



# uOttawa

**Deliverable B: Needs, Problem Statement, Metrics, Benchmarking and Target Specifications**

Group 2.1

Hanna Curry 300158551

Jacob Miller 3000198313

Paige Petroskie 300158917

Eli Pratt 300177477

Laura Karlin 300172136

GNG 2101 [C02]

Professor Jason Foster

January 23<sup>rd</sup>, 2022

University of Ottawa

## Table of Contents

|  |    |
|--|----|
| 1. Introduction/Briefing .....         | 4  |
| 2. Client Statements.....              | 4  |
| 3. Customer Needs Identification ..... | 4  |
| 4. Problem Statement.....              | 7  |
| 5. Metrics .....                       | 7  |
| 6. Benchmarking .....                  | 7  |
| 6.1 Product Benchmarking:.....         | 8  |
| 6.2 Customer Benchmarking:.....        | 9  |
| 7. Target Specifications .....         | 11 |
| 8. Reflection on Client Meeting .....  | 11 |
| 9. Conclusion.....                     | 11 |

List of Tables

Table 1: Organization of Interpreted Client Needs and Justification ..... 4

Table 2: Metrics of Clothing Rack Design and Types ..... 7

Table 3: Technical Benchmarking of Similar Products..... 8

Table 4: Customer Benchmarking of Similar Products ..... 9

Table 5: Target Specifications of the product..... 11

## 1. Introduction/Briefing

Our first client meeting introduced us to [REDACTED]. [REDACTED] works for the uOttawa Free Store on campus. [REDACTED] has expressed a need for a new collapsible clothing storage rack. This rack must be durable, accessible, and adjustable. We took it a step further and scheduled an interview with the uOttawa Student Coordinator, Alex Kay. Throughout Deliverable B, we will discuss our observations from both interviews. We will then develop and prioritize the customer's needs. From the established needs, we will then develop a problem statement. Lastly, we will create a list of metrics and compare it with other competitors through benchmarking analysis.

## 2. Client Statements

A list of client statements/observations obtained from client interviews:

- we would like to have racks that can be moved to different locations around campus
- we would like to have racks that can be wheelchair accessible
- we would like to have racks that can be collapsible
- we would like to have racks that aren't very expensive
- we would like to have racks that can hold a lot of weight
- we would like to have racks that have an easy and intuitive set-up
- we would like to have racks that can be easily moved by a maximum of two people
- we would like to have racks that are quick to set-up
- we would like to have racks that are very strong and durable
- we would like to have racks that look very polished and clean

## 3. Customer Needs Identification

A list of translated and prioritized customer needs (using the five techniques shown in class: what not how, specificity, positive, attribute of the product and avoid words must and should).

Table 1: Organization of Interpreted Client Needs and Justification

| <b>Client Statement</b>                                       | <b>Interpreted Client Needs</b>  | <b>Priorities</b><br>(1- most important<br>9- least important) | <b>Justifications</b>   |
|---|----------------------------------|--|---|
| We would like to have racks that can be wheelchair accessible | The rack is adjustable in height | 2  | The client has expressed their extreme concern with accessibility within the free store. They want everyone to have the opportunity to shop there. Through making the |

|  |  |   |   |
|--|--|---|---|
|  |  |   | clothing racks more accessible, it will allow more students to feel included. The client expressed their idea that adjustable height may grant access for the employees to change the rack height to accommodate wheelchair users. As accessibility is a major concern for the client and one of the reasons they would like to change the design, the need was ranked as 2, second only to strength out of safety reasons.   |
| We would like to have racks that can be moved to different locations around campus.  | The rack is collapsible and movable by hand              | 4 | The client had expressed that mobility was an issue with their current clothes rack. The client had stated that the clothes rack needs to be exported from a building approximately a five-minute walk away and by one to two people. With a heavy clothes rack, it was not ideal to be moved for one person (safety). The client expressed that a collapsible design would be ideal, but if not possible, wheels would also be possible; hence why the priority is only 4.   |
| The clothing rack needs to be able to withstand the "not-very-careful" treatment of the rack by volunteers working at the free store who are in a hurry. | The rack is durable and can withstand rough handling     | 5 | The client has expressed that they want a clothing rack that can handle a lot of weight. The volunteers do not have time to be concerned about how much weight is being on it, and they have to be to take clothes on and off quickly, without worrying about the state of the rack. However, the client as also expressed the ability to, if a weight limit exists, instruct the employees to only hold a certain amount of clothing articles; hence why the priority is lower.  |
| We would like to have racks that have an easy and intuitive set-up   | The rack is easy to assemble by a maximum of two people. | 6 | The client has expressed their current racks have had issues with being set up and taken down quickly, being able to extend the bars for more use, and being able to collapse them for compact storage. Being able to meet all these needs will allow the store to feel more open and less crowded. In addition, the client expressed (as seen a couple rows later) a desire for the rack to be movable by a max of two people, so the setup may, by extension also be setup by two people. Due to the current racks still being very useful though, the priority was judged as not as important in comparison to other needs, which is why it was only assigned 6. |

