

# Hwa Chong Institution

## Project Work

### Category 3

## Inventions Log Book

(Revised for 2020)

Title of Project:	<u>Treadwheel</u>
Group Name:	3-29
Group Members:	<ol style="list-style-type: none"><li>1) Joel Ng (1A1)</li><li>2) Derrius Tan Jun Kal(1A1)</li><li>3) Seng Koi Han, Kyan (1A1)</li><li>4) Chan Geng Yeam (1A1)</li></ol>

## 1. Problem Finding

(The beginning...)

Identify a problem you would like to solve. You may want brainstorm for problems using different approaches eg thematic, survey or general brainstorming etc.

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

### Covid-19 problems

- 1) **Mental health.** As people are stuck in their houses for a long period of time, they might get frustrated and get agitated easily. Hearing the number of cases increase and other unpleasant news might make the person feel even more helpless and this may cause them to just lose control of themselves overtime as they are draining their energy by thinking of things that they cannot control
- 2) **Fitness.** Exercise is an important part of a daily person's life. Because of the fact that everyone should stay at home and only go out to exercise or carry out essential tasks, some people would be too lazy to leave the house just to exercise. They would rather stay at home and do other activities. As most people do not have the motivation to exercise, they would be too lazy to exercise at home. They might have sign up for gym sessions outside but now, gyms are closed and the only way is to exercise by themselves which most people would not.
- 3) **Boredom.** People are stuck at home and would run out of things to keep themselves occupied. This is when they should be creative and think of ideas to keep themselves occupied or pick up a new skill(for example: baking,cooking,etc)

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

In the end, we decided to focus on the fitness problem. Mental health is something that someone has to manage and as we are not psychologists or councillors, we may not understand how to solve this problem. For boredom, it really depends on an individual. Everyone has different interests and it would be challenging to create something that is entertaining for the majority.

**1 C List some problems your group would like to solve. List also the considerations for selection of problem 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

\*add more columns and rows where necessary

Considerations for Selection	Problems		
	#1	#2	#3
Safety	2	3	1
Trust in new product	2	2	2
Attractiveness	2	3	3
Total Score	6	8	5

## 2. Define the Problem (This is one...)

Now that the problem has been identified. It is important to gather information on the extent of the problem and/or evaluate the usefulness of existing solutions based on *some criteria*. You may need to conduct surveys and research on existing solutions.

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

Due to Covid-19, there was the circuit-breaker period where all of us were mandated to stay at home and only go out to buy food or grocery shopping. The elderly were advised to stay at home , as they were more vulnerable to the virus, and ask a family member to go out to do the groceries or buy food. This caused a few problems for the elderly including the problem How were they going to keep themselves active at home? The government had been constantly reminding the elderly over the radio and television to keep themselves occupied and active during the circuit-breaker period, but how were they going to do so?

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

During COVID 19

They are advised to stay home all the time and refrain from leaving the house. They have to find ways to occupy themselves at home and continue with their everyday lives which include keeping fit. Some elderly would feel bored at home or not stay active as they do not have the suitable equipment at home. Most elderly have the mentality that exercise is walking or jogging and that the house is too small to do so. Thus, their mentality stops them from thinking of creative ideas to keep fit at home.

Before COVID 19

Usually many elderly would go outside to buy food or groceries, causing them to be more active. However, now that the circuit breaker is in place, the elderly are forced to stay at home, limiting their movement. Hence, they would not be active, causing them to have higher rates of falls, obesity, heart disease and early death compared with the general population. People may not buy the product

### **3. Your BIG IDEA#**

(Developing the idea....)

Write down your proposed invention and why you want to do it. State also how you think your proposed invention is better.

#### **3 A Describe your proposed invention.**

Our product is a treadmill machine which can change surfaces for the elderly. When the elderly are running/jogging they can add the non-slip yoga mat as a surface for them to run/jog on. When the elderly feet are sore after running/jogging, they can detach the yoga mat and switch the surface to

the pebble surface to help loosen their feet muscles. The surfaces (pebble surface and non slip yoga mat) can be attached or detached from the treadmill by the Velcro attached on both ends of each surface.

