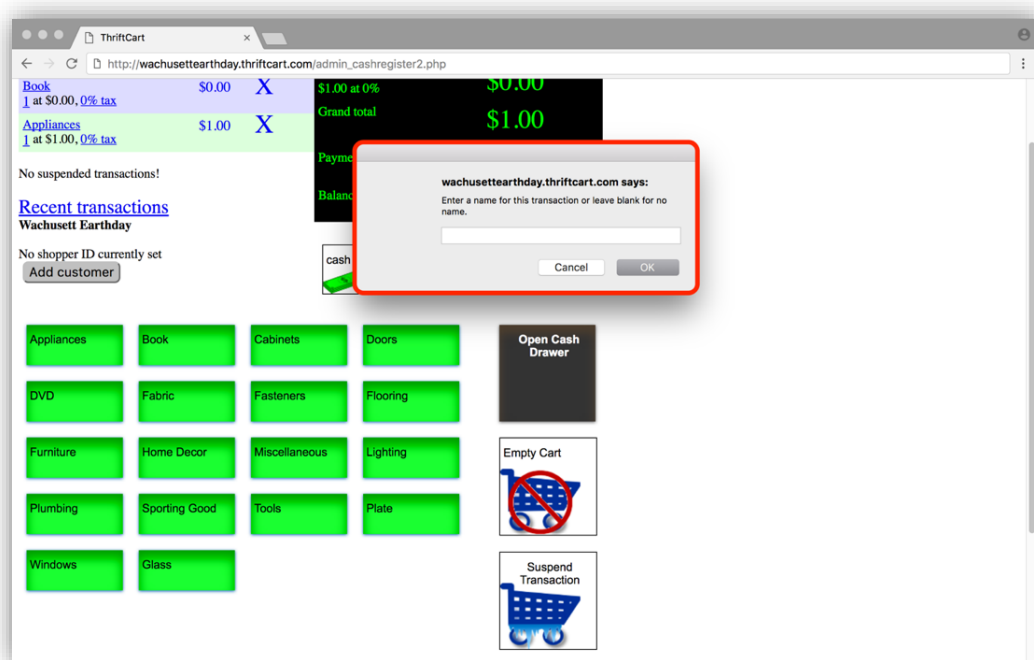
ThriftCart suggests that you should enter a brief description of the person who is making the purchase as the name of the transaction.

After clicking the "OK" button, you will have successfully suspended a purchase transaction (in this example, we have named our suspended transaction "Man with blue hat").
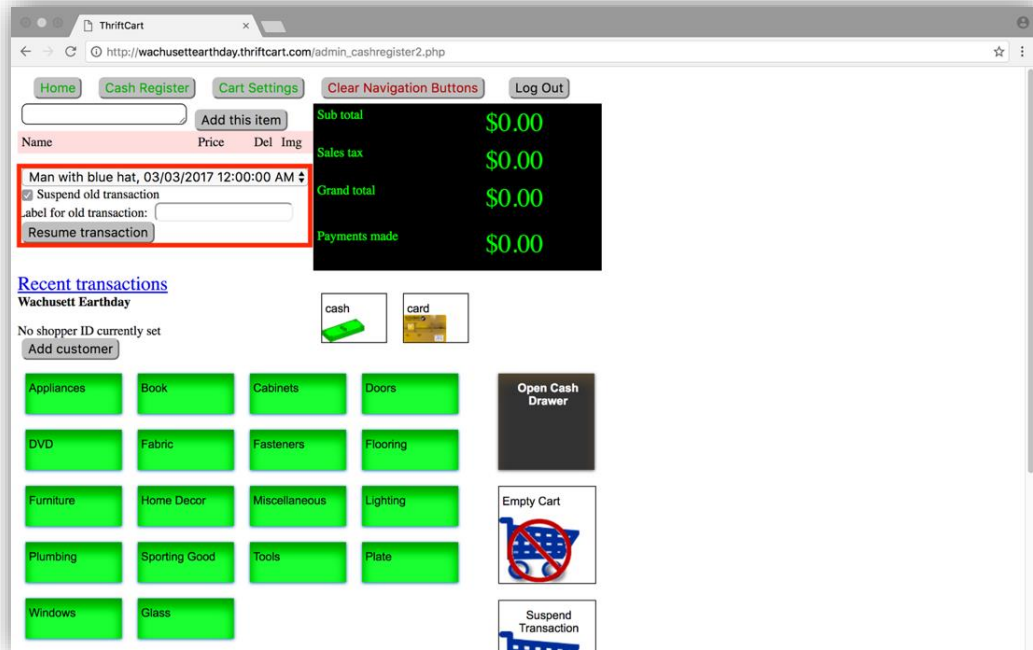
To resume a purchase transaction at any time from the "Cash Register" page, select the suspended transaction you intend to resume from the drop-down menu and click the "Resume transaction" button.

REPRINTING RECEIPTS AND RETURN TRANSACTIONS

ThriftCart lets you browse through previous transactions, allowing you to reprint their corresponding receipts and perform return transactions.

