

**Hwa Chong Institution**  
**Project Work**  
**Category 3**  
**Inventions Log Book**  
**(Revised for 2020)**

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| Title of Project:<br>Ultima bag  |
| Group Name:<br>3-28  |
| Group Members:<br>1)xavier sheng(1)<br>2)alvin(2)<br>3)Shi Rui Qi(3)<br>4)Wui Jeong Jun(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.**

### **Identifying the Problem**

**As a student myself, I felt that the problems we face did not have any solutions to them yet. we have decided to focus on what students need in their daily lives. Our main idea is to make what students need, even more efficient and better. The problems that we have identified are as follows.**

- 1. Problem Carrying cca equipments**
- 2. Feeling tired on public transport**
- 3. Being lazy to take out their file to file their worksheets**
- 4. Long queues in canteens**

**Our group has decided to pick 4 problems and decide to choose 3 biggest problems out of them.**

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

Our first consideration is the number of people affected as it depends on whether people are affected to affect how effective our solution will be, how many people would possibly use it.

Our second consideration is our ability to solve the problem as some problems might not be in the realm of possibility for us to solve.

Our third consideration is the cost of our solution/product as we have to keep it affordable and some inventions might take more money, have a higher cost.

**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                              |                                   |  | Problems                |
|----------------------------------|---------------------------------------|-----------------------------------|--|-------------------------|
|                                  | Carrying CCA equipment is troublesome | Feeling tired on public transport | Being lazy to take out their file to file their worksheets | Long queues in canteens |
| the number of people affected    | 4                                     | 2                                 | 3  | 4                       |
| our ability to solve the problem | 3                                     | 2                                 | 4  | 1                       |
| cost of product                  | 2                                     | 3                                 | 3  | 3                       |
| Total Score                      | 9                                     | 8                                 | 10   | 8                       |

**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)**

The problem that is most relevant to students (according to the survey) is the problem of homework getting crumpled. Based on our survey and our own personal feelings, worksheets get crumpled in our bags without a file. However, this also puts students in a dilemma as sometimes, putting worksheets in a file will be troublesome for them as they might be rushing for time. Most students would also prefer to just put their work in their bags if it would not get crumpled. This would result in teachers reprimanding the student for irresponsible behaviour. This would not be good for both teachers AND students as teachers would not have an easy time marking and the student would not have an easy time revising that piece of work. Although the student indeed is in the wrong, this kind of situation can be prevented with some existing solutions as shown in the next section.

(ruiqidid this)

Another problem is how troublesome it is to carry cca gear, based on the survey, most people agree that it is troublesome. with heavy cca gear or large/bulky equipment, carrying with hands causes our hands t be filled up and unable to do anything else, for example when alighting the bus, it will be hard to tap the card if you are carrying another bag. this also applies to when u have to tap you card entering the school.

The last problem is students feeling tired on after school, after a long day of school, students will always be tired and it is hard to find a comfortable place to rest. This is especially true while on the bus.

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

One of the existing solutions for this problem is snapping the piece of work in between the pages of a textbook, this would allow the worksheet not to be crumpled and it is relatively convenient to do. However, this solution comes with significant flaws. For example, the student might forget that he has put the worksheet in the book and might waste time finding it or might just forget about homework altogether, which makes the problem even worse. There is also another existing solution, which is known as a Document case. This is basically a case that stores your documents or in this case homework and your stationery together. This may be the best solution on the market currently as it combines the most useful things together. However, it will be troublesome to open your file every time you need to open your pencil case. Furthermore, it is quite bulky in size and cannot hold a lot of worksheets. These flaws make it impractical for students to use in their daily lives and thus, there is a need for our invention.

A existing solution for the fact that it is troublesome to carry cca gear is the bag given when entering the army as all the pouches are removable. but, we plan to make it more customizable with not only pouches but for other items such as a badminton racket, a pedal etc.

### **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.**

Our proposed invention is to create a bag that has multiple functions to cater to students' needs. One function will be an in-built file inside of the bag with one folder for each subject, which will be easily accessible through a pulltab. Another function is that there will be a modular system where another bag can be attached to the school bag with velcro. Other accessories such as shoe bags can also be strapped on. If the accessory is too large, straps will be provided to secure items in place. We will be using nylon for the material of the bag and the pillow would be made of cotton.

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

**The built-in file inside of the bag would benefit students so that they do not have to spend too much time taking out their file and worksheets from their bag.** the pulltab is attached to a double layer file system so the contents can be pulled out easily and selectively as there is one pulltab for each of the subjects.

**The modular system will help students as Instead of carrying equipment or heavy books in your hands, it can be attached to the back of the bag, or at the other handy locations with velcro slips** and straps for larger objects. this is to keep it affordable and also convenient to attach things onto the bag with straps and velcro slides that can be sewed on for smaller objects if needed.

