

Hwa Chong Institution
Project Work
Category 3
Inventions Log Book

Title of Project: **The Ceiling Fan Cleaner**

Group Name: **The Ceiling Fan Cleaner**

Group Members:

- 1) Tan Yi Wei
- 2) Foong Wei Sung
- 3) Lim Li-Ang Liam
- 4) Zhang Xinchun

1. Problem Finding

1 A Document a list of problems you have identified. Your documentation should show clearly how your group came up with the problems.

We decided to solve some problems about cleanliness because we discovered that some areas are particularly dirty. First, we identified the areas which needed cleaning and their problems.

- **Ceiling fans (mostly in classrooms) are usually dusty and dirty**
 - **This may be due to static electricity happening when the fan blades travel through the air quickly and brush the air molecules to move them out of the way. These molecules will build up an electrical charge on the leading edge of the fan blade, which is why dust particles will collect and stick more to one side than the other.**
 - **Ceiling fans are also places that are rarely cleaned by the school due as the school has many ceiling fans.**
- **Underneath beds, sofas and other heavy furniture**
 - **There are little light underneath these places, too dark**
 - **There are also small spaces, too narrow/small**
 - **too low**
- **Ceilings**
 - **Too high, dangerous to climb up objects to reach the ceiling**
- **Others**
 - **Stains, scratches, dirt**

1 B You should have selected a problem based on some considerations. Identify and justify these considerations.

We selected the problem of cleaning ceiling fans.

Ceiling fans are not usually cleaned as they are difficult to clean. They may be too high so it will be troublesome to reach the fan. Some people, especially the seniors, may even have more trouble cleaning the fans as they will have to look high up, which may be hurtful to their necks. They will also have a difficult time cleaning dust that drops off onto the surroundings when cleaning the fans. Ceiling fans are everywhere and thus it is important to clean them frequently. Approximately 15 to 19 million ceiling fans are sold annually, showing the large amount of ceiling fans used all over the world.

Target Group: Seniors aged 59 to 79

1 C List some problems your group would like to solve. List also the considerations for selection of problems in the evaluation grid below. Score the considerations, against the problems, with points 1 (least significant) to 4 (most significant). Sum up the total points for each problem. Identify that problem you would like to solve.

Problem Evaluation Grid

Considerations for Selection	Problems		
	#1 Ceiling fans	#2 Underneath heavy furniture	#3 Others (stains, scratches)
Solvability	4	4	2 (Too general, many different types of stains and scratches, difficult to come up with effective solutions)
Need for new/better solution	4	2 (Many existing solutions in the market)	3
Severity of Problem	3	2 (Not that difficult to clean for most people)	3
Total Score	11	8	7

2. Define the Problem

2 A **Extent of problem (Research and discuss the problem and write down the problem statement)**

We conducted a short survey to understand more about the problems the elderly face when cleaning fans.

Out of the 15 people surveyed, (Responses can be repeated)

- 6 stated that ceiling fans are too high to reach
- 7 said that dust enters their eyes when cleaning ceiling fans
- 4 said that fan cleaners used are not effective
 - “Too heavy”
 - “Too small”
 - “Too tedious and annoying as it takes a long time and you can’t see the top of the fan so you are unsure whether or not it really is clean”

Warm weather and ceiling fans go hand-in-hand. The hotter the days, the longer the fans run — and the more that dust collects on the edges of the blades. Dirt will start to fling around every time the ceiling fan is turned on if the fan is not cleaned properly.

2 B **Compare and contrast the existing or similar solutions.**

There are many different problems regarding cleaning dirty ceiling fans. There are also different ways to clean ceiling fans. Some of the ways are listed below:

- Vacuum cleaners
- Wet cloth, sponge or brush
- Fan cleaners



Estilo Microfiber Ceiling and Fan Duster (\$15) [Left], EverSprout 5-to-14 Foot Flexible Microfiber Ceiling & Fan Duster (\$38) [Right]

Some of the problems faced of using the above methods are stated below:

- The design of that nozzle of vacuum cleaners is not suitable to clean up the ceiling fans since the position and the surface of the blades become the issues.

- **Wet cloth, sponge or brush is not suitable for fast and efficient cleaning of all the blades as people have to struggle cleaning the upper part of the ceiling fan they cannot reach and see**
- **The fan cleaners products**
 - **Are not easily adjustable when cleaning the fans**
 - **Are not very versatile and may not be suitable for certain designs of fans**
 - **Do not capture and trap dust effectively, and the dust may fly around and will need to be cleared.**
 - **The cloth used to wipe the blades may not be suitable for some fans**

After much research, we found out that there are many problems regarding the cleaning of ceiling fans. The major problem is that people are unable to find the correct equipment used to clean the ceiling fans to clean the fans effectively and completely.