To browse through previous transactions, from the "Cash Register" page click on the "Recent transactions" link.
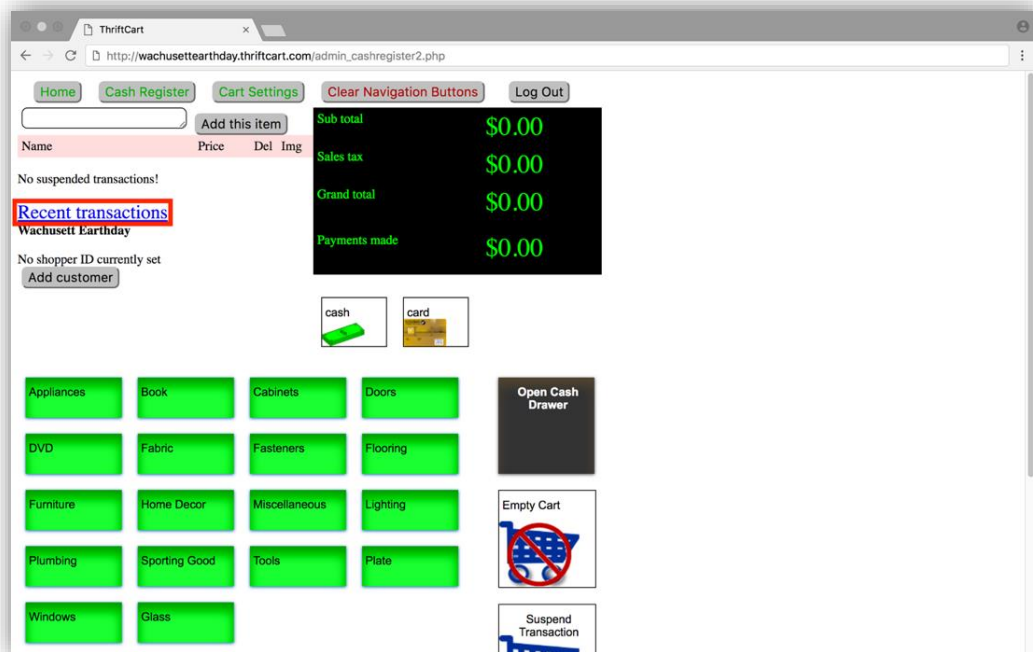
By clicking on the "Recent transactions" link, you will be directed to this page:
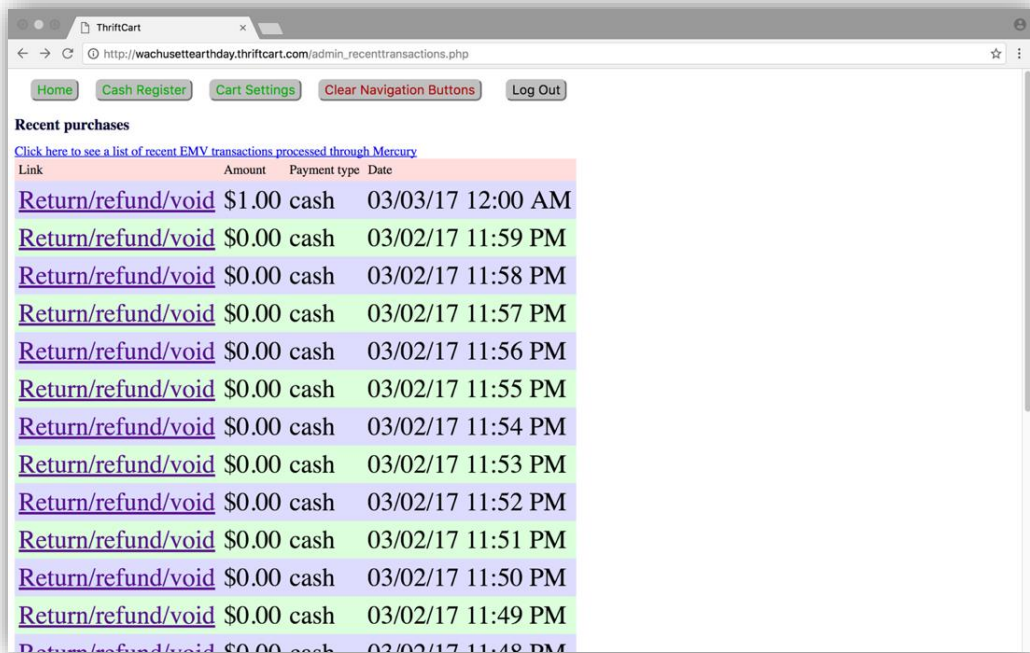
Each "Return/refund/void" link leads to a page that gives more information about a transaction, such as what items were sold, and more importantly in this situation, options to "View/Print" the transaction's receipt and "Void" the transaction.
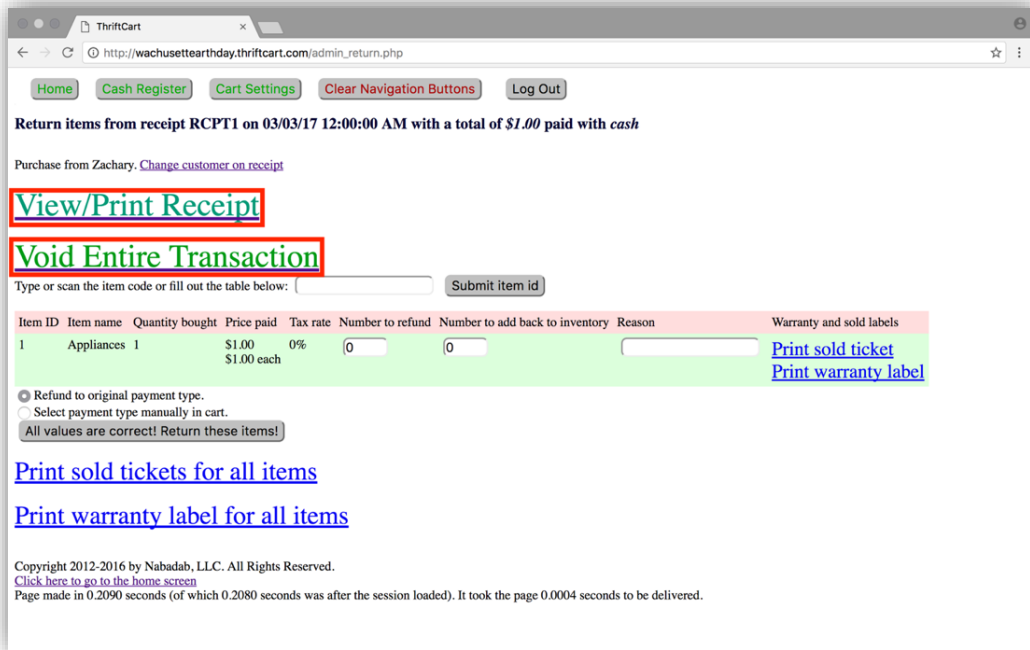
To reprint the transaction's receipt, click on the "View/Print Receipt" link.

To void a purchase transaction, thereby performing a return transaction, first click on the "Void Entire Transaction" link. Then click the "OK" button for each of the two dialog windows that appear.
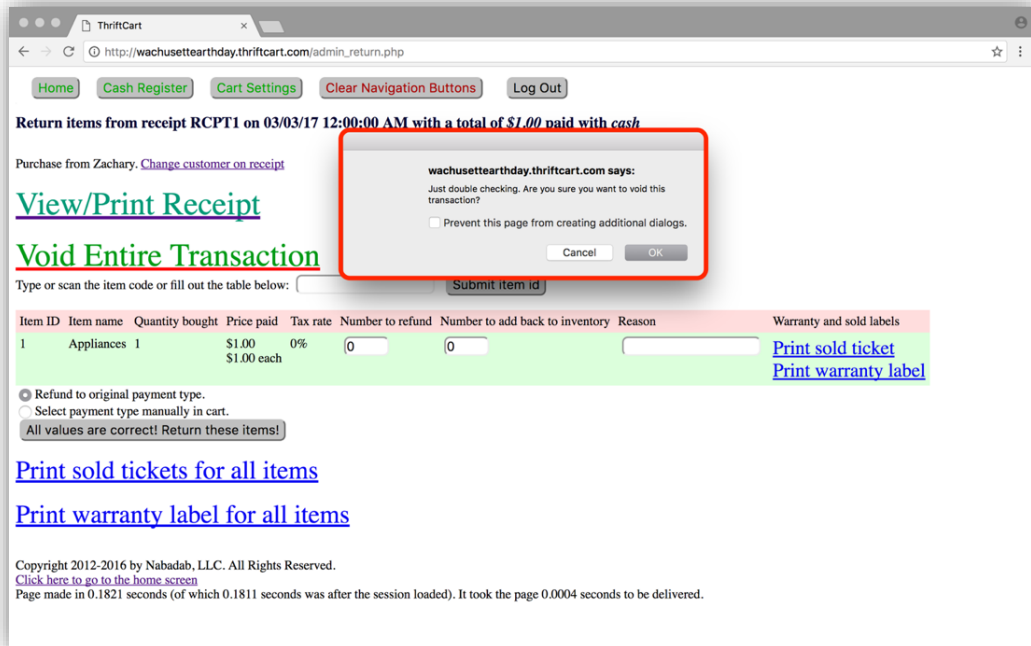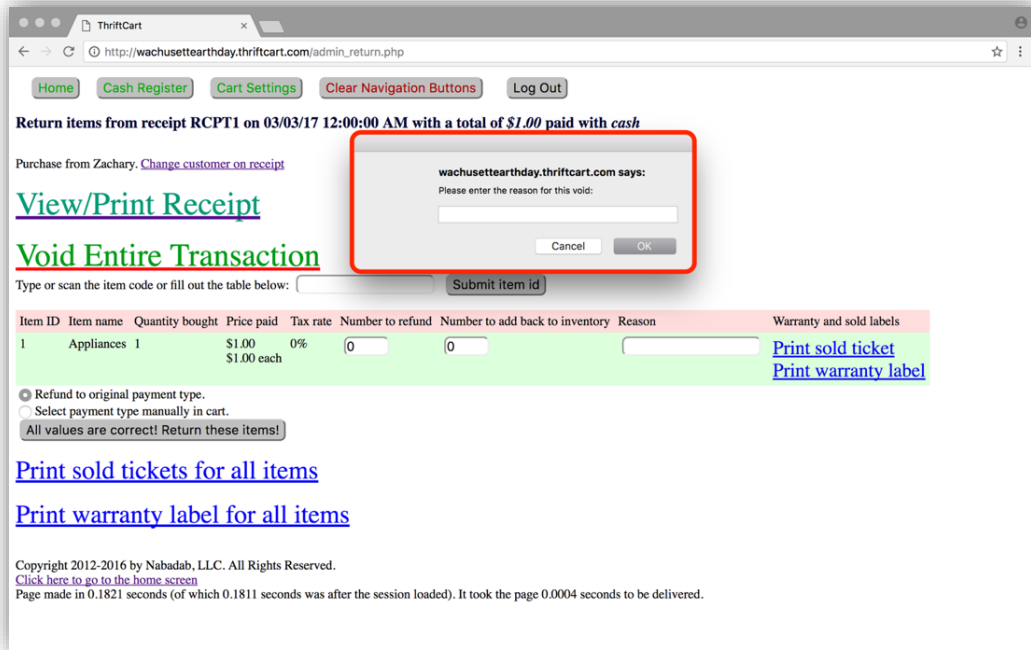
You will be brought back to the "Cash Register" page, where you can complete the return transaction by clicking on the "Payments match amount due. Complete purchase" button.
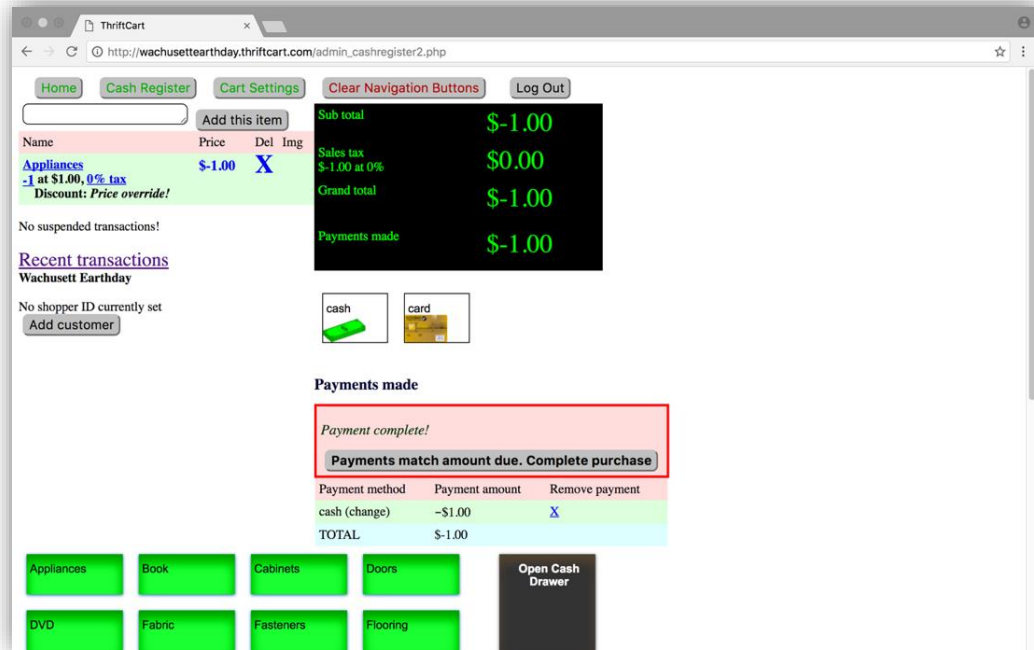
ADDING AN ITEM TO INVENTORY

