Major Assignment 2: Travel + Tourism

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1. ACCEPT SITUATION

How can wheelchairs carry baggage more effectively?

2. ANALYZE

I have observed that wheelchair users have difficulties in carrying baggage when they travel. Erik Kondo, a T5 paraplegic, published on Wheelchairtraveling.com Access the World, stating common problems met by wheelchair users and tips for carrying baggage. Erik (n.d.) mentioned that only a small suitcase can be put on the user's lap and towing a large suitcase or hanging a heavy loaded backpack at the back of the chair causes the wheelchair to become wobby.

Figure 1: Wheelchair user carrying as much baggage as possible

Source: Kondo, E. (n.d.). Luggage Tips for Wheelchair Travel - Packing to Carrying - wheelchairtravelling.com. photograph.

2. ANALYZE

I investigated existing wheelchair designs on the market and found three useful designs but caused other problems.

The first one is from Phoenix Instinct, it is designed to tow a backpack with wheels behind the wheelchair. However, the suitcase cannot be too heavy, or else it is going to cause unbalance as Erik insisted.

Figure 2: Backpack with Wheels

Source: Phoenix Instinct. (n.d.). Phoenix Independence: Twin Set. photograph.

2. ANALYZE

Another design is called “luggage carrier attachment for wheelchair” (Archavist, 2019). It attaches a luggage carrier in front of the wheelchair. In fact, the design is stable regardless of the weight of the luggages. Nevertheless, it is redundant to bring it while one travels.

Figure 3: Luggage Carrier Attachment for Wheelchair

Source: Archavist, Y. (2019). Luggage Carrier Attachment for Wheelchair - Makeability. photograph.

2. ANALYZE

The last wheelchair is from first choice mobility, designed to have extra storage space under the seat. This idea consists of a great use of space and does not increase the size of the wheelchair but still cannot hold too many things for wheelchair travellers.

Figure 4: Wheelchair Underseat Box Bag
Source: first choice mobility LT. (n.d.). Wheelchair Under Seat Box Bag. photograph.

3. Define

After organizing the strength and weakness of the existing products, the three core issues are storage capacity, size of the wheelchair, and balance.

01

Storage Capacity

The main goal of the design, dealing with the inability to carry baggage effectively

02

Size of the Wheelchair

The size of the wheelchair defines the usability of the wheelchair because having a wheelchair that is either too wide or too long can have many troubles.

03

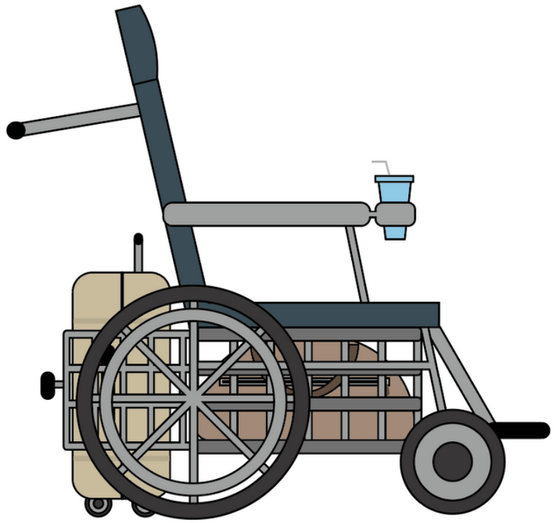
Balance

Balance is strongly related to the safeness of the wheelchair. When a wheelchair is tipped over due to unbalanced weight, it can hurt disabled seriously.

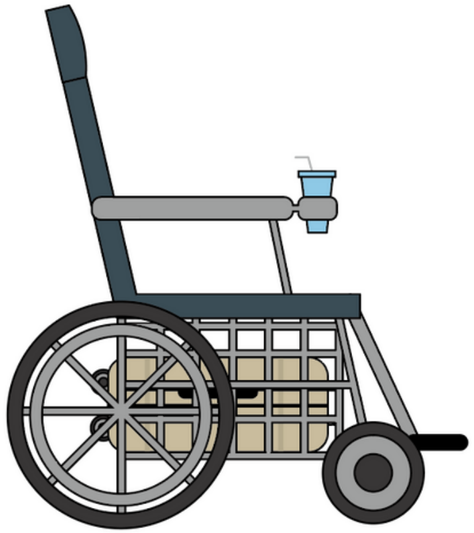
3. Define

	Backpack with Wheels	Luggage Carrier Attachment for Wheelchair	Wheelchair Underseat Box Bag
Storage Capacity	Medium	High	Low
Increase in the Size of the Wheelchair	Medium	Long	No Increase
Balance	No	Yes	Yes