|   |   |   |  |
|---|---|---|--|
| We would like to have racks that aren't very expensive                          | The rack is cheap   | 3 | It was mentioned in the client meeting that the uOttawa Free store relies almost entirely on donations and thus does not have a lot of extra money to spend on an expensive clothing rack; therefore, a cheaper cost is highly necessary for the store to be able to implement the item into their store.  |
| We would like to have racks that can hold a lot of weight                       | The rack is stable and strong enough to hold a lot of clothing    | 1 | The client expressed a need for the racks to be able to hold many items. Most importantly, the racks were supposed to be stable enough to support the weight as to not pose a safety hazard; hence why the need would be categorized as the most important objective.  |
| We would like to have racks that can be easily moved by a maximum of two people | The rack is light enough to be carried by a maximum of two people | 7 | In the meeting, it was mentioned by the client that the Free store relies primarily on the work of a few volunteers, and as such the clothing racks should not require for very many people to lift them and transport them (given their low staffing). The client, however, has also expressed how wheels could be useful for mobility in case the design is heavier, which is why the need was deemed as not as important if wheels can be used to negate any issues associated with weight. |
| We would like to have racks that are quick to set-up                            | The rack is fast to assemble                                      | 8 | In the client meet, it was discussed that during display periods the Free store needs to be able to put their items up for display quickly, and thus the rack should be fast to disassemble and reassemble in case of a last-minute display. The client did mention that the employees usually have 30 minutes for setup, though, which is why, if enough time is allocated to setup, the need was deemed as not the most important; hence why the priority is 8.                              |
| We would like to have racks that look very polished and clean                   | The rack is aesthetically pleasing and simple in design           | 9 | The client expressed that while aesthetics would be appreciated, they were not necessary. The client stated that while the current racks aren't "beautiful," they accomplish their task, which is what matters to the customer; therefore, as long as the new design isn't "hideous," they didn't see a need to prioritize aesthetics.   |

## 4. Problem Statement

A problem statement was developed answering the following questions: What is the problem? Who has the problem? What form can the solution be?

“The uOttawa Free store is looking for a collapsible clothing rack that is both easily mobile and cost effective, with high clothing capacity and moderate weight bearing ability while remaining accessible and easy to set up.”

## 5. Metrics

A list of metrics pertaining to the problem with associated units, identified needs each metric addresses and if the metrics are functional/non-functional or constraint.

Table 2: Metrics of Clothing Rack Design and Types




| <b>Metric</b>          | <b>Relationship</b> | <b>Value</b> | <b>Unit</b> | <b>Type</b>                |
|------------------------|---------------------|--------------|-------------|----------------------------|
| Weight capacity        | >=                  | 10           | lbs         | Functional requirement     |
| Accessibility          | =                   | High         | N/A         | Constraint                 |
| Compactness            | =                   | High         | N/A         | Constraint                 |
| Wheel size             | <=                  | 1.5          | In. (dia.)  | Functional requirement     |
| Cost                   | <=                  | 100          | \$ (CAD)    | Constraint                 |
| Durable                | =                   | Yes          | N/A         | Functional requirement     |
| Wheels can lock        | =                   | Yes          | N/A         | Functional requirement     |
| Setup time             | <=                  | 4            | minutes     | Constraint                 |
| Aesthetically pleasing | =                   | Yes          | N/A         | Non-functional requirement |

## 6. Benchmarking




Benchmarking of similar products and potential customers that may use the product other than the customer outlined by the client.