The following instructions detail the process of adding an item that currently does not exist in inventory to inventory.

From the home page, press the "Point-of-Sale and Inventory" button.
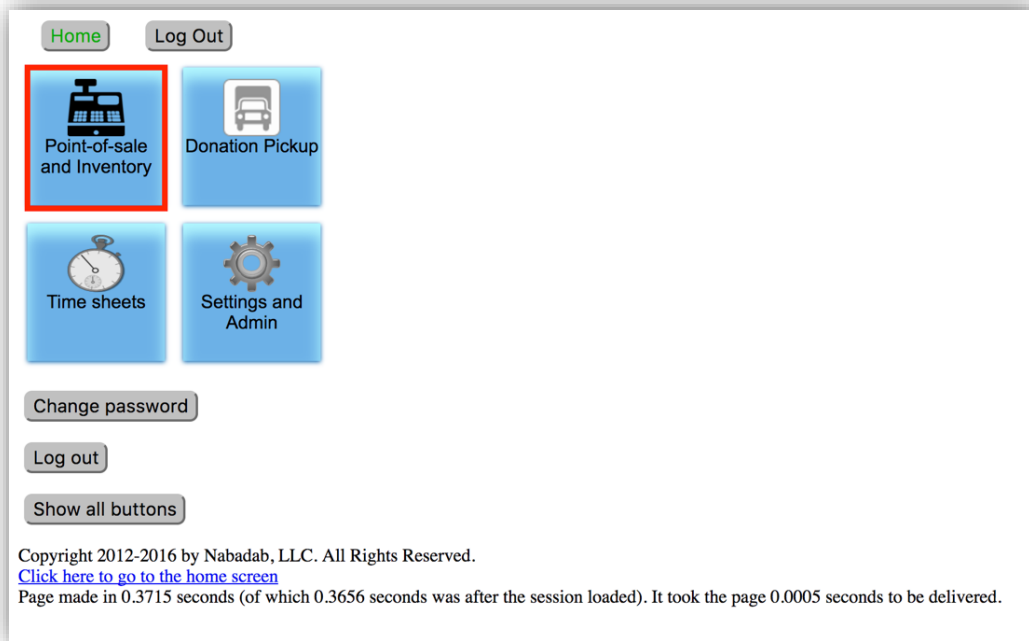
A menu will appear on the right side of the screen. Click the "Add Inventory Items" button.

Choose the "Select an Anonymous Donor" button.

If prompted, select "Wachusett Earthday" as a location.
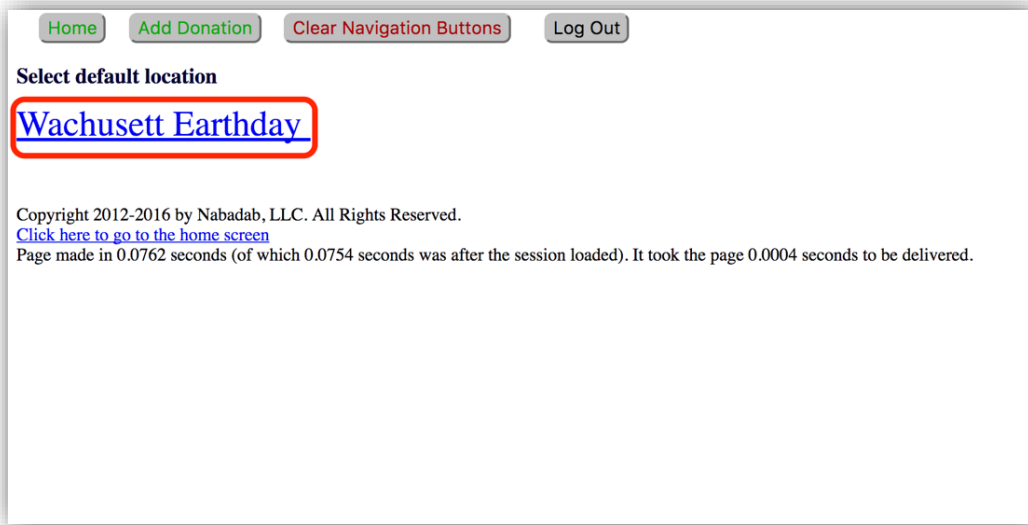
You will be presented with a panel of different categories of items. Press the panel labeled "Custom".

You will be brought to a page where you can enter the specific detail regarding the new item you wish to add to inventory. Enter the desired information for this item in the appropriate fields.

Add an item

Category

(Parent category) ⬍

Item title

Item description

Item price

$

Quantity

1   (-1 for no limit)

Units

(e.g., *pound*, *foot*.
Leave blank for no units)

Tax rate

Non-taxed (0%) ⬍

Donation source

Donated ⬍

Location of item

Wachusett Earthday ⬍

Weight

0   pounds (leave as 0
for unweighed items. Give the weight of one
unit.)

Hide from website

☐ Do not show this item on the website!

Allow item to appear multiple times separately
on receipt (import for custom items)

☐ Allow this item to appear more than once in
checkout.
Otherwise items with the same code will be
consolidated into a single item.

Print barcode

☐ Yes, please print a barcode for this item

Barcode quantity

1

Add this item and return to adding items

Add this item and close out donation

Note that not every field has to be filled. Once the appropriate fields have been filled out, there are two options:

1. Create the new item and continue to add items be pressing the button labeled "Add this item and return to adding items". Items can continue to be added by following the instructions detailed earlier in this section.