4. Ideate



Wheelchair + Drawer



Wheelchair + Market Cart

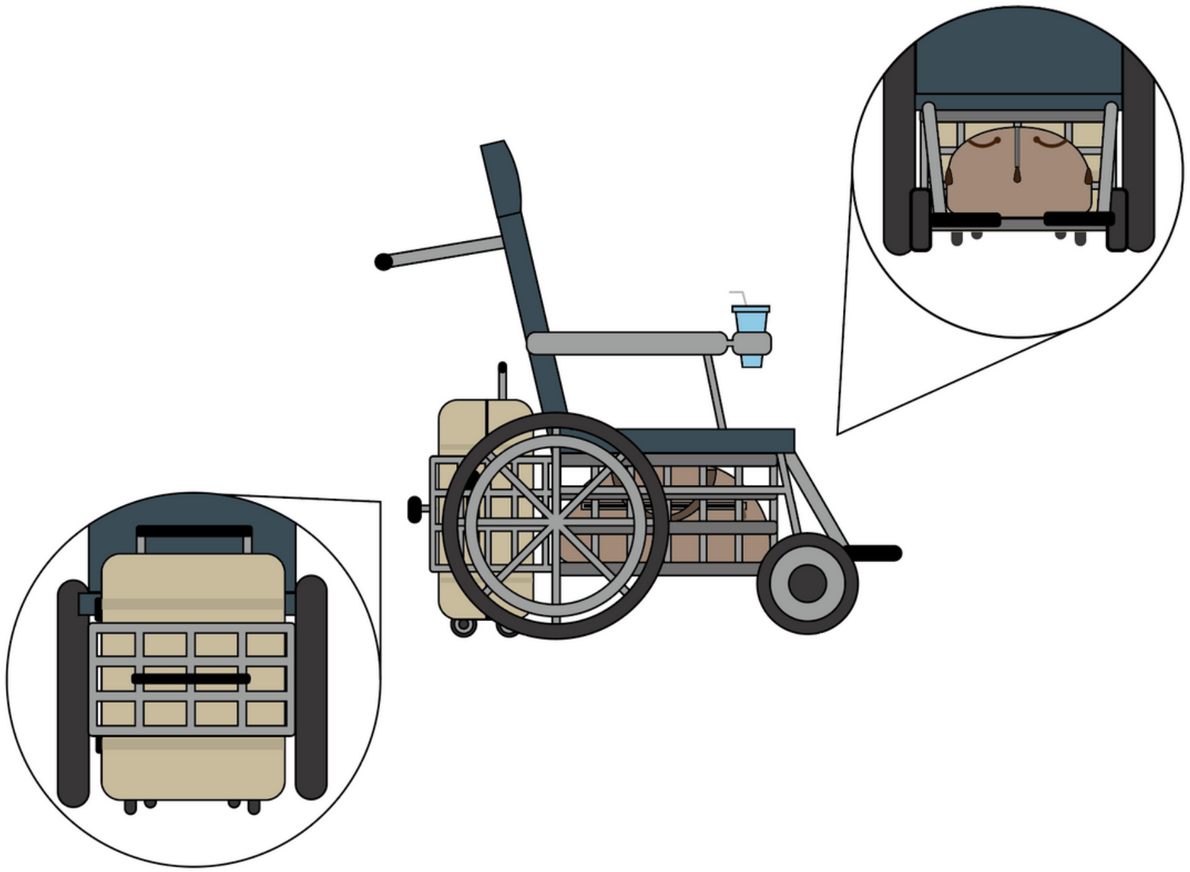
Handle + Laptop Bag

DESIGN 1

4. Ideate

Wheelchair + Drawer

The first design uses bisociation by combining the idea of a drawer and the telescopic legs of a folding table. This design works by pulling through the handle and the telescopic rods will be pulled out. After putting the suitcase in the hollow part, user can push the drawer back a little to make the suitcase stick to the back of the wheelchair. At the same time, a baggage can be put under the wheelchair through the opening in front.

