

# Hwa Chong Institution

## Project Work

### Category 3 Inventions Log Book

Title of Project:Back-up Plan
Group Name:3-38
Group Members: 1) Zhao Enguang 2) 3) 4)

# 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.

- Messy toilets (homes)

-noticed while visiting some friends houses and been brought up by parents.

- passengers dozing off on vehicles (no head support)

-observed while on public transport otw to school

- pollution

-this is a common issue in the world right now, be it air, water or land pollution, there are many ways to help reduce them.

- back care

-the spine is the most important piece(s) of bone in the human body, thus it requires proper care.

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

will the solution to the problem be easy?

It will have to be manageable mostly by myself, thus i cannot have a problem where the solution is unlikely to be done by me alone since I am the only member.

will the invention that solves the problem be easy to make?

Same problem where I have to be able to somehow manage the creation of the model by myself.

what's the quantity and/or quality of other products which helps solve the problem on the market?

If there are many existing products out there with similar purpose/target audience/usage as my invention, it would be quite useless for me to add on to the list.

Is the issue at hand relatable to many/impactful to many people?

If it is not, the invention which would solve the problem which is already not impactful would be meaningless as well.

**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			
	Messy toilets (homes)	passengers dozing off on vehicles	pollution	back(spine) care
easy solution	4	3	2	4
relatability	3	1	4	4
originality (amount of other solutions 1-most, 4-least)	2	4	1	3
Total Score	9	8	7	11

## 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)**

**Slouching** (sitting)

- can cause problems like spinal disorders, backache, deformed spine. Even breathing difficulties and digestion problems.
- commonly seen esp among the younger people.
- a normal working adult spends on average 10 hours a day sitting, similarly, a normal student.
- if not made to have a good sitting habit/posture from young, one may start to develop spinal disorder as they grow.

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

1. spine vests  
Straightening the spine and keeping it in shape, but for standing postures and support during sports activities, also less suited for older people.
2. foldable chairs  
These are for domestic use, such that it doesn't take up much space in the house when not in use, none are designed for proper spine support.
3. ergonomic chairs  
Not portable, and that is one of the main criteria of my invention, although it may provide a more comfortable sitting position compare to the "more mobile" one, it have lesser areas of usage.

## **3. Your BIG IDEA<sup>#</sup>**

(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.**

A portable/foldable chair that has a backing which supports the spine in the right position. Portability and the ability to support one such that he/she would have a proper sitting posture even when relaxed are both features that the invention must have so to achieve its purpose.

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

First of all, the target audience is the old and youngs, teens and working adults are not the main target that his invention would help.

The invention can be brought alongside the user so that he/she can rest comfortably but also healthily while outside.

It benefits the old people such that it provides a proper sitting positions and support for their weakening bones (spine).

It benefits the young as they are in their growing stage where their spine should be cared for. It also allows the young children to rest comfortably.

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

Although the aim of my product is also to solve slouching/spinal problems, my invention mainly focuses on sitting position, so unlike the vest, although also portable, it focuses on a different aspect of the spine problem.

When compared to a normal ergonomic chair/chair with spine support, my chair also focuses on the fact that it is portable(foldable), not that it can't be used inside houses like the others, but that it is better such that it has a greater range/area of uses because that it is portable.

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

The invention may not have unique features in terms of creativity, thus it may seem dull and not a good invention.

**The creation of the invention is also a problem and some problems are:**

1. material gathering
2. planning/blueprint
3. overall time management

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

Proposal evaluation (second round) I, project started late thus did not go for first round

***#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. 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**
  
- 4 B Explore these considerations that may guide the construction of your prototype/ product.**
  
- 4 C Document the prototype/ product development stages. You may use drawings, photographs or videos.**

#### **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. Modification and Evaluation

Upon the completion of your prototype/ product, you would need to see if it is working the way you want it to work. Check if your product has met the identified purpose and the user's need; and implement necessary modifications and improvements. This process may take several rounds.

**5 A Write down your prototype/ product test criteria and check against it if it works. Identify areas of weakness for modification. Indicate the test iteration and date of test.**

Test Iteration:	Tick			Remarks
	Pass	Fail	Potential Failure	
Test Date:				
Test Criteria 1				
Test Criteria 2				
Test Criteria 3				

\*Add more rows for more criteria

\*\* Repeat table for next test iteration

**OR** if you are creating an animation / video to show how your invention will work, write down the different possibilities / outcomes [success or failure] if a full-scale prototype is to be constructed.

## 6. 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.)**

“100% Family”. (2015, August 3). Long Term Effects of Poor Posture. Retrieved from <https://www.100percentchiropractic.com/long-term-effects-of-poor-posture/>

Brigid, S. (2015, June 2). Health experts have figured out how much time you should sit each day. [https://www.washingtonpost.com/news/wonk/wp/2015/06/02/medical-researchers-have-figured-out-how-much-time-is-okay-to-spend-sitting-each-day/?noredirect=on&utm\\_term=.b151f500844d](https://www.washingtonpost.com/news/wonk/wp/2015/06/02/medical-researchers-have-figured-out-how-much-time-is-okay-to-spend-sitting-each-day/?noredirect=on&utm_term=.b151f500844d)

“Human Solution”. (2017, February 22). What makes a chair ergonomic? <https://www.thehumansolution.com/blog/what-makes-a-chair-ergonomic/>

“Admin”. (2014, July 15). How to Choose the Best Material for Outdoor Furniture <https://www.patioproductions.com/blog/patio-furniture/best-material-for-outdoor-furniture/>