2. If you are done adding items, press the button labeled "Add this item and close out donation".

When the "Add this item and close out donation" button has been pressed, you will be brought to the page listing the different categories of items. Towards the bottom of the screen will be a list of the new items you have added and the detail pertaining to them.
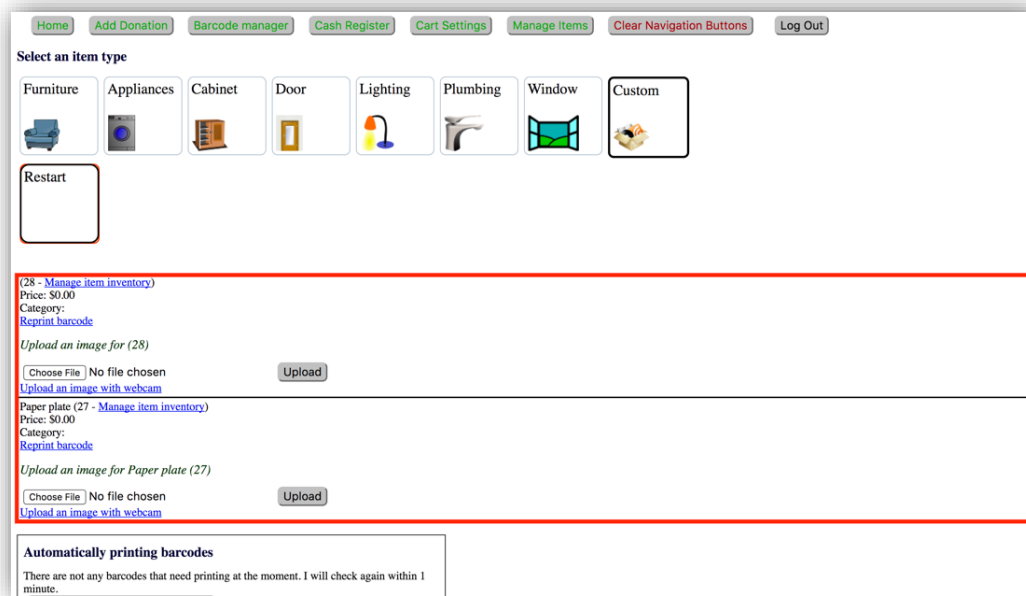
EDITING AN ITEM IN INVENTORY

From the home page, press the "Point-of-Sale and Inventory" button.

From the menu that appears on the right, press the "Manage Items" button.

If you know the ID of an item you can search by ID. Otherwise, you can search for the item by name. To see a listing of all items just press the "Search" button at the bottom of the page.

To select from the listing of items, press their corresponding ID number to the left of their name.

Show [100] items starting with item number [0]
☐ Show only exact matches (leaving unchecked shows best matches first)
[Search!]

Search results. Click a row to edit.

Item ID	Item title	Category	Price	Quantity	Barcode print link
28			0.00	1	Print barcode
27	Paper plate		0.00	-1	Print barcode
26	hkjjnbkjn		0.00	1	Print barcode
25	Couch	Furniture	0.00		Print barcode
24	Glass	Kitchenware	0.00	-2	Print barcode
23	Plate	Kitchenware	0.00	-5	Print barcode
22	Fastener	Tools	0.00		Print barcode
21	DVD	Library	0.00		Print barcode
20	CD	Library	0.00		Print barcode
19	Magazine	Library	0.00		Print barcode
18	Book	Library	0.00		Print barcode
17	Sporting Goods	Sporting Goods	0.00		Print barcode
16	Sporting Goods	Sporting Goods	0.00		Print barcode
15	Misc.	Stuff	0.00		Print barcode
14	Tools	Tools	0.00		Print barcode
13	Toys	Toys	0.00		Print barcode
12	Fabric	Cabinets	0.00	-15 Sq. ft.	Print barcode
11	Black gas Electrolux freezer	Appliances	25.00	1	Print barcode
10	Windows	Windows	1.00		Print barcode
9	Plumbing	Plumbing	1.00		Print barcode

Edit the appropriate fields. Note that not every field has to be filled. When finished, press the "Edit this item and return to search page" button. Or press the "Do not edit. Go back to search" button if you no longer wish to make changes to the item.

Home   Manage Items   Clear Navigation Buttons   Log Out

Edit item ID 23

Category	–Kitchenware (2) ⇕
Title	Plate
Description	
Price	0.00
Quantity	-5
	Quantity cannot be edited. It can only be increased and decreased by adding the item, selling the item, or doing inventory adjustments.
Tax rate	Non-taxed (0%) ⇕
Donation source	Donated ⇕
Location of item	Wachusett Earthday ⇕
Weight	0 pounds (leave as 0 for unweighed items. Give the weight of one unit.)
Units	(e.g., *pounds*, *feet*. Leave blank for no units)
Picture	Choose File No file chosen (The current picture, if any, is shown below this table)
Hide from website	☐ Do not show this item on the website!
Allow item to appear multiple times separately on receipt (important for custom items)	☐ Allow this item to appear more than once in checkout. Otherwise items with the same code will be consolidated into a single item.

Edit this item and return to search page

Do not edit. Go back to search.

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REGISTER INTERFACE

ADD ITEM BUTTON TO THE INTERFACE

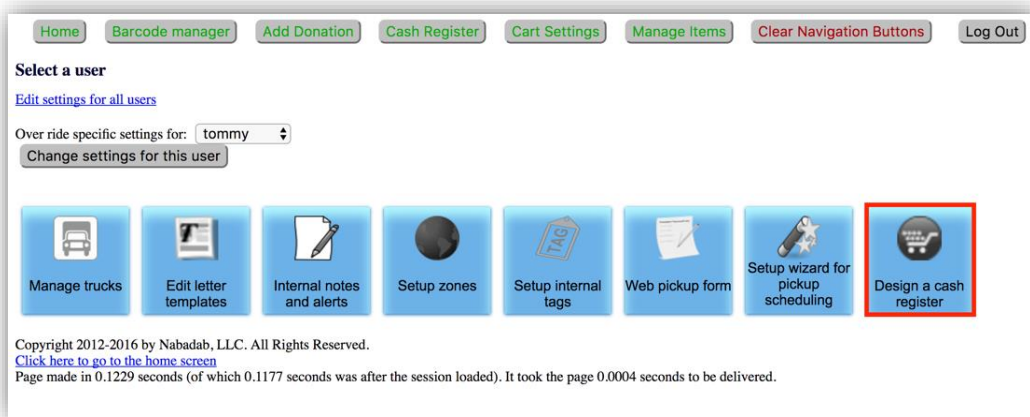The following instructions detail how to edit the register interface.

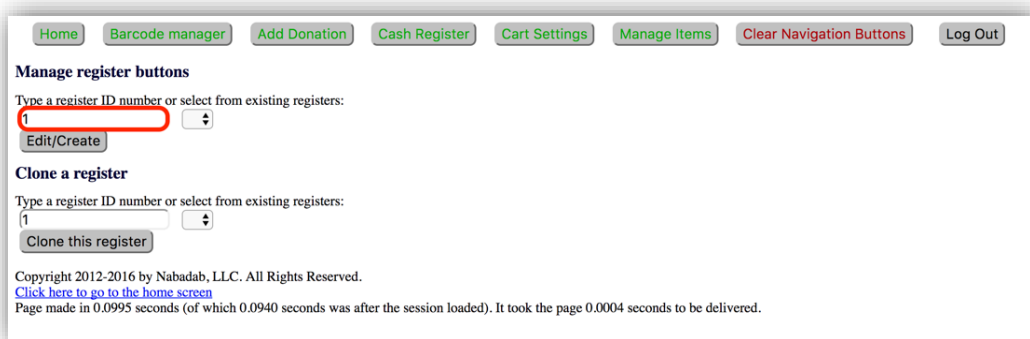Press the "Setting and Admin" button from the home screen.