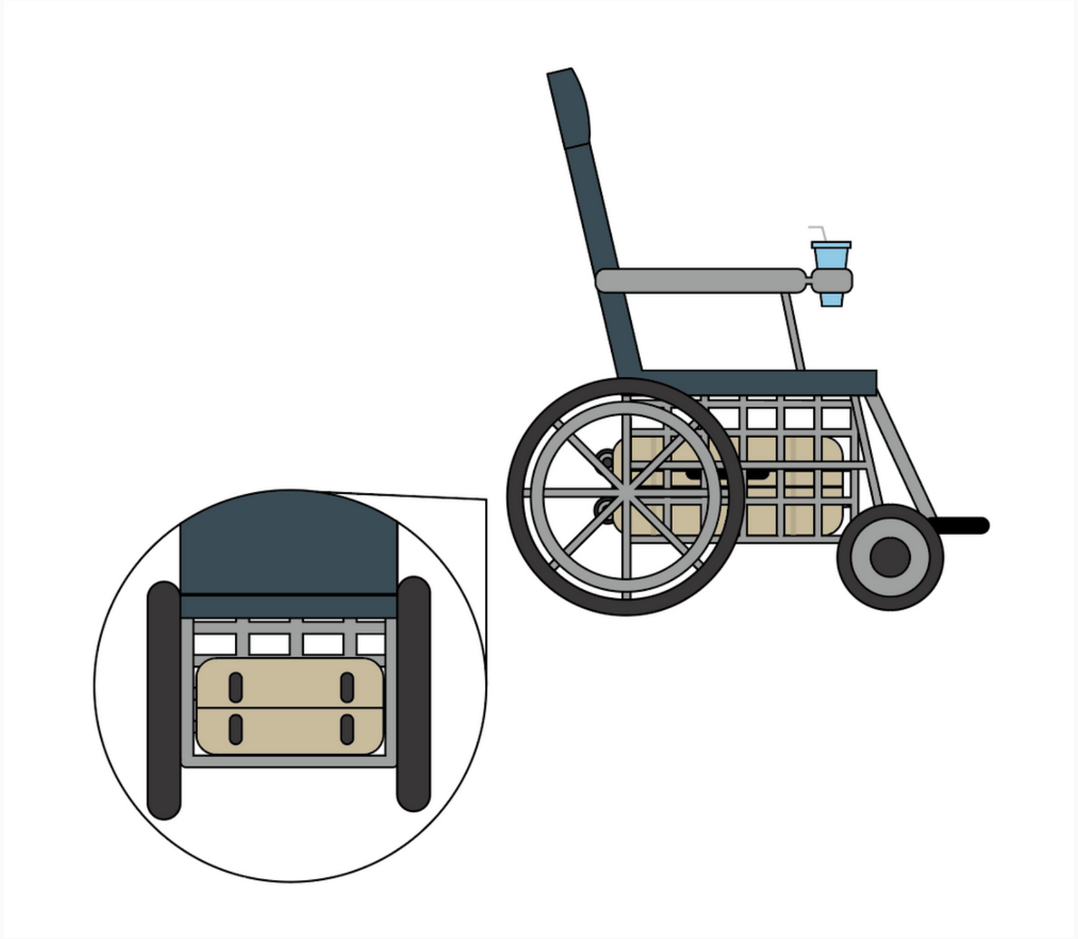


DESIGN 2

Wheelchair + Market Cart

The second design uses bisociation by combining a wheelchair and a market cart. This design is similar to the first one but only using metal rods. Since the height designed to be higher, a suitcase can fit in by putting it through the back of the wheelchair.