## 6.1 Product Benchmarking:

Table 3: Technical Benchmarking of Similar Products


| Product   | Source  | Description  |
|---|---|--|
|    | <a href="https://www.amazon.ca/Collapsible-Folding-Clothing-Rack-Salemsans/dp/B0038Z7BK6">https://www.amazon.ca/Collapsible-Folding-Clothing-Rack-Salemsans/dp/B0038Z7BK6</a>   | <ul style="list-style-type: none"> <li>- Holds up to 250 lbs of capacity</li> <li>- Folds down to 5" high</li> <li>- Made of Chrome Plated Steel</li> <li>- Has extensions on the end of the hang-rail</li> <li>- Wheels on the bottom for movement</li> <li>- 55.9 x 121.9 x 165.1 centimeters</li> <li>- 72" Hanging Space</li> <li>- 48" long hang-rail</li> <li>- two 12" Extensions</li> <li>- Adjustable Height Settings: 55", 60", 65"</li> </ul> |
|   | <a href="https://www.homedepot.com/p/Honey-Can-Do-28-5-in-W-x-73-5-in-H-Chrome-Steel-Collapsible-Tripod-Clothes-Drying-Rack-2-Tier-DRY-09220/316452718">https://www.homedepot.com/p/Honey-Can-Do-28-5-in-W-x-73-5-in-H-Chrome-Steel-Collapsible-Tripod-Clothes-Drying-Rack-2-Tier-DRY-09220/316452718</a> | <ul style="list-style-type: none"> <li>- Chrome Steel</li> <li>- 2-tier</li> <li>- Holds up to 30 garments on individual ridges for hangers</li> <li>- Top tier extends clothes up to 6 ft. off the floor to flutter in the breeze</li> <li>- Collapses compactly for easy storage</li> <li>- Dimensions: 28.5 in. D x 28.5 in. W x 69 in. to 73.5 in. H</li> </ul>  |
|  | <a href="https://www.amazon.ca/Whitmor-Foldable-Collapsible-Garment-Silver/dp/B01M1900H1">https://www.amazon.ca/Whitmor-Foldable-Collapsible-Garment-Silver/dp/B01M1900H1</a>   | <ul style="list-style-type: none"> <li>- Easy to assemble garment rack with no tools required.</li> <li>- Height adjustable</li> <li>- Durable yet lightweight</li> <li>- Garment rack folds away for easy storage</li> <li>- Dimensions: 22.0" x 34.75" x 66.25"</li> <li>- Can hold up to 6.89 Pounds</li> <li>- Wheels on the bottom for movement</li> </ul>  |






|  |   |  |
|--|---|--|
|   | <a href="https://www.mobico.ca/us/2911-collapsible-double-clothing-rack.html">https://www.mobico.ca/us/2911-collapsible-double-clothing-rack.html</a>   | <ul style="list-style-type: none"> <li>- Adjustable height 55", 60", 65"</li> <li>- 2 hangrails 1" round-tubing with 12" pull-out hangrail at each end</li> <li>- 4" ball bearing casters</li> <li>- Wheels on the bottom for movement</li> </ul>  |
|   | <a href="https://www.amazon.ca/TOOLF-Clothes-%20Collapsible-Indoor-Outdoor-Clothing%20/dp/B09DCR6JW9">https://www.amazon.ca/TOOLF-Clothes-%20Collapsible-Indoor-Outdoor-Clothing%20/dp/B09DCR6JW9</a>                         | <ul style="list-style-type: none"> <li>- Designed for indoor and outdoor use.</li> <li>- Equipped with 4 casters makes it easy to move around.</li> <li>- Has a 44LBS weight capacity</li> <li>- Rust-proof and durable.</li> <li>- Item weight: 5.32 kg</li> <li>- Made of alloy steel</li> <li>- 45 x 45 x 48 cm</li> <li>- No movability while in expanded state</li> </ul> |
|  | <a href="https://www.amazon.ca/AmazonBasics-Hanging-Closet-Removable-Drawers/dp/B07JJCHNH2/ref=asc_df_B07JJCHNH2">https://www.amazon.ca/AmazonBasics-Hanging-Closet-Removable-Drawers/dp/B07JJCHNH2/ref=asc_df_B07JJCHNH2</a> | <ul style="list-style-type: none"> <li>- 6-tier</li> <li>- Includes 3 smooth-sliding removable drawers</li> <li>- Can hold up to 10 pounds</li> <li>- Dimensions: 13.6 by 12.2 by 6.9 inches</li> <li>- Installation type: Freestanding</li> <li>- Collapsible for better movement</li> </ul>  |

## 6.2 Customer Benchmarking:

Table 4: Customer Benchmarking of Similar Products

| Customer | Product   | Source  | Explanation  |
|----------|---|---|--|
| Library  |  | <a href="https://www.ikea.com/ca/en/cat/bookcases-10382/">https://www.ikea.com/ca/en/cat/bookcases-10382/</a> | <ul style="list-style-type: none"> <li>- Many libraries use a similar bookshelf product to store their books for the customers.</li> <li>- This product is stackable, and very accessible to people with disabilities.</li> <li>- This product is easily stored due to its basic rectangular shape.</li> </ul> |