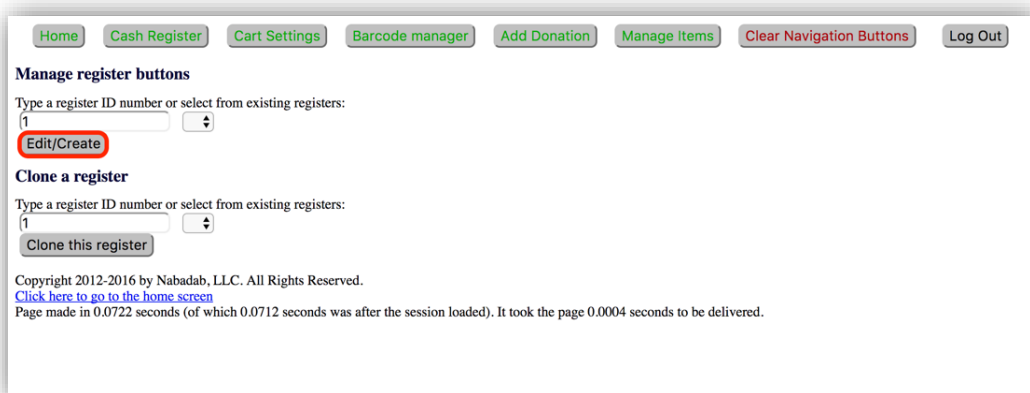From the menu that appears on the right, press the "Manage Setting" button.
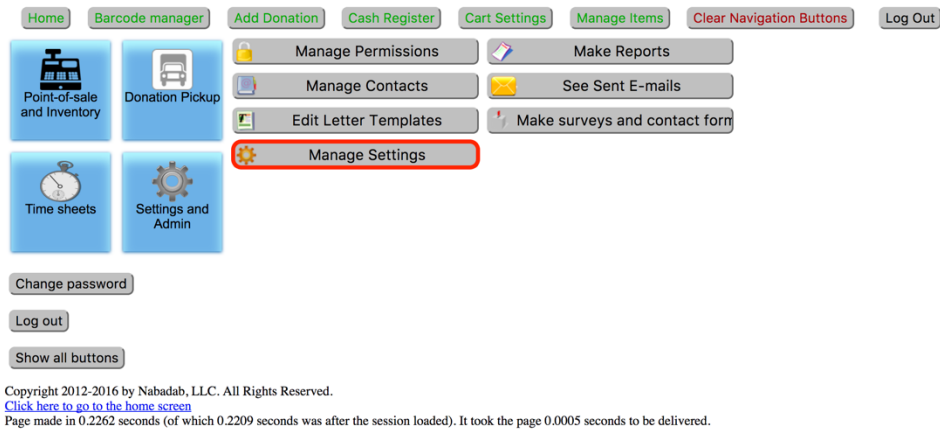
You will be brought to a new page containing a panel of different buttons. Press the "Design a Cash Register" button.

Indicate which register interface you wish to make edits to.

Once you have chosen the appropriate register, press the " Edit/Create" button.

Out of the list of categories presented, press the "Item Zone" option.
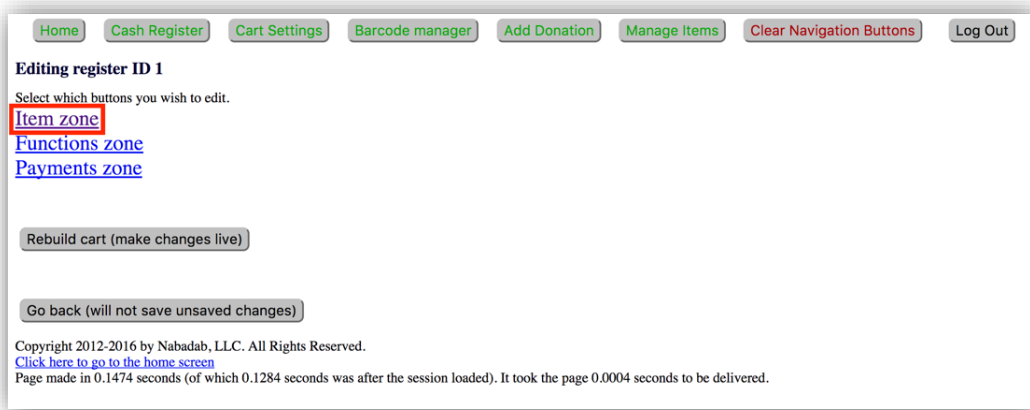
Scroll to the bottom of the page. Press the "Add New Button" option.

After the "Add new button" button is pressed, a list of fields will appear below that can be filled in to change the appearance of the button you are adding to the register interface. Fill in the appropriate fields pertaining to the new button being added and its aesthetic qualities. Note that not every field has to be filled. Below is a description of how some specific fields change the appearance of a button.

Button caption: The text displayed within a button.
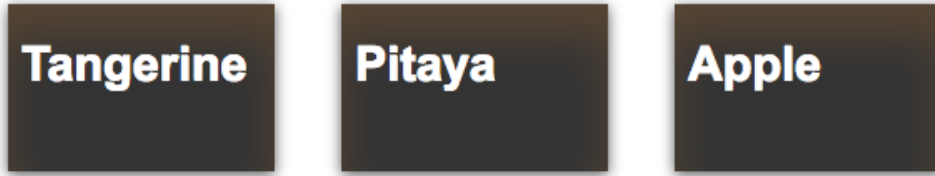
Image: An optional image inside of the button.

Style: The size and color of the button.

Button action: What the button does when you press it.

Item ID: ID of the item associated with the button.

Once finished, press the "Add button" button at the bottom of the page. Continue to add buttons as desired.

To ensure that the added buttons can be viewed in the current register interface, please follow the instructions in the "Make Changes Live" section of this manual.

EDIT/DELETE A BUTTON IN THE INTERFACE

The following instructions detail how to edit the register interface.

Press the "Setting and Admin" button from the home screen.

From the menu that appears on the right, press the "Manage Setting" button.

You will be brought to a new page containing a panel of different buttons. Press the "Design a Cash Register" button.

Indicate which register interface you wish to make edits to.

Once you have chosen the appropriate register, press the " Edit/Create" button.

Out of the list of categories presented, press the "Item Zone" option.

Press the "Edit this button" option for the button whose appearance you wish to make changes to.

Scroll to the bottom of the page and change the contents of the item's field where desired. Note that not every field has to be filled. When finished, click the "Edit button" button.

Plate	67	23		greenbuttonmedium	addtocart	0	View/edit children	Edit this button	Move Up	Move Down
Windows	60	10		greenbuttonmedium	addtocart	0	View/edit children	Edit this button	Move Up	Move Down
Paper Plate	69	27	misc.png	greybuttonmedium	addtocart	0	View/edit children	Edit this button	Move Up	Move Down
Glass	68	24		greenbuttonmedium	addtocart	0	View/edit children	Edit this button	Move Up	Move Down
Hidden	141	28		transparentbutton	addtocart	1	View/edit children	Edit this button	Move Up	

Edit button

Button caption: Appliances

Image:

Style: greenbuttonmedium

Extra CSS styling:

Button action: addtocart

Parameters:

Item ID: 1

Search for items:

Hidden button: ☐ Yes, hide this button

[Edit button]

[Delete this button]
[Add new button]

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Click here to go to the home screen
Page made in 0.0783 seconds (of which 0.0728 seconds was after the session loaded). It took the page 0.0007 seconds to be delivered.

Continue to edit buttons as necessary.

To delete a button, scroll down to the bottom of the page and press the "Delete this button" button.