4. Ideate

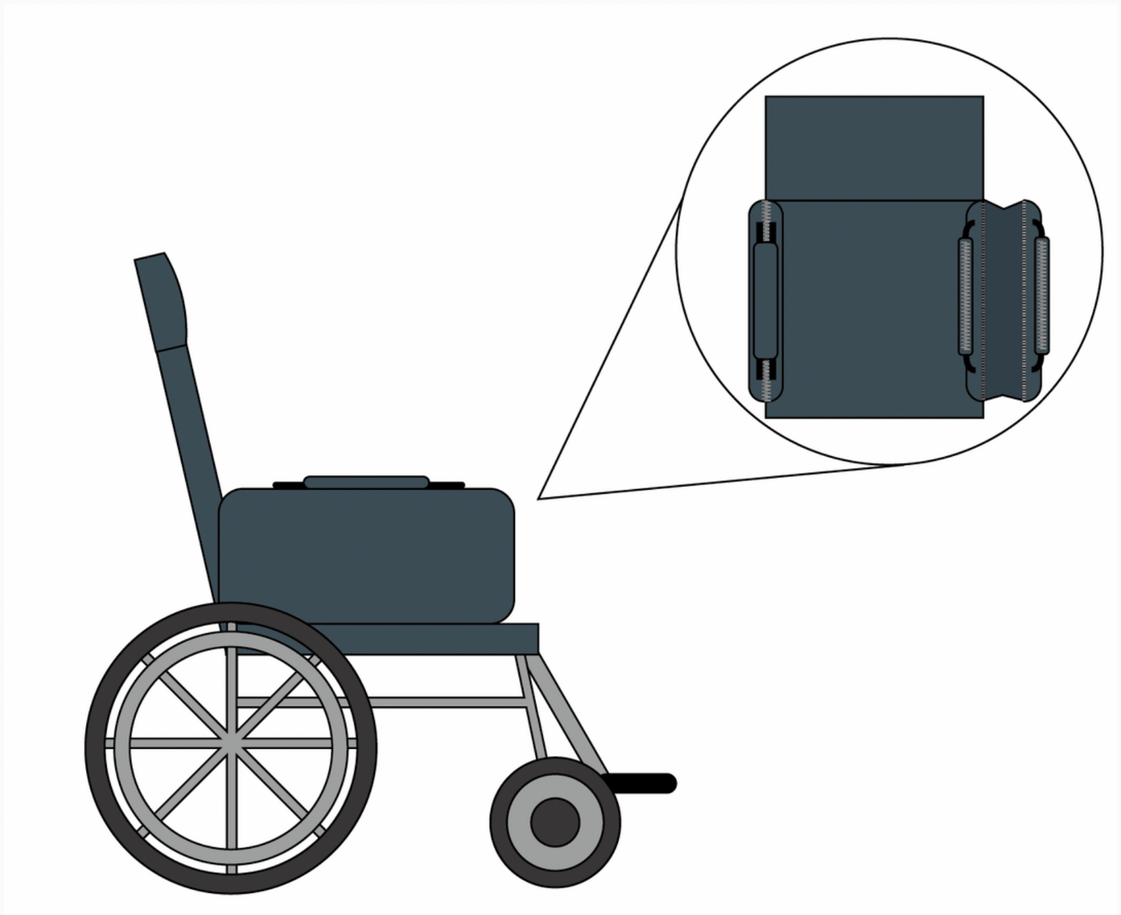


DESIGN 3

Handle + Laptop Bag

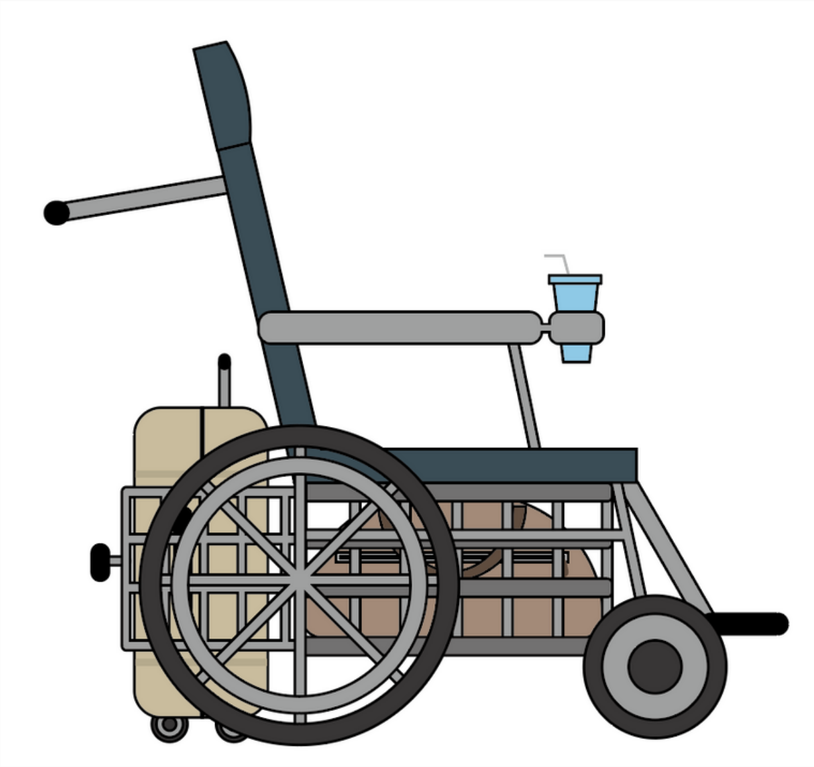
4. Ideate

The third design uses bisociation by combining laptop bags with the handles on the wheelchair. Beneath the handles are the laptop bags that can store things. Compared to a regular laptop bag, this one is thicker in order for more stuff. The handles of the bag are thicker and wider with zippers that can be opened and stored little things like passports, cards or tickets needed during transportation. Also, if needed, the laptop bag can be removed from the wheelchair.



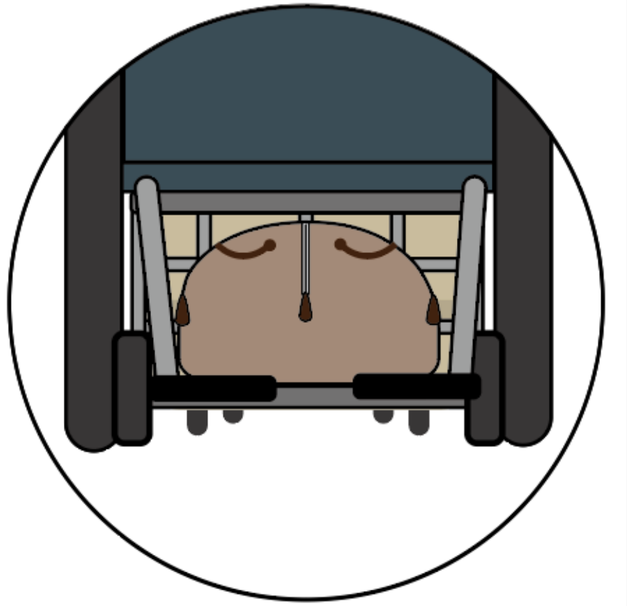
5. SELECT

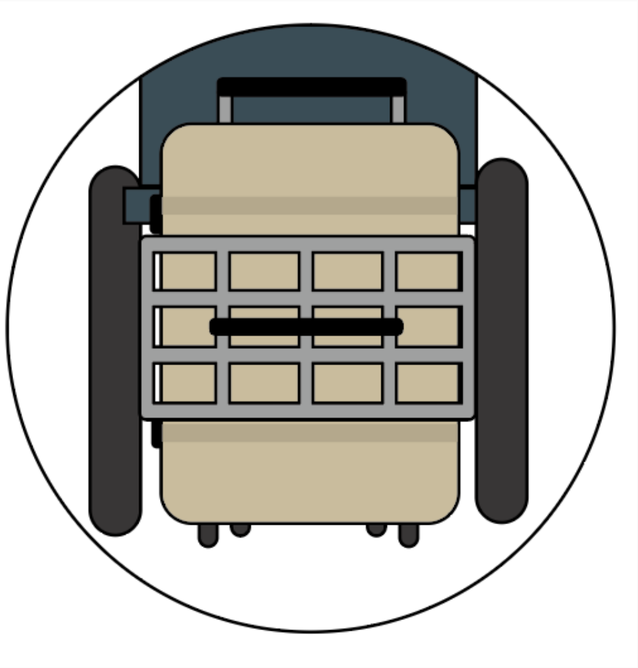
The final design that I chose to go with is the first design, the idea of a wheelchair and drawer. This idea provides the most storage capacity. When the telescopic rods are not pulled out, it provides a minimum of storage capacity that is already enough for daily use. For example, one can put groceries inside it. When a suitcase is needed to go for a trip, pulling out the telescopic rods increases a lot of storage capacity while the minimum storage space can still be used. At the same time, it does not cause unbalance because the weight of the suitcase is not put on to the wheelchair. As for the size of the wheelchair plus suitcase is not too big to bring inconvenience during the trip. In addition, the height of the wheelchair did not increase a lot, which would not lead to danger to disabled for sitting and getting up.