3. Your BIG IDEA

3 A Describe your proposed invention.

We have decided to invent a product that can help clean fans, wipe fan blades efficiently and effectively.

The prototype is a lightweight, high mobility and strong product that can clean ceiling fans effectively. It consists of 2 wooden planes that can be opened and closed easily with the help of a string, a long extendable light metal stick (1.5-2m) to lift the fan cleaner up to the fan, and a plastic transparent container that is detachable to help trap dust.

The 2 panels are joined together and both have a soft cloth stuck to one side to clean the fan blade. A string is attached to the top panel such that when pulled, the top panel opens. The container slightly below the panels collects dust wiped off from the fan blade.

3 B Explain the purpose of your proposed invention and the potential benefits to users.

Our invention allows the elderly to attach the easily controlled panels to the ceiling fan. The long extendable stick lets the elderly reach the ceiling fan with ease. The string attached to the panels allow the panels to easily open and close. The product is light and sturdy, thus easily movable with having the elderly strain themselves. With the transparent container, the container will not block the view of the ceiling fan and dust will also be caught by the container.

Our invention will allow people to clean fans effortlessly and easily, without making big messes. We hope that with this prototype, it will encourage the elderly, and maybe others, to easily clean ceiling fans frequently. This will be beneficial to their health as dust and dirt from the fans will not accumulate.

3 C In what ways would your proposed invention be different and/or better than existing solutions, if any?

Firstly, our proposed invention is lighter than usual products, as it is made out of lightweight materials such as wood and plastic and is simple for anyone of any age to use. Second, it minimizes the mess created as a result of the presence of a cloth (wet or dry, depending on choice) to wipe all dust off and a lightweight detachable container to collect all the dust. Having multiple joints in it, along with the freedom of an extendable handle, makes it extremely mobile. Lastly, even though our product is made out of lightweight and green materials, it is extremely strong, durable and eco-friendly, and will not break easily under pressure.

Our invention provides a diverse variety of options for users to select the best way to clean their ceiling fans. It is easily adaptable to suit almost any kind of ceiling fan. For example, it has a detachable container to trap dust and the cloth used can be dry or wet, depending on the user's choice.

3 D What are some problems you expect in the course of your proposed invention?

We would need to find the best spot to attach the stick onto the bottom panel. This may be difficult as we cannot permanently attach the stick when trying out. This is because it would result in the destruction of the panels. In addition, it may be difficult to select eco-friendly materials to build our prototype as we are trying to make a sturdy yet lightweight product. As a result of that, we need to spend a lot of time deciding on which materials to build our final product. Furthermore, the wood pieces may rot if stored in moist places, as it is designed to be biodegradable. We take environmental conservation very seriously.

It is also difficult to find a large transparent container. It is even difficult to find a way to attach it. Thus, we decided to improvise and come up with another idea. We attached a reused paper bag to the side of the panels to trap dust instead.

3 E What and when are the major milestones (project timeline) in your invention?

One of our major milestones that enabled us to decide upon which project to work on was our decision of the target audience during our project proposal. This helped us to finalise our decisions and choose a suitable invention to have a clear aim and intention to help the public. Therefore, the target audience (elderly aged 59 to 79) is one of the roots of our project and a deciding factor to whose lives we wished to benefit.

The choice of methods for the construction of our prototype is also one of our milestones. It is the start of the important actions and implementation of our ideas. This choice affects our future construction of our ideas. It is important to have a good start.

Thus, this is considered as our major milestone as it is the start of a new beginning of our project.

4. Proposed Construction or Modelling Process

4 A Explain how and why the materials were chosen for the prototype/ product of your invention

Thin wood pieces were chosen because they were lightweight and were strong enough. We also carefully selected old clothes for the cleaning of ceiling fans. We did not want to waste cloths but also choose the best material for the cleaning of ceiling fans. Light metal poles (reused sticks of old mops) are used as they are lightweight and strong enough to bear the weight of the wood pieces. In addition, it is extendable, making it convenient to store as it can be fitted into smaller spaces. Lastly, we decided to go with something green and recyclable, hence we chose recyclable wood pieces and reused broom or mop sticks and cloths.

