Hwa Chong Institution
Project Work
Category 3 Inventions Log Book

Title of Project: DOG EAR CREASE REMOVAL	

Group Id: 3-02	

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1. Problem Finding

(The beginning…)

Identify a problem you would like to solve. You may want to brainstorm for problems using different approaches e.g. 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.

We first brainstormed the problems that we faced in real life, and discussed how those problems affect our life, together with their current solution. We then made a unanimous conclusion that dog ear creases are a common yet "inconspicuous" problem which all three of us face. For example, when we are in a rush, we tend to shove our homeworks, documents into our bag. This would cause some unwanted creases on our paper, which affects the overall presentation of the document. Hence, we came up with the lists of three main problem that our product aim to solve

1. Untidiness. When the corners of our paper are accidentally folded, or creased, it is very hard to remove the crease. These creases could evoke a feeling of dissatisfaction and annoyance since creases on paper are very ugly and untidy. Hence people with pet peeves or OCD may find it annoying and distracting.

2. The current 'solutions' are not practical, some were even not built for the purpose of removing creases, and even if they were built for it, they are sometimes too expensive or bulky. Examples of these 'solutions' are iron and hairdryers. It is not really reasonable to buy products like a hairdryer just for the purpose of removing creases, when hairdryers are built for drying hair. There are also solutions that are inaccessible such as a paper preser which is very large and hard to buy.

3. As some of the solutions are 'make-shift' solutions, they are not built for this specific task, hence it might pose a fire hazard to the users should the creased paper catch fire.

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

We came up with 3 considerations. How badly the problem affects people(degree), the number of people affected(quantity) and the overall significance of the problem(severity). These considerations are something common in all 3 problems that can help score them.

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

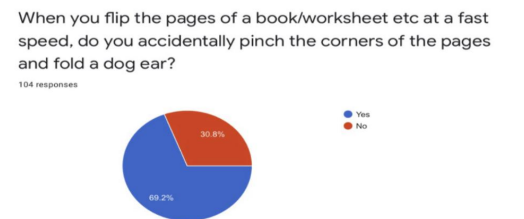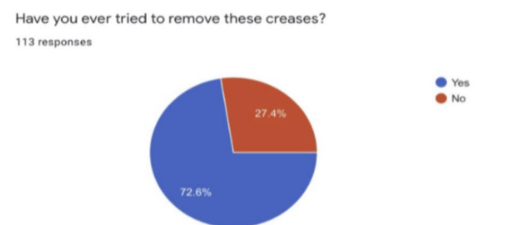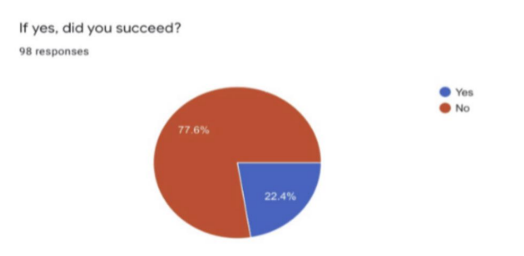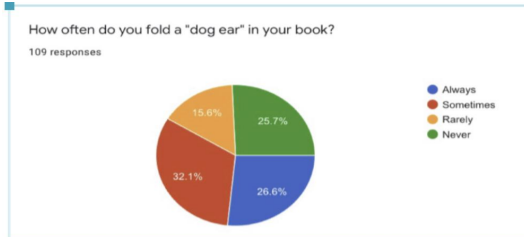*add more columns and rows where necessary

Considerations for selection	Problems		
	Pet peeves/OCD	Too expensive or inaccessible	Too Bulky
How badly does this problem affect people	4	3	2
How many people will be affected	1	3	2
How significant is the problem overall	2	4	3
Total Score	7	10	7

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)

We conducted surveys and evaluated that most people intentionally or unintentionally fold dog creases and are annoyed by them as they are hard to remove.

How often do you fold a "dog ear" in your book?

109 responses

- Always
- Sometimes
- Rarely
- Never

15.6%
25.7%
32.1%
26.6%

If yes, did you succeed?

