

Hwa Chong Institution

Project Work

Category 3 Inventions Written Report

Title of Project:
Table stabiliser
Group Name:
3-45
Group Members:
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2) Koh Jun Qi, Seth (16) 1P2
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1. Problem Finding

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

The problems which our team faces were those which we have had encountered often or had deep personal experiences. Some of these problems include:

- Dirty tabletops of hawker centres
- Wobbly classroom tables due to uneven lengths of table legs
- Pain in the shoulders as we carry heavy school bags

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

In our evaluation process, we seek to determine how we may be able to resolve some of these issues in an optimal manner. Our team's decision criteria include the following:

- The problem's solution lies within our current level of technological expertise
- The problem's solution does have a large monetary cost. (Our team's limit is about \$50)
- The problem affects a significant number of people
- The development of the solution will not take us beyond the Project work deadline

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

Considerations for Selection	Problems		
	Dirty Hawker Centres	Shaky Tables	Heavy Schoolbags
Impact on community	4	3	3
Our Capability to solving this problem	1	4	3
Cost of solving the problem (1 point for the most 4 points for the least)	1	4	2
Total Score	6	11	8

2. Define the Problem

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

Based on the Evaluation Grid, we have decided to solve the problem of uneven table legs which cause tables to wobble. This problem has persisted for a long time. From our private survey, we can tell that many of our fellow schoolmates find that the shaky table is a serious distraction and would like it to be solved. We have also experienced this issue before and it also affects their performance during lessons.



Compare and contrast the existing or similar solutions.

Sometimes, the problem lies in the fact that the floor on which the table rests is not entirely flat. Hence, some table manufacturers have included screw-like extensions which can extend or contract the table legs to suit the floor, thereby eliminating. Unfortunately, this means that the extension must be included during the manufacturing process as any post-manufacture modification is too difficult and can possibly destroy the table leg in the process.



Then we have the layman solution to the problem: by placing a piece of paper under the table legs is not an effective way of solving the problem as this incurs paper wastage. The paper also easily gets misplaced during times where students are moving the tables, which is then mistaken as litter to be thrown away, causing the paper to be replaced frequently, adding to wastage and is thus a short term solution

3. Your BIG IDEA[#]

Describe your proposed invention.

Our invention is a table leg stabiliser. It is 3D printed and its material is hardened plastic. It is able to fit below the leg of the table students use in the classroom and is meant to adjust the height of the table leg if the table is shaky. This is done by placing scrap paper into the stabiliser until the table is stable.

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

The table leg stabiliser is meant to solve the irritating problem of shaky tables we students face so that we are able to focus and concentrate better on the ongoing lesson so that the learning environment can be more conducive. This is even more important when we are taking a test. Writing on a shaky table can affect our performance and ability to focus.

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

The current solution, which is placing scrap paper underneath the table, has the tendency of coming out if we accidentally kick it or even slightly move the table. Not only will it be frustrating to bend down and shift it back into place, but it will also be very unsightly when teachers or visitors in the classroom walk past it. It may also be mistaken as litter and get thrown away or leave a bad impression of our school to visitors. It also may result in paper wastage.

However, our invention is able to provide lasting support to stabilise the table by staying in place and allowing adjustments in the height. It is also light, will not break easily and is able to be used on any student's table in school. What's more, we are able to adjust the height of the stabilised by fitting pieces of scrap paper in it before fitting it onto the leg of the table. In this way, we will not have to use much scrap paper to stabilise the table.

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

We expect some designing faults in the invention, making it unable to fit onto some table legs.

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

The major milestone in our invention was when our 3D printed object was able to serve its purpose and stabilised the legs of the table, just like it was supposed to.

4. Construction and Modelling Process*

Explain how and why the materials were chosen for the prototype/ product of your invention:

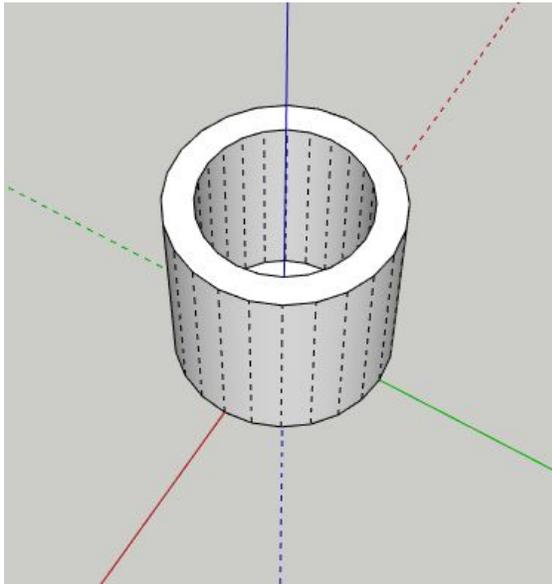
We needed a material that was durable, waterproof and lightweight for our material, thus we carefully shortlisted some of the most suitable materials, wood, metal and plastic. After going to the decision-making matrix, we decided that hardened plastic produced by the 3D printer would be ideal as it met all the criteria of our selection of materials, and it was also convenient and easy for us to make.

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

We wanted the product to be easy to make, so we could make as many as possible should the need arise. Also, we did not want the product to be handmade, as it would be very time-consuming, and will take very long for someone to make one for us. The 3D printer is ideal as although it takes about 2 hours to make the product, no manpower is needed and it is able to do the job well and completely using our ideal material, plastic.

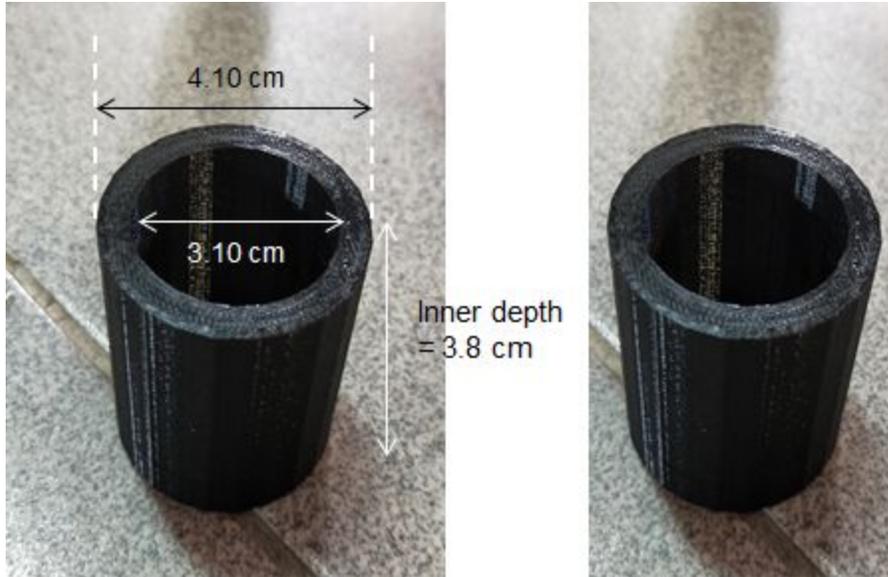
Document the prototype/ product development stages. You may use drawings, photographs or videos.

First, we designed how the product would look like, according to the actual dimensions of the school table legs.



Dimensions of the invention: 4cm height, 1.55cm inner radius, 2.05cm outer radius, 0.2cm height of base

Then, we plotted the design on software in the SRC, and 3D printed the product there. The next day, we went to collect the finished product.



This is a picture of our final product, 3D printed and made of hardened plastic. As you can see, it looks exactly as we had planned it to be and is able to work as we wanted it.

5. Modification and Evaluation

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: 1	Tick			Remarks
Test Date: 2/07/2019	Pass	Fail	Potential Failure	
Test Criteria 1: Ability to fit on school table legs	√			Fits well on school table legs they were designed for
Test Criteria 2: Ability to stabilise table and prevent shaking	√			The amount of paper used has to be adjusted until it is stable
Test Criteria 3: Does not fall out from the table leg easily	√			The stabiliser does not fall out even through vigorous shaking of the table

Test Iteration: 2	Tick			Remarks
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Test Date: 2/07/2019	Pass	Fail	Potential Failure	
Test Criteria 1: Ability to fit on school table legs	√			Fits on another school table legs they were designed for
Test Criteria 2: Ability to stabilise table and prevent shaking	√			The amount of paper used has to be adjusted till stabilisation
Test Criteria 3: Does not fall out from the table leg easily	√			The stabiliser does not fall out even through vigorous shaking of the table

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.)

- Personal experience and our own photos