**The bag will be made of nylon as Nylon is waterproof and this will allow the bag to be more "life-proof" and make the bag last longer. Also, nylon gives the bag a very modern look, which makes the bag more attractive**

**The O-shaped pillow so that it is comfy and snug, and will hence help students rest as the head to be kept in class due to the "dent" in the middle**

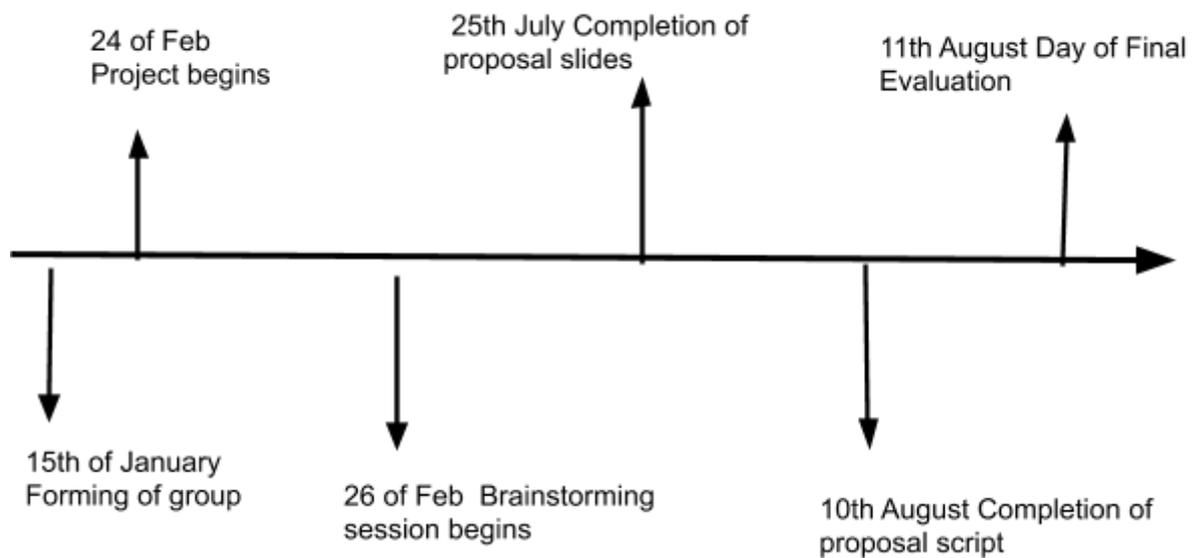
**3 C In what ways would your proposed invention be different and/or better than existing solutions, if any?**

**In other existing solutions, there were irrelevant features that students would not need (e.g.power banks, wifi routers) While for our invention, it is specifically designed for students and to solve problems they face. our modular system is also more customizable and the pillow is an additional feature. there are pillows that can be attached to bags but it is no as firm as this since this is not just attached with one clip**

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

I think finding the right materials and making the modular system would be difficult. We would have to face failures and try to find the best solution

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



#### **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**

We will be using nylon for the material of the bag as nylon is waterproof and this will allow the bag to be more “life-proof” and make the bag last longer. Also, nylon gives the bag a very modern look, which makes the bag more appealing to our target audience, students. Another possible choice is Polyester. However, we decided not to go with it due to it requiring lots of energy and the production process usually results in the emission of harmful greenhouse gases and chemicals into the atmosphere. Polyester is also non-porous, which means that in hot and humid conditions, the backpack may feel clammy and uncomfortable due to moisture buildup inside. Polyester is also highly flammable which would be unsafe for students in the event of a fire.

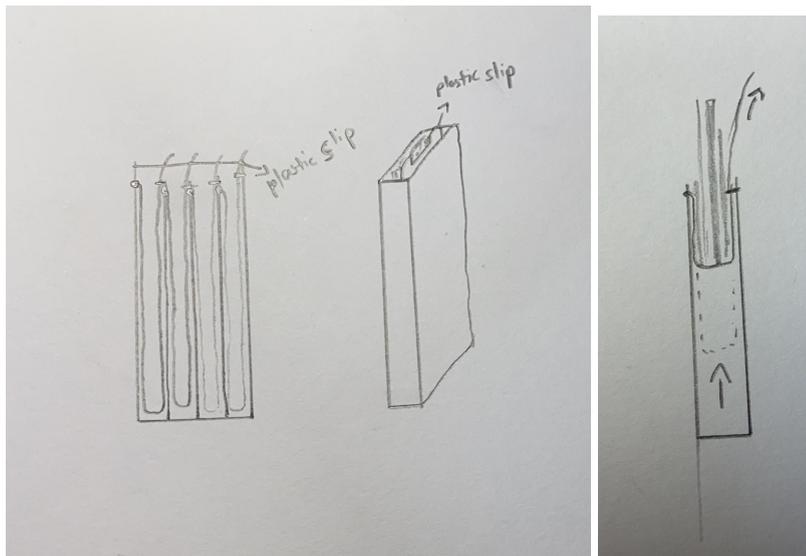
We will be using cotton for the material for the pillow as Cotton pillows feel cool when against the skin. Cotton pillows are also easier to wash. Another possible material is Polyester. However, they do not offer the comfort level of a cotton pillow and does not breathe well.