4 B Explore these considerations that may guide the construction of your prototype/ product.

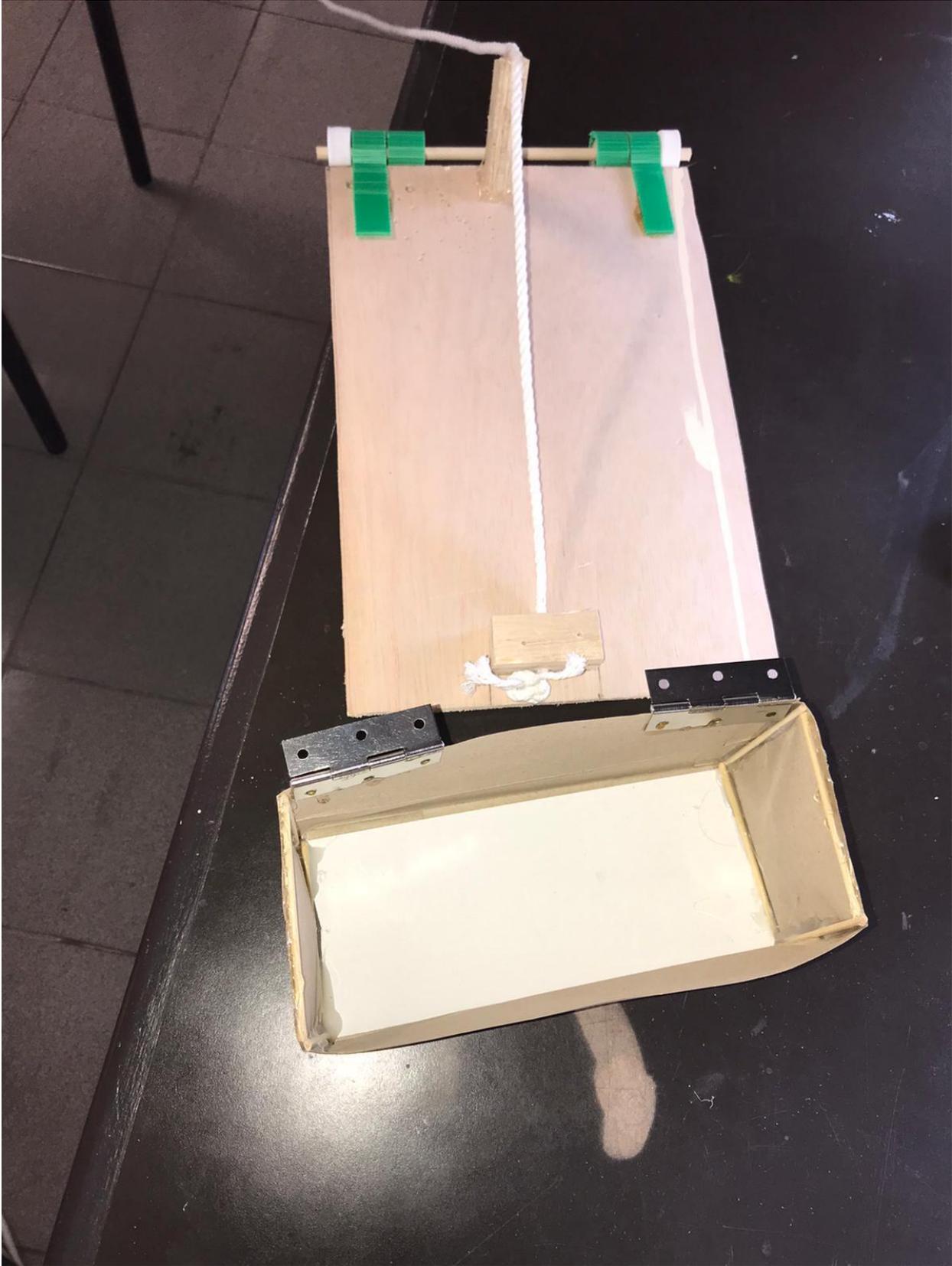
As our aim is to enable seniors to use the product with ease, we settled with something lightweight that is also very convenient to use. Thin metal poles are strong and lightweight, suitable for the seniors to use, hence we chose those for our product. Furthermore, the product made is strong and will not bend easily. Extendable metal poles provide mobility as it can be kept easily when not in use, and strength to withstand the weight of the openable flaps. Panels are easily opened by the user and easily inserted onto the fan blade. This process is short and simple.

