

## Design Brief

### 1. Problem statement and background

**“Flexireach”** is a universal design product inspired from the users’ difficulties in climbing up or bending down for reaching. The commercially-available long-handle reachers, however, has limitations for reaching things in positions that require turning as they are all straight in shape.

### 2. Methods/Approach/Solutions considered

We first considered preventive measures to solve the problem mentioned above, such as placing objects in positions that the existing reacher can reach. However, this method is not applicable in all places. For instance, the living environment Hong Kong is small, it is difficult to avoid placing objects on high shelves or drawers at below waist level.

Besides, we also thought of a reacher with a fixed angle at 90 degrees for lifting objects on the ground. Yet, without flexibility, the reacher cannot be adjusted to fit the shape of the objects, which is not convenient and universal enough.

### 3. Description of Final Approach and Design

#### **“Flexireach” -----An extended helping hand**

The idea of **“Flexireach”** comes from existing reachers which has limitation in grasping objects from floor or high place. The commercially-available long handled reachers are all straight in shape and cannot be flexed to adjust the angle when getting objects. Besides, they can only clip light-weight objects and the strength of gripping is determined by the grip strength of users, which may induce potential risk of dropping objects for users with weak upper limbs. Therefore, the existing long handle reachers is not a good helping hand for all users.

In light of this, **“Flexireach”** is designed as an extended helping hand with remarkable features : **flexibility and strength**

For **flexibility**, **“Flexireach”** allows users to adjust the gripping angle easily. Users can access objects from different angles, so that the reacher is accommodating the objects instead of hands accommodating objects, in order to prevent undesirable postures and injuries. Users can also adjust the angle according to their own needs and preferences. This design supplements the existing long handle reachers for more friendly usage.

For **strength**, **“Flexireach”** adopts an additional aluminum plate on the handle, which helps stabilising the angle of arm and increases strength. Holes on the plate allow the reacher to be stabilised at different angles, which facilitate getting heavier objects from different places. Wire for pulling the clip is covered by coating of bicycle brake wire. Clips are coated with dycem to increase friction for grabbing objects, this assures a secure grip on objects and reinforces the strength of **“Flexireach”** at different angles.

These remarkable features enables **“Flexireach”** to act as an extended helping hand for the elderly and people with difficulty in bending down such as suffering from low back

pain or lower limb weakness, thus improving their performance in daily life. With **“Flexireach”**, these users can be more capable of performing activities of daily living independently.

People suffering from low back pain or lower limb weakness usually found tremendous difficulties when they have to bending their trunk or kneeling down to pick up objects. Nevertheless, with adjusted gripping angle, **“Flexireach”** can accommodate with the best angle to grab objects on floor and in high shelves. Hence, undesirable postures causing pain are no longer required when performing reaching tasks can be avoided. Weakened grip power and standing imbalance are two major problems encountered by most elderly. Getting objects at height is a major risk factor of fall due to their poor balance. For instance, taking boxes and bottles from high shelves (especially with stool) is very dangerous and easily causes imbalance, as their center of gravity shifts out of their small base of support. And without much grip strength, they may not hold objects firmly and objects may drop down causing injuries. Besides, risky behaviours may be performed by elderly , which increases the risk of fall. **“Flexireach”** serves as an extended helping hand in preventing these risks.

With no doubt, wheelchair users are barely accessible to objects on the floor and objects at heights. With the help of **“Flexireach”**, wheelchair users can access objects overhead or on the floor by adjusting the angles of the reachers. As a result, wheelchair users can access the objects without much adjustment on their own posture, facilitating the independent daily life performance.

#### 4. Outcome

The **“Flexireach”** is safe to use in accessing objects at different height and distance easily.

##### (I) Finalized product design



##### (II) Product illustration





# "Flexireach"

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## Background

"Flexireach" is a universal design product inspired from the users' difficulties in climbing up or bending down for reaching. The commercial-available long handle reachers, however, has limitations for reaching things in positions that require turning as they are all straight in shape.

## Characteristics and Features

"Flexireach" targets on flexibility and strength. For flexibility, users can easily adjust the angle of handle to reach objects according to personal and environmental needs. For strength, "Flexireach" has an add-on aluminum plate on the handle, which helps stabilize angle of arms and increase strength. It can also be folded for easy storage.

## Fabrication

"Flexireach" is made by replacing part of the handle with a flexible thick iron wire. An add-on aluminum plate with holes dug reinforces the strength of "Flexireach" at different angles. Two screws for aluminum plate installation is added on the handle, fixed by liquid nail. Wire for pulling the clip is covered by coating of bicycle brake wire. Clips are coated with dycem to increase friction for grabbing objects.

## Applications and Operations

"Flexireach" is designed for a wide range of users, especially elderly, people with limited ROM in Upper limbs, Lower limbs and trunk. It is also useful for normal people.

## Conclusion

In response to the limitations of the existing long handle reachers and the difficulties encountered by our target users, "Flexireach" was designed with high flexibility and strength for easy reaching.



## 5. Cost

Item no.	Item	Quantity	Cost (HKD\$)
1	Reacher body (including clip & button)	1	10
2	Flexible part	1	10
3	Bicycle brake coating (1 metre)	1	15
4	Liquid nails (glue)	1	10
5	Aluminium plate	1	5
6	Screw	2	1
7	Aluminium segment	2	2
8	Tape (2 metres)	1	5
9	Dycem (small piece)	2	5
10	Lug	1	1
11	Spray (used for one time)	1	3

Total Cost: HKD\$67

## 6. Significance

To enable all users to access objects at different height and distance easily by using “**Flexireach**”.