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

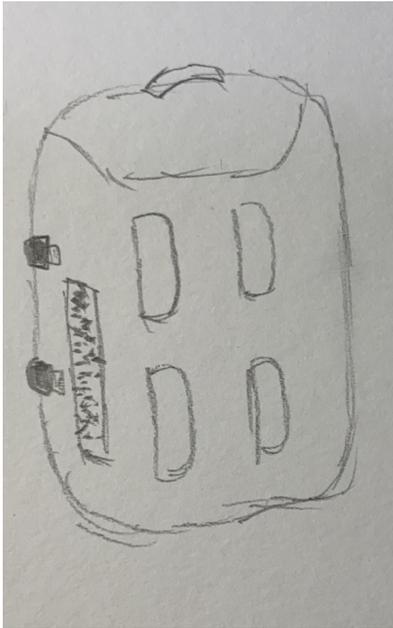
**4 C Propose how the prototype/ product will be constructed or developed. You may use drawings and photographs.**

First we will get a bag in which we can make our modifications.

Secondly, we will attach the double layered plastic file inside after we make it by securing the plastic pulltab



Thirdly, we will attach the straps and velcro slips by sewing/glueing with covering to ensure the velcro can last.



**Then, we will attach the O-shaped pillow**



**lastly we will check if everything is working properly**

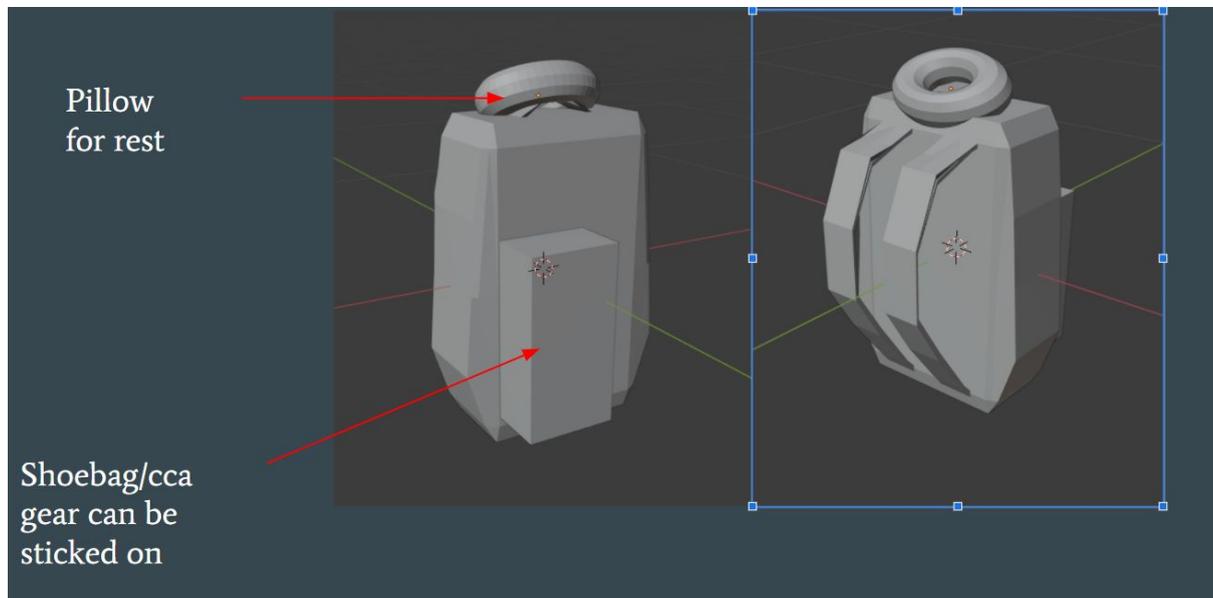
**OR**

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.**

**With limited resources and currently with the pandemic, it would be hard for us to buy the materials needed for the bag**

**4B** Briefly explain how the video / animation can effectively show how your invention will work and the different considerations.



The model above shows how the bag would look like. Due to limits in the 3d model making site, we could not make a model of our modular system which has velcro on the bag that would allow anything to be stuck on it as long as it has velcro on it.

**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.)

<https://travelbagexperts.com/nylon-vs-polyester-backpack/>

Source for the comparison of materials used in the bag