|                            |   |  |  |
|----------------------------|---|--|--|
| <p>University Students</p> |    | <p><a href="https://fustany.com/en/lifestyle/living/discover-how-a-clothing-rack-can-serve-you-in-many-ways">https://fustany.com/en/lifestyle/living/discover-how-a-clothing-rack-can-serve-you-in-many-ways</a></p>             | <ul style="list-style-type: none"> <li>- Many university students live in apartments that are not very big and they need to be able to store their belongings without making their bedrooms feel “crowded.”</li> <li>- The collapsible clothes rack can be easily set up and taken down when needed.</li> <li>- Can withstand the weight of almost all clothing items and is not bulky.</li> <li>- Can be aesthetically pleasing.</li> <li>- Can be rolled around if it is needed to gain access to something else.</li> </ul> |
| <p>Swimming Pool</p>       |    | <p><a href="https://www.anikasdiylife.com/diy-outdoor-towel-rack/">https://www.anikasdiylife.com/diy-outdoor-towel-rack/</a></p>   | <ul style="list-style-type: none"> <li>- Some swimming pools have outdoor towel racks that are used to store dry towels.</li> <li>- Easy accessibility when the user needs a towel after swimming.</li> <li>- Needs to withstand outdoor conditions, rain, wind, etc.</li> <li>- Can withstand the weight of many towels due to the sturdy material used.</li> </ul>   |
| <p>Grocery Store</p>       |  | <p><a href="https://www.alibaba.com/product-detail/Stable-grocery-store-marketing-floor-standing_60736582178.html">https://www.alibaba.com/product-detail/Stable-grocery-store-marketing-floor-standing_60736582178.html</a></p> | <ul style="list-style-type: none"> <li>- Many grocery stores use different display racks for easy access to their products.</li> <li>- Allows customers to see all products that are able to be bought.</li> <li>- Good separation between products.</li> <li>- Not easily set up or taken down.</li> <li>- Pretty bulky.</li> </ul>   |
| <p>Hotels</p>              |  | <p><a href="https://www.nathosp.com/category/hotel-room-wall-racks">https://www.nathosp.com/category/hotel-room-wall-racks</a></p>   | <ul style="list-style-type: none"> <li>- Every hotel has a hanging rack in their closet for easy storage of the user’s belongings.</li> <li>- Easily accessible.</li> <li>- Not easily put up or taken down since it is permanently screwed into the wall.</li> </ul>  |

## 7. Target Specifications

A set of target specifications (both ideal and marginally acceptable values) along with reasons for each choice

Table 5: Target Specifications of the product

| Specifications                   | Desired Value   | Justification  |
|----------------------------------|---|--|
| Performance- Travel              | The Clothes Rack can be moved across campus without the wheels stopping.          | The clothes rack needs to be easily moved by one person across campus without any issues.  |
| Service Life of the Clothes Rack | The Clothes Rack will have a continuous service life of 10 years.                 | The clothes rack needs to be durable to withstand a service life of 10 years.  |
| Aesthetic                        | The Clothes Rack will have an aesthetic and clean appearance.                     | The clothes rack should have an aesthetic, clean appearance and to have enough room on the end to place quotes.                                    |
| Material                         | The material used will withstand indoor and outdoor conditions                    | The clothes rack will be made with durable material to withstand moving around indoors and weather conditions in the summer and fall.              |
| Set-Up                           | The set-up process can be easily set-up by one person within a small-time frame.  | The Set-Up process is required to be set up by one to two people maximum as quickly as possible.   |
| Performance- Working Wheels      | The wheels will lock easily when required to stop the clothes rack from moving.   | The customer had stated that working, locking wheels is essential for the space that is available.   |
| Accessibility                    | The clothes rack will be lowered to various heights for wheelchair accessibility. | There is a need for an accessible clothes rack for wheelchair accessibility. The clothes rack will be required to be raised and lowered with ease. |

## 8. Reflection on Client Meeting

Prior to the client meeting, our group did not know a lot about the free store. We were not familiar with the inner workings, or the trials of the free store. By discussing with [REDACTED], we were able to empathize with the customer's challenges and needs. Without this client meeting, it would have been difficult to establish a list of prioritized needs, because we did not know what they are currently struggling with. For example, before the client meeting, we were concerned about outdoor elements and aesthetics. After our meeting, we were made aware that they are not concerned about the aesthetic or "outdoor proofed" aspect of the design. Instead, they want us to focus on the accessibility and durability of the design. This allowed us to establish what is more important, so we can spend more time on those aspects. Some unknown information we must consider, is the lifespan of the design. Is this clothing rack expected to last for a long amount of time? We also do not know qualitative weight and size restrictions.

## 9. Conclusion

In conclusion, after our first client meeting, we were able to identify the needs of the customer. These needs are including but not limited to a clothing rack that is both accessible and durable, while

remaining cost effective and mobile to take around campus. We were able to prioritize these needs, as well as develop a problem statement that we will reflect on when developing our product. We were able to compare generic clothing racks and benchmark the aspects we like, as well as the aspects we would not like to incorporate into our product. Lastly, we pointed out some ideas we need to clarify. We feel confident and excited to begin creating the design criteria.