6. IMPLEMENT

The design follows Norman’s concept of visibility, feedback, and mapping. The idea of visibility is that users know how to use it just by looking at it. The space beneath the seat intuitively tells the user that they can put their stuff inside it. The handle with rubber part also informs the user that they can pull from it.





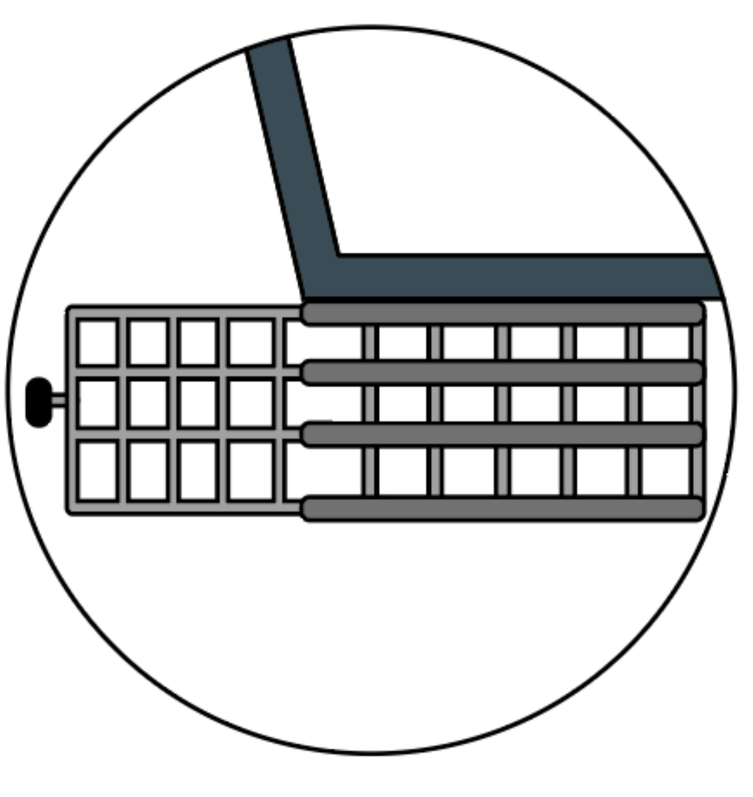
6. IMPLEMENT

The concept of feedback is when users know whether their action has performed successfully or not. Users can see if the telescopic rods are pulled out or not directly. When the rods cannot be pulled anymore, this means the process has completed. Lastly, mapping is when users can see the effect of their control. As the telescopic rods are pulled out, users can see how much has been pulled.

I also designed the telescopic rods to be thicker and darker to make it different from other metal rods. This can let the users know which rods will be pulled out.

The target of the design was to provide convenience to wheelchair users and travellers. Thus, I kept the design simple to intuitively allow users to achieve their goal of use.

The materials that are needed are telescopic rods, iron tubes, and rubber.



7. Evaluate

I believe wheelchairs can be redesigned in such a way to increase storage for wheelchair users and travellers. This kind of design can not only be helpful during traveling time but can also be used in daily lives. The design can also benefit patients and nurses in the hospital. For example, nurses can carry a patient’s daily necessities under the wheelchair’s seat. When anything is in need, things can be taken very soon. The design is also simple and intuitive. This gives people from all age range to use it easily, especially the elderly, who are the most common users. The additional part of the design is simple, manufacturing it should be cost effective.

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