

Hwa Chong Institution

Project Work

Category 3 Inventions Log Book

Title of Project: <u>Color Patch</u>
Group Name: <u>Project Color Patch</u>
Group Members: 1)Keagan So 2) Mickelson Teo Jing Xiang 3)Jacques Khaw 4) Ng Chao Jiun

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.

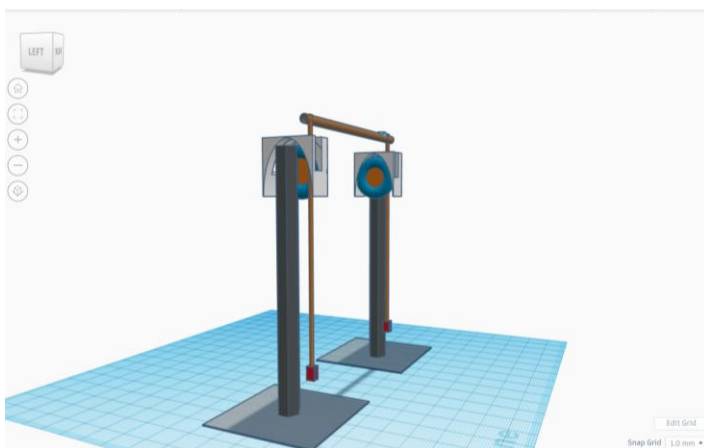
1 A Document a list of problems you have identified. Your documentation should show clearly how your group came up with the problems.

1. Difficulty the elderly face when wearing their clothes.
2. Difficulty the visually impaired face when selecting clothing(differentiating between the colours of clothes).
3. Difficulty in carry heavy things
4. Difficulty with putting on pants for those with physical disabilities

For problems 1 and 3, there were already products on the market that were created to solve these problems, and the fact that there were also many other products made for this purpose, hence we decided that since we too had a lack of new ideas to improve on the existing solutions, we did not embark on the project to solve these problems that faced the elderly.

We initially decided on embarking on tackling problem number 4, which is trying to solve the problem of those who are physically disabled to help put on their pants. However, the prototype that we originally came up with a prototype but realized that the concept that we were working with to solve the problem, was not going to solve the problem realistically.

Our original prototype for Problem 4, was that we were going to have 2 stands on either sides of the user's legs, with a rod connected by an extensible string attached to the ends of the 2 stands. The rod was going to be attached to the shorts of the user, allowing them to pull the shorts up with ease, without bending down. However, we realized that this meant the user still had to stand up to put on his pants and thus we scrapped the solution for this problem.



^Original Prototype to tackle Problem 4

We then decided to focus on the last problem we identified which is about the difficulty that the visually impaired face when differentiating between the colours of various article of clothing. We first came up with the idea of a circular cloth patch with a rectangular braille text attached to the

cloth. We realized that this would essentially mean that the product would be too bulky and obstructive which was what we did not want it to be. Thus, we decided to use SCAMPER and simplified the prototype to just the braille text alone, and add holes on all 4 corners to allow for the product to be easily sewn onto the article of clothing

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

We have selected the problem of the visually impaired being unable to differentiate between the colour of the article of clothing that they own

The visually impaired would be unable to identify the color of their clothing due to their lack of the sense of sight (type of clothing identifiable by feel) , causing them to wear mismatched clothing of clashing colors

Such outfits cause the public to look at them in a negative light, having a poor first impression of them, thus hindering their ability and opportunities to get a job, and climb up the social ladder

A solution to such a problem would thus make Singapore a more inclusive society, where people are given equal opportunities to succeed regardless of the situation that they are placed in

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			
	Braille text causing user to feel uncomfortable	Patch being hard to locate	Braille Text not prominent enough	Patch coming off after wash
User-friendly	4	2	3	1
Effectiveness of product	1	4	3	2
Durability of				

Product	1	2	3	4
Total Score [Total:16]	6	9	9	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)

Jacques who has some blind friends at Church, was talking to them about life as a disabled person. They then raised the problem of not being able to independently dress themselves. This problem affected their self-confidence as they could not be independent

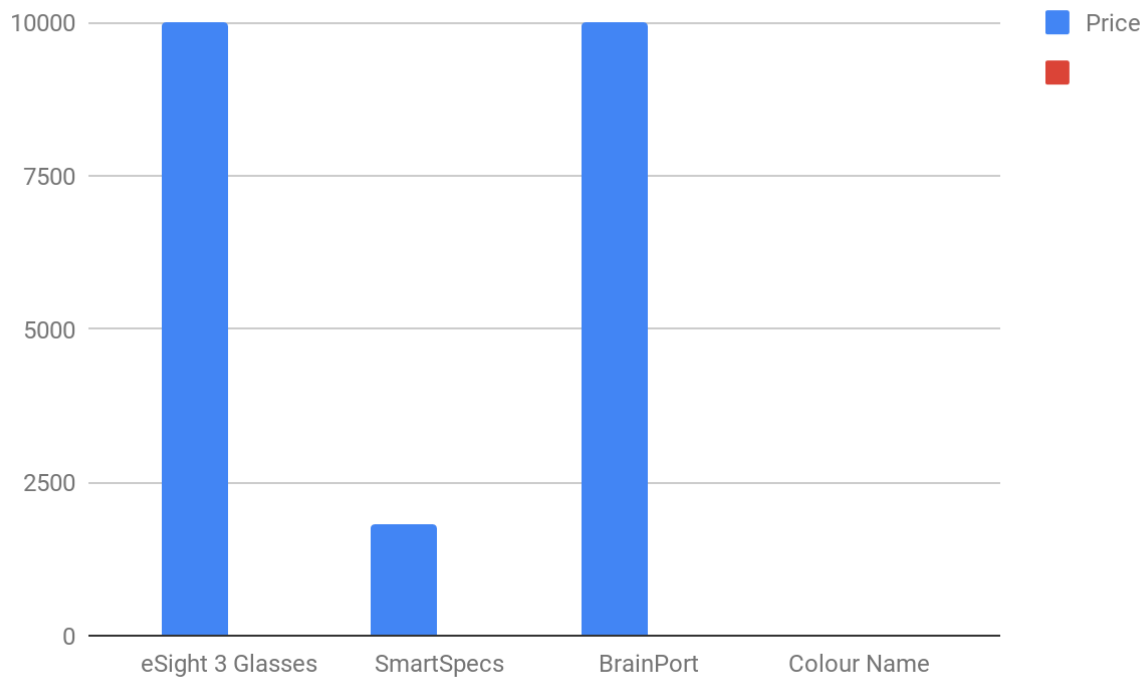
The blind in our society have difficulty identifying the color of the article of clothing which will lead to them wearing mismatched clothes, which will give people a bad first impression of them, affecting the social opportunities that they can access, and their ability to climb the social ladder

2 B Compare and contrast the existing or similar solutions.

Inventions	Benefits	Disadvantages
eSight 3 Glasses	Allows the wearer to be able to see and identify color again	Cost is very high (\$9995)
SmartSpecs	Allows the wearer to be able to see again	Cost is very high (\$1803)

BrainPort	Allows the wearer to partially experience of seeing