After running, their feet or heels may be sore, so in order to fix that problem, they can put a mat with a pebble surfaces to the treadmill and can help to relax their feet and muscles through stimulating reflex points (reflexology). For example, at some parks, there would be always have pebble walkways for the elderly to walk on. Our item will replicate the feeling of walking on the pebbles not in the park but in the comfort of their homes.

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

To help the elderly stay fit in the constraints of their home. The elderly are advised to stay at home during this special period of time and they will definitely need to carry on with their everyday life, including exercise. Before this pandemic, they could exercise by walking or jogging outdoors. But now, they are unable to do so. Also, the pebble surface would allow them to relax their feet(reflexology) after exercising.

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

The surface of our treadmill can be changed compared to the single surface treadmill in the market.

The treadmill does not require electricity to function. (The PVC pipes will roll when the person start walking/jogging/running on it.)

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

Difficulty in finding the materials for the prototype and its price.

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

Proposal evaluation ( 14 April)

Planning and construction of prototype( May -July)

Final evaluation preparation( Late July-August)

Final evaluation (12 August)

***#must be able to be constructed based on current / emerging technologies, must not violate the laws of Science or go against the laws of nature.***

**4. Proposed Construction or Modelling Process\***

(This first... then that...)

You are now onto the fabrication of your prototype/ product. You need to select material and understand how to put them together so that your prototype/ product can perform its function.

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

1. 24 Metal washers
2. 12 Pvc pipes
3. 30 Nuts and bolt
4. Non-slip yoga mat
5. 24 Ball bearing
6. Pebbles
7. Plywood
8. Mat
9. Screws
10. 24 rubber stoppers
11. Non-Slip socks

The materials used are hard and firm, this will allow the treadmill to withstand a person's weight when a person uses the treadmill. However, there will be some limitations to the weight that the treadmill and the max weight that the treadmill can hold is 80kg. If the person's weight is more than 80kg, we will customise it to the person needs such as changing the Pvc pipes with hollow metal tubes.

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

Primally, the plywood and other materials are easy to attach or detach from one another with the use of screws. This would allow us to fit on part by part and finally constructing our prototype with less difficulty compared to items getting jam when attaching items with hooks or locks.

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

First, screw a ball bearing and a metal washer on a bolt and secure it with a nut. Put it into both sides of a PVC Pipe. Then make 12 of these. So this means 24 sets of Metal washer+bolt+nut+ball bearing. Screw it onto a wooden board . Take a wooden board around 20 x 120cm and drill 12 holes into it (twice). Take two boards about 20 x 60cm and connect it to the two other wooden boards. It will eventually be like a rectangle shape. Attach 2 (20 x 130cm) plywood board vertically on the sides of the other boards. This will be the support that the elderly can use. Fit the 12 Pvc pipes through the holes drilled in the plywood and secure it with screws. Then the treadmill machine is complete and the elderly can choose which surface they want to use and attach it to the treadmill.

OR

If construction of the prototype is not possible, then you have to create an animation / as a proof of concept that it can be applied in a bigger scale.

- 4A Explain why construction of a prototype is not possible and the proof of concept is needed in your case.**
- 4B Briefly explain how the video / animation can effectively show how your invention will work and the different considerations.**

**Warning:**

- *Video / animated simulation only if prototyping is absolutely no possible.*
- *Video / animated simulation must be logical and convincing that the invention works.*
- *Constraints must be clearly included in the logbook or the project will be heavily penalized.*

## 5. References

Read <http://www.bibme.org/citation-guide/apa/> on how to cite references.

- 6 A Cite the references you have used for your project work. Your source of reference should come from different types (eg books, magazine, websites, journal articles, interview, photographs, product brochure, reviews etc.)**

Construction of Treadmill: <https://www.youtube.com/watch?v=NUm0V2Kz8kQ>

Health benefits: <https://medlineplus.gov/benefitsofexercise.html>

Example of treadmill: [https://homefitness.com.sg/cardio-equipment/treadmills?gclid=EAlaIQobChMIldDYwKGn6wIVTQwrCh3nSgPFEAAAYBCAAEgJKQ\\_D\\_BwE](https://homefitness.com.sg/cardio-equipment/treadmills?gclid=EAlaIQobChMIldDYwKGn6wIVTQwrCh3nSgPFEAAAYBCAAEgJKQ_D_BwE)