98 responses

- Yes
- No

77.6%
22.4%

Have you ever tried to remove these creases?

113 responses

- Yes
- No

27.4%
72.6%

When you flip the pages of a book/worksheet etc at a fast speed, do you accidentally pinch the corners of the pages and fold a dog ear?

104 responses

- Yes
- No

30.8%
69.2%

— L

The problem of expensiveness and inaccessibility

There are a few current solutions(refer to 3C for more details) that we have found online and they are mostly "DIY" where the products used are everyday things e.g. hairdryer and iron. All of the current solutions have its disadvantages mostly because the product itself is not being made for this purpose. We aim to have our product solve these disadvantages.

Problem statement

We aim to make our product to solve the flaws in current solutions to allow people to remove dog ears on books seamlessly (without spending too much money on it and for the dog ear crease removal to be easily carried around.)

2 B   Compare and contrast the existing or similar solutions.

1. **Putting heavy weights on top of the creased page**

-       Not time efficient

2. **Using a paper presser**

-       Troublesome
-       Could potentially damage the book spine

3. **Ironing the creases**

-       Bulkier
-       Higher temperature and may risk burning the paper.

4.   **Using a hair dryer**

-       Bulkier
-       Wind produced makes the paper flap and harder to heat

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 helps remove dog ears on matte paper

-       Triangular in shape and resembles a corner bookmark.
-       Heats and steams the paper
-       Has a magnet to replace the heavy weights
-       Small and portable.
-       Safe

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

-       Remove creases made by people on the books
-       Helps students to keep their worksheets free of those creases
-       Allows for "preservation" of book
-       Helps people that have OCD/Pet peeves

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

Our product makes use of a magnet to flatten the paper instead of weights, making it lightweight. Our product will be adjusted to be at a suitable temperature to ensure the fast and efficient removal of creases and prevent burning.

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

● Ensuring the safe usage of our product
● Addition of certain features
● Unsure how to find suitable materials

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

Early April(1 to 10)	Mid April(11 to 19)	Late April
Change of invention	Research on current solutions	Evaluation
Formulating of idea	Designing of product	
and conducting surveys	Problems met along the way	
	(e.g unsure how to	
	incorporate a steaming function)	
	Solving of problems and	
	finalisation of design	

#*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.*

Construction <u>or</u> 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. ABS plastic- It is a poor conductor of heat also has a high melting point (commonly used in hairdryers)

2. Silicone Putty- Poor conductor of heat to further protect user

3. Poly cotton sheet- Inexpensive; can withstand high heat

4.Mica sheet- Easily found; poor conductor of heat (commonly used in hairdryers)

6. Nichrome and copper wires- Allow heat and electricity to pass through

7. Ground Fault Circuit Interrupter plug- As a safety precaution to stop flow of electricity

   when there is too much electric current

8. Magnets- To flatten the paper with magnetic force instead of weights

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.

COVID 19, hard to get resources for construct

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

We have already done tests and experiments (eg. using heat and humidity) to ensure that our methods work. An animation is sufficient to show how our product works.

Animation

https://docs.google.com/presentation/d/1dwXuZPPaP-TEn2BJYnQ1h8wN9oQwg28wJ42gemyAkIc/edit#slide=id.p

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
Test Date:	Pass	Fail	Potential Failure	
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.

Success

Mechanisms work,everything runs smoothly, crease is removed

Failure

Mechanisms do not work/ electric circuit fails, product is not able to heat up and work

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.)**

1. YouTube. (2012). *YouTube*. https://www.youtube.com/watch?v=gFFvaLzhYew.

2. Wikepedia.Ironing.(February 21, 2021).(Website).Available: https://en.wikipedia.org/wiki/Ironing#:~:text=Ironing%20is%20the%20use%20of,the%20fibers%20of%20the%20material.. (April 05, 2021)\

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4. Caroline Bendix, ACR, Accredited Library Conservator. (February 2010). Damaged Books. Page no. 6. REtrieved April 05,2021,from https://www.bl.uk/britishlibrary/~/media/bl/global/conservation/pdf-guides/damaged-books-preservation-guide.pdf\