Plate	67	23		greenbuttonmedium	addtocart	0	View/edit children	Edit this button	Move Up	Move Down
Windows	60	10		greenbuttonmedium	addtocart	0	View/edit children	Edit this button	Move Up	Move Down
Paper Plate	69	27	misc.png	greybuttonmedium	addtocart	0	View/edit children	Edit this button	Move Up	Move Down
Glass	68	24		greenbuttonmedium	addtocart	0	View/edit children	Edit this button	Move Up	Move Down
Hidden	141	28		transparentbutton	addtocart	1	View/edit children	Edit this button	Move Up	

Edit button

Button caption: Appliances

Image:

Style: greenbuttonmedium

Extra CSS styling:

Button action: addtocart

Parameters:

Item ID: 1

Search for items:

Hidden button: ☐ Yes, hide this button

[Edit button]

[Delete this button]
[Add new button]

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Click here to go to the home screen
Page made in 0.0783 seconds (of which 0.0728 seconds was after the session loaded). It took the page 0.0007 seconds to be delivered.

MAKE CHANGES TO THE CASH REGISTER LIVE

Press the "Setting and Admin" button from the home screen.
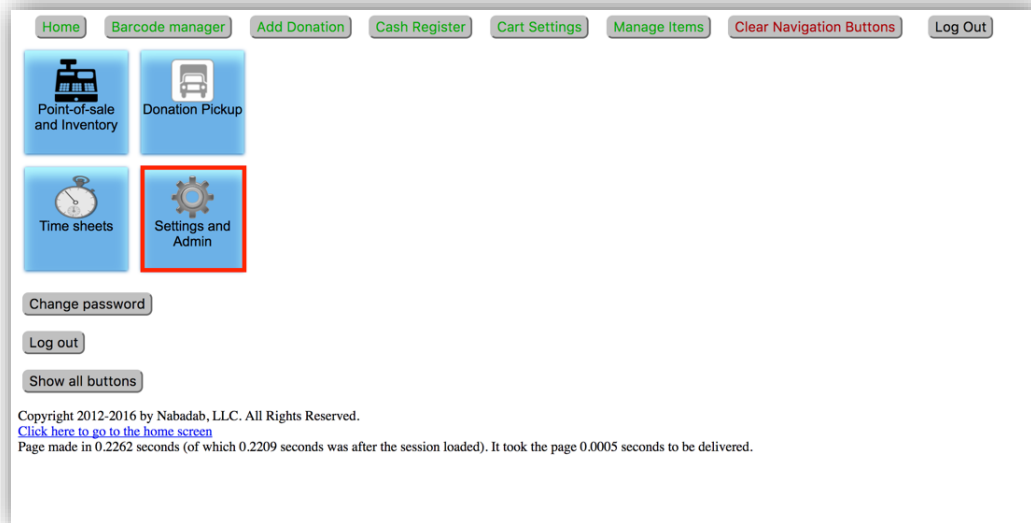
From the menu that appears on the right, press the "Manage Setting" button.
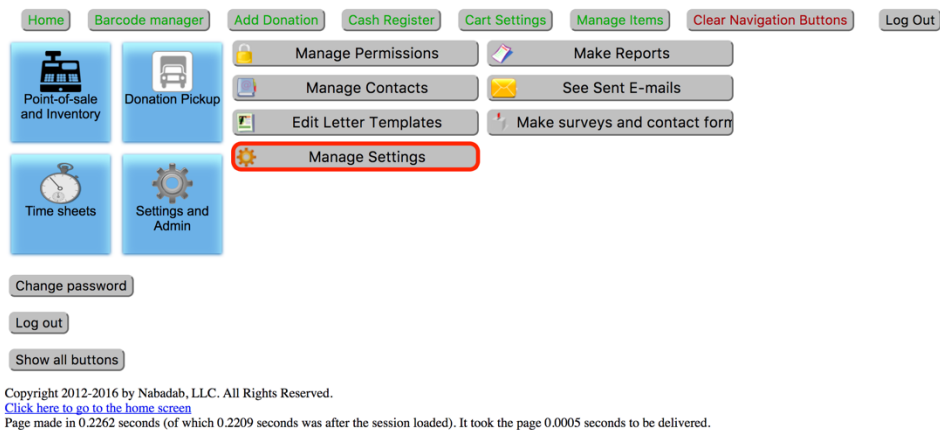
You will be brought to a new page containing a panel of different buttons. Press the "Design a Cash Register" button.

Indicate which register interface you wish to make edits to.

Once you have chosen the appropriate register, press the " Edit/Create" button.

Press the "Rebuild cart (make changes live)" button.

The current register interface should now reflect the changes you have made.

GENERATING REPORTS

ThriftCart can generate reports based on your sales and customer base. The reports that are relevant to your sales and customer base are as follows:

- Daily Summary Report

- Receipt tape report

- Category sales report

- Customer Sales Report

- "Sales by zip code" report

This section will instruct you on how to navigate to the pages where you can generate these reports and will show you example reports.

After logging onto ThriftCart, click on the "Settings and Admin" option from the home page.
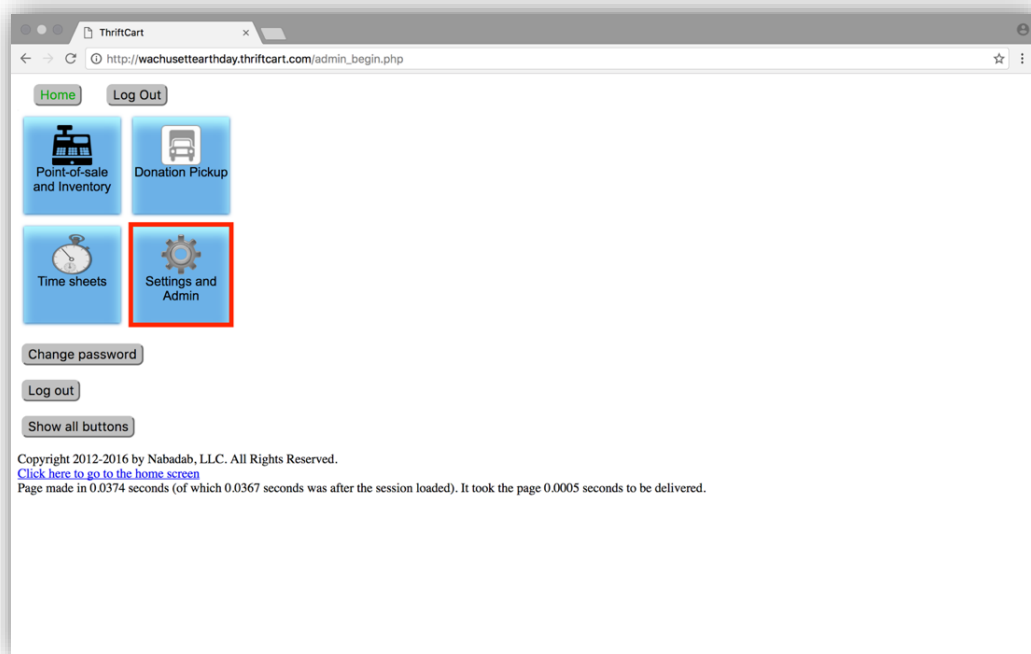
Then click on the "Make Reports" option.
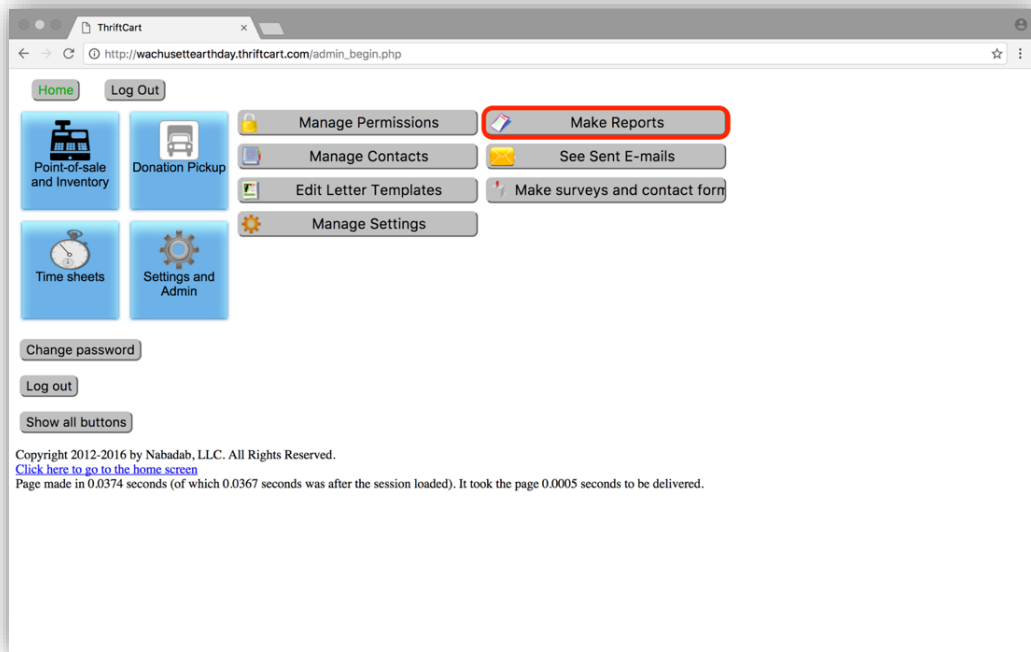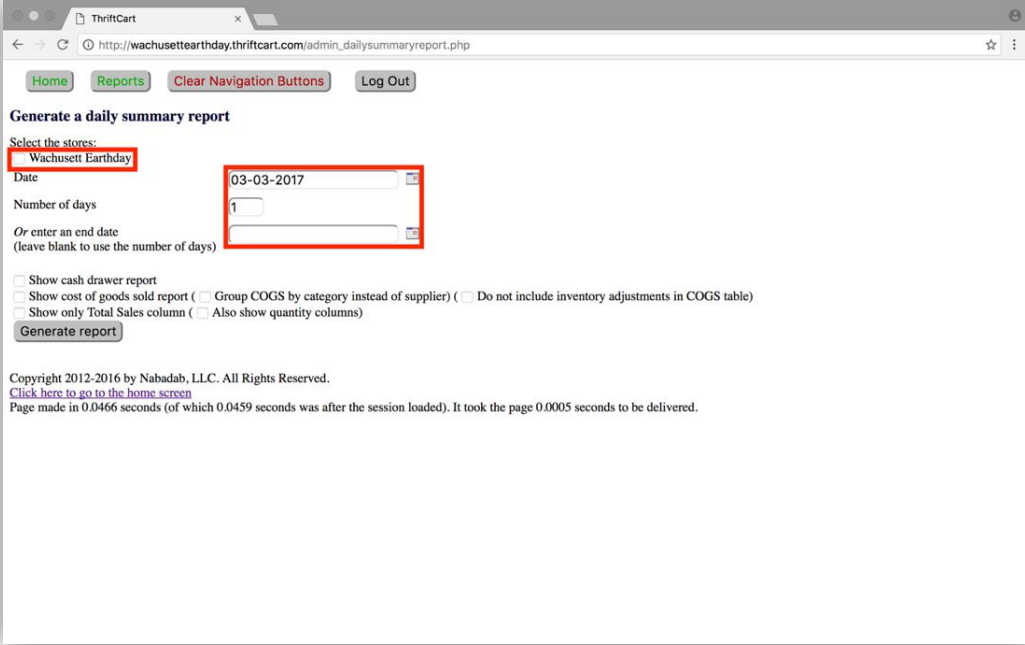
On the "Make Reports" page, you will see a list of options that refer to the reports that ThriftCart can generate.
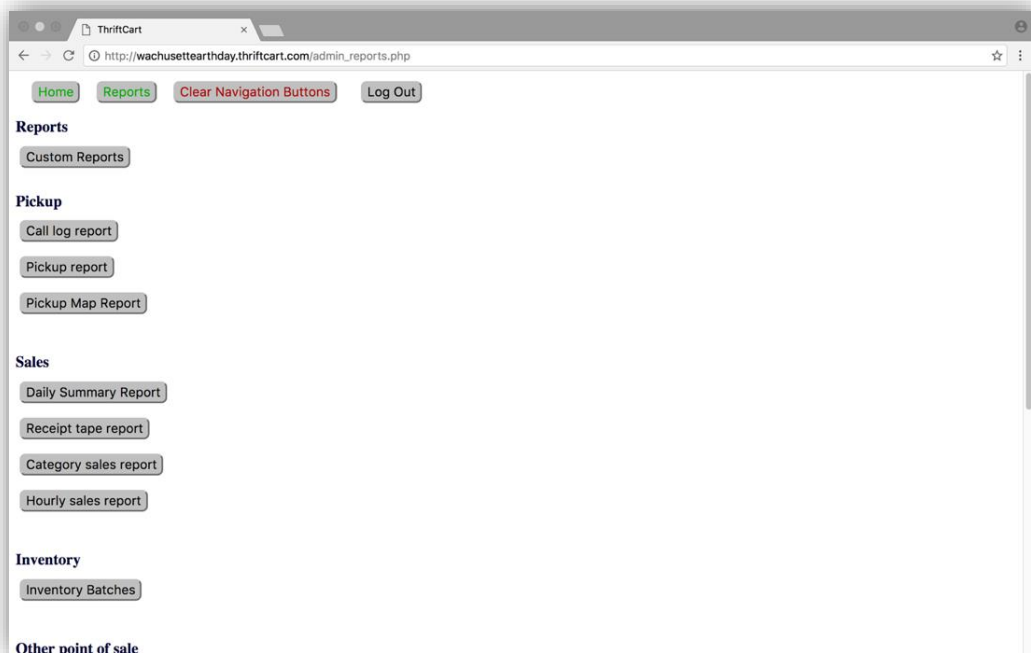
DAILY SUMMARY REPORT

ThriftCart describes a "Daily Summary Report" as "A quick report that gives daily sales by top-level categories as well as sales amount by payment type". Clicking on the "Daily Summary Report" option from the "Make Reports" page will lead you to this page:

To generate a "Daily Summary Report", you must select the store(s) the report will gather information from (in this case, "Wachusett Earthday") and provide a range of dates that the report will limit itself to (despite its name, the report is not limited to a single day). Doing so will create the "Daily Summary Report" in tabular form. Below is a portion of a sample "Daily Summary Report":

Summary for 03/03/2017 to 03/10/2017

Category name	Donated	Purchased	Total sales	Total quantity sold	Unique items sold
Appliances	$0	$0	$0	0	0
Cabinets	$0	$0	$0	0	0
Doors	$0	$0	$0	0	0
Flooring	$0	$0	$0	0	0
Furniture	$0	$0	$0	0	0
Home Decor	$0	$0	$0	0	0
Kitchenware	$0	$0	$0	0	0
Library	$0	$0	$0	0	0
Lighting	$0	$0	$0	0	0
Miscellaneous	$0	$0	$0	0	0
Plumbing	$0	$0	$0	0	0
Sporting Goods	$0	$0	$0	0	0
Stuff	$0	$0	$0	0	0
Tools	$0	$0	$0	0	0
Toys	$0	$0	$0	0	0
Windows	$0	$0	$0	0	0
Total before tax (excluding store credit)	$0.00	$0.00	$0.00 $0.00 taxable $0.00 non-taxable		
Sales Tax			$0.00		
Store credit			$0.00		
Open-issue store credit balance			$0.00		
TOTAL			$0.00	0	0
voids/returns			$0.00		

RECEIPT TAPE REPORT

ThriftCart describes a "Receipt tape report" as a report that "Shows all receipts for a given day". Clicking on the "Receipt tape report" option from the "Make Reports" page will lead you to this page:

To generate a "Receipt tape report", you must select the store(s) the report will gather information from (in this case, "Wachusett Earthday") and provide a range of dates that the report will limit itself to. Doing so will create the "Receipt tape report" in tabular form. Below is a portion of a sample "Receipt tape report":
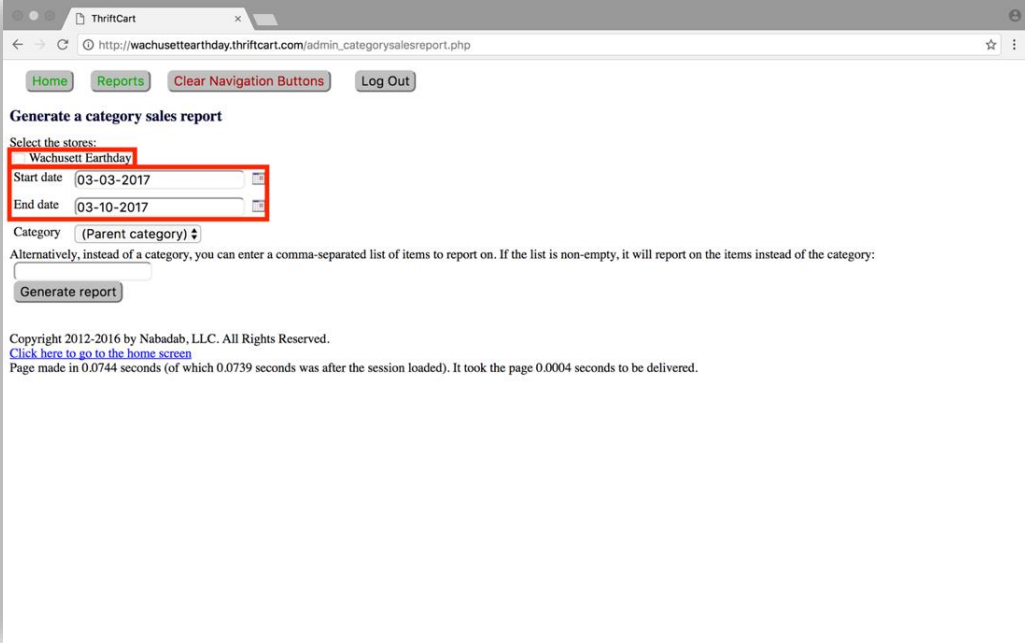
You can export a "Receipt tape report" to Microsoft Excel by selecting "Generate a CSV file (can be used in Excel)" and (re)generating the report.

CATEGORY SALES REPORT

ThriftCart describes a "Category sales report" as a report that "Break[s] down sales by category or by lists of individual items. Gives statistics such as average price, standard deviation, etc.". Clicking on the "Category sales report" option from the "Make Reports" page will lead you to this page:

To generate a "Category sales report", you must select the store(s) the report will gather information from (in this case, "Wachusett Earthday") and provide a range of dates that the report will limit itself to. We suggest that you leave the "Category" option as "(Parent category)" to get sales from all categories. This will create the "Category sales report" in tabular form. Below is a portion of a sample "Category sales report":

Mean		$0.00	$0.27	
Median		$0.00	$0.00	
Mode		$0.00	$0.00	
Minimum		$0.00	$0.00	
Maximum		$0.00	$1.00	
Count		60	60	
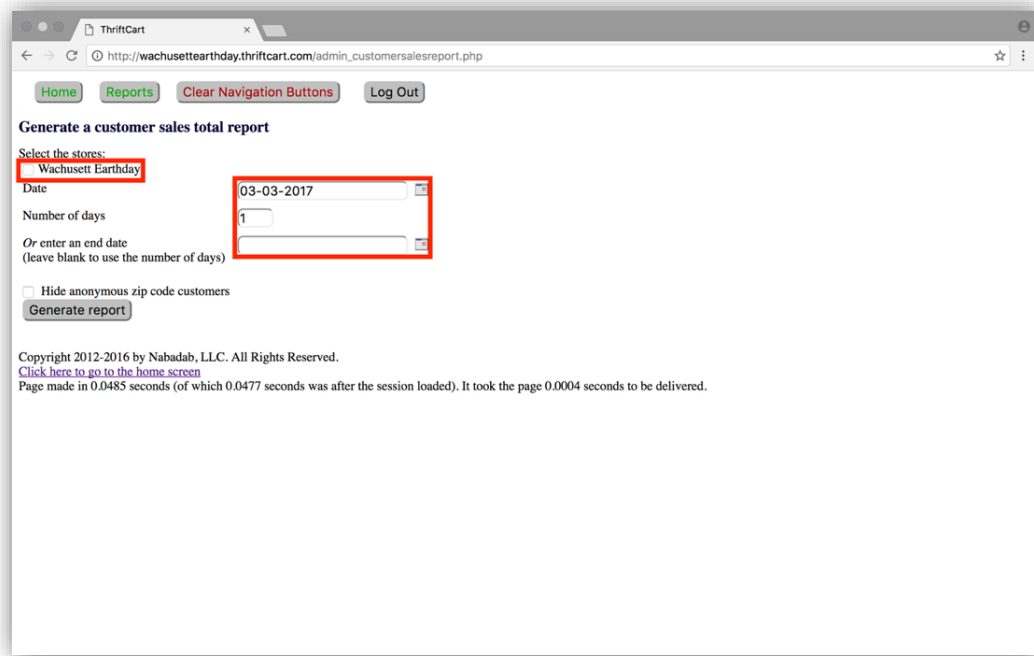
Grouped by item

Item ID	Item name	Quantity	Purchase price	Unit price	Unit price (before any discounts)
1	Appliances	2	$0.00	$0.00	$1.00
3	Doors	2	$0.00	$0.00	$1.00
5	Furniture	3	$0.00	$0.00	$1.00
6	Home Decor	4	$0.00	$0.00	$1.00
7	Lighting	2	$0.00	$0.00	$1.00
8	Miscellaneous	3	$0.00	$0.00	$1.00
12	Fabric	14	$0.00	$0.00	$0.00
14	Tools	1	$0.00	$0.00	$0.00
18	Book	4	$0.00	$0.00	$0.00
21	DVD	4	$0.00	$0.00	$0.00
22	Fastener	7	$0.00	$0.00	$0.00
23	Plate	11	$0.00	$0.00	$0.00
24	Glass	3	$0.00	$0.00	$0.00

Grouped by cashier

CUSTOMER SALES REPORT

ThriftCart describes a "Customer Sales Report" as a report that shows "sales totals grouped by customer for given date ranges". Clicking on the "Customer Sales Report" option from the "Make Reports" page will lead you to this page:

To generate a "Customer Sales Report", you must select the store(s) the report will gather information from (in this case, "Wachusett Earthday") and provide a range of dates that the report will limit itself to. Doing so will create the "Customer Sales Report" in tabular form. Below is a portion of a sample "Customer Sales Report":

You cannot export a "Customer Sales Report" to Microsoft Excel.

A "Sales by zip code" report generated by ThriftCart groups sales by customers' zip code. Clicking on the "Sales by zip code" option from the "Make Reports" page will lead you to this page:

To generate a "Sales by zip code" report, you must select the store(s) the report will gather information from (in this case, "Wachusett Earthday") and provide a range of dates that the report will limit itself to. Doing so will create the "Sales by zip code" report in tabular form. Below is a portion of a sample "Sales by zip code" report:

TROUBLESHOOTING

This section will identify some problems that you may encounter while operating ThriftCart and how to address them. If you encounter a problem that is not covered in this section, we suggest that you contact Nabadab LLC. for additional support by filling out the form located at http://thriftcart.com/contact.php.

"YOU DO NOT HAVE THE PERMISSION REQUIRED TO DO THIS"

If ThriftCart displays a page that has this warning:

> Sorry, you do not have the permission required to do this. Contact the site administrator.

It means that your ThriftCart administrator has not set the necessary user permissions for you to perform your operation. You should ask your ThriftCart administrator to set the necessary user permissions before attempting to perform your operation again.

RECENTLY ADDED INVENTORY ITEM NOT FOUND IN CASH REGISTER PAGE

If you cannot find an inventory item button in the "Cash Register" page after adding the related item to your inventory, it most likely means that you have not rebuilt the "Cash Register" page yet. You should follow our instructions to modify the register interface "Cash Register" page. Visit the section titled "Make Changes to the Cash Register Live."

WARNING PAGE REGARDING MYSQL

If ThriftCart displays a page that begins with the following:

> **Warning**: mysql_connect() [function.mysql-connect]: Access denied for user 'DB_WEAKUSER'

It most likely means that you were performing an operation that ThriftCart will always prevent as a security precaution. You cannot perform your operation, and should navigate to the previous page using your browser's "back" button.