Hwa Chong Institution

Project Work

Category 3 Inventions Written Report

(this is the correct file, the other one is an nonupdated file.)

Title of Project: CERES Tray
Group Name: Group 3-26
Group Members: 1)Su Peng Zhong 2)Samuel Lim Song Yi 3)Shih Jin Wei Isaac 4)Yang Shurui

1. Problem Finding

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

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

Considerations for Selection	Problems		
	#1	#2	#3
It is always extremely annoying to spill your food on the floor and waste time and money after queueing for your food and paying for it.	Spilling the food on the floor in the hawker centre	The tray he is holding may be slippery	There may be a lot of people in the hawker centre making it extremely hard to manoeuvre around the hawker centre with your food

Wasting electricity and money when you forget to off the lights and fans in your room and wastes the time to go back and off your lights and fans after remembering that you forgot to off it	Being forgetful and forgetting to off the lights and fans when leaving a room after using it	Being lazy and don't bother to switch off their lights and fans when leaving the room	Having a mentality that if you keep going in and out of the room you will have to keep hitting the switch to on and off the lights and fans and might spoil the mechanism so wants to keep the lights on until going to bed
Certain companies are troublesome and annoying when he/she realize that the clothes are wet and have to rewash their clothes, which are certain companies which are especially time-consuming.	Going out of the house and forgetting to bring in the clothes and then it rains wetting all your clothes.	Forgetting to begin in the clothes as he/she is too engrossed in whatever he is doing at that point of time when it is raining and then his/her clothes get wet.	Going to sleep and then when waking up realises that the clothes are wet because he/she forgot to take them in before going to bed.

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

In the end, we decided to go with the problem of food spillage on the floor in the hawker centre because it is a common sight to see people in hawker centres spilling food or even in our very own school canteen. Our design can help to solve this problem.

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

Decision Matrix	Criteria		
Problem	The impact made on the public 4	Time is taken to solve the problem 3	The effort needed to solve the problem 2

Dropping food on the floor in the hawker centre and or the canteen	High - many people visit the hawker centre/canteens making this problem very common 4x3= 12	Medium - Technology is advanced making it easier to solve the problem 3x2=6	High - It does require much manpower although it is installing a lot of features that need precision to our product 2x3=6 <u>Total: 24</u>
Wasting electricity and money because he/she forgets to turn off the lights and fans when leaving the room.	High - Solving this would save money for many families as it would decrease their electricity bill. 4x3= 12	Medium - It requires slight amounts of trying multiple times before successfully making a usable product 3x2=6	Low - Technology needed extremely advanced and hard to build with machines 2x1=2 Total: 20
Forgetting to bring in the clothes when it starts to rain and consequently wets the clothes	Medium - a slight number of people use bamboo poles to hang their clothes 4x2=8	High - needs a lot of planning of each particular household 3x3=9	Medium - requires slight amounts of coding 2x2=4 Total:21

2. Define the Problem

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 the problem (Research and discuss the problem and write down the problem statement)

Our project is a tray that prevents food/soup itself from spilling. The tray will have an adjustable band to hold bowls of different sizes as well as a section to put our utensils on, when the tray is being tilted, the bowl will tilt the other way, thus staying in the same position and preventing spillage.

2 B   Compare and contrast the existing or similar solutions.

In the current solution, there are certain companies that have made a tray that has a made suction cups at the bottom of the tray and hence caused the bowl or plate to be stuck on the tray so that the bowl will not topple. However, if the user were to tilt the tray drastically or drop the tray entirely, it will still cause the tray to spill. Hence we decided that we will fix the problem that has not been solved.

3. Your BIG 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 project is a tray that prevents food/soup itself from spilling. The tray will have an adjustable band to hold bowls of different sizes as well as a section to put our utensils on, when the tray is being tilted, the bowl will tilt the other way, thus staying in the same position and preventing spillages.

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

   We came up with this idea because we had experienced the painful feeling of spilling our food firsthand. Our group members have often bought food from the hawker centres and tried to move around the bustling hawker centre, only to find themselves tripping and spilling their food. tasting the food as well as their money.

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

   It would allow the user to be almost guaranteed that his food would not spill unless he threw his tray on the ground as there would be something below to bowl to ensure that the centre of gravity would always be at the bottom of the tray so that if the user were to tilt the tray excessively, he would still not spill his food.

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

Building a prototype would be hard because it is Covid-19 but it would be hard to make a tray out of recycled materials to build our prototype, such as cardboard and styrofoam as it is hard to get resources and meet up at the same time to make the prototype

3 E   What and when are the major milestones (project timeline) in your invention?
   February 2021: found a mentor and an approved idea

   March 2021: the google survey we made got 110 responses and hence we were able to gather much information.

   April 2021: improvised on the idea.

   June 2021: 3D modelling and invention log

   July 2021: started on the prototype

   July 2021: Prototype failed, redesigning

   Aug 2021: Correct design, finished prototype.

4. Construction or Modelling Process*

You are now onto the fabrication of your prototype/ product. You need to select materials 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 decided to use cardboard as it was the easiest resource available and also it was light and
much easier to cut and use compared to our other option which was styrofoam and we also decided to use string to hold up the middle platform. Using the mass of the middle platform with bowls and food as the centre of mass. Therefore, the outer layer(handle) and strings will adjust when the tray tilts, leaving the middle part unmoved. The string is also cheap and is easy to attain.

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

We decided to look out for some considerations that this tray must be usable to everyone no matter if they were old or young so it should not be too heavy. We also thought that no matter the weight of the food in the bowl or the plates, it should not affect the balance of the tray.

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 included in the logbook or the project will be heavily penalized.*

5. References

Read http://www.bibme.or;]g/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 (e.g. books, magazines, websites, journal articles, interviews, photographs, product brochures, reviews etc.)

S. L., S. Y., P. S., & I. S. (2021, April). Project Ceres. Retrieved May 2021, from https://docs.google.com/forms/d/1wHqcSt2wXpY9HXq66o-_Q-xpN9Vl13VJ4E5Pz0dt0CU/edit?ts=60507487&gxids=7628

Unspillable Tray Keeps Dishes In Place. (2016, December 29). Retrieved April 2021, from https://www.youtube.com/watch?v=CrcSMowTTrk

Boh, S. (2018, March 06). Parliament: Tray-return reminders work wonders at Zion Riverside and Adam Road food centres. Retrieved from https://www.straitstimes.com/politics/parliament-tray-return-reminders-work-wonders-at-zion-riverside-and-adam-food-centre