4 C Propose how the prototype/ product will be constructed or developed. You may use drawings and photographs.

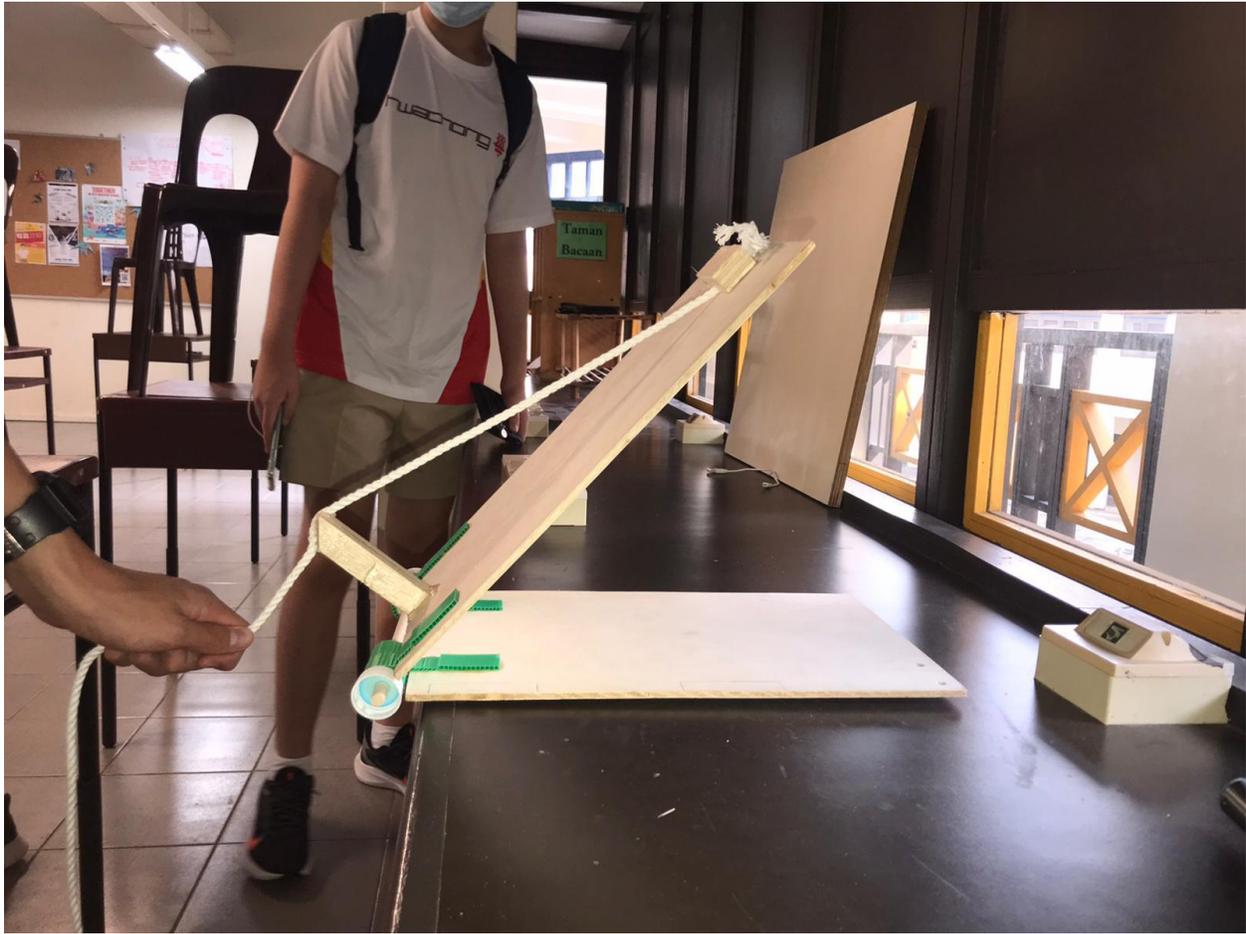
The prototype is done up in The Makerspace at HCI. We spent 3 sessions of around 2 hours each time doing it. Firstly, we made an openable flap meant for wiping the dust. This is done by attaching 2 circular wooden blocks with holes in the center to each panel. A stick is then inserted through the 4 holes in the blocks. A string is also attached onto the top panel. When pulled, the flaps open easily. We then acquired an extendable pole, attaching it to the bottom panel. We attached a paper box meant to collect dust on the right side of the prototype. This box is easily detachable when not in use. Lastly, 2 cloths are stuck on each panel to clean the fan efficiently.

Here are some photos about our prototype and the construction of it.

2 panels and the container.



The fan cleaner opens.



Construction process.



5. References

5 A Cite the references you have used for your project work. Your source of reference should come from different types (e.g. books, magazines, websites, journal articles, interviews, photographs, product brochures, reviews etc.)

Survey: <https://forms.gle/TK7kNzq3MX4icsje9>

Article on cleaning ceiling fans:

<https://www.today.com/series/how-often-should-you/how-clean-ceiling-fan-when-do-it-t113795>

Statistics on ceiling fans: <https://forum.cee1.org/system/files/library/1001/140.pdf>

Fan Cleaner Products:

<https://www.amazon.com/Estilo-Removable-Washable-Ceiling-Duster/dp/B00U6H39IM>

<https://www.amazon.com/EVERSPROUT-Microfiber-Removable-Lightweight-Extension/dp/B075HJMMLQ>

Information on logbook:

<https://iemb.hci.edu.sg/Board/content/92202?board=1048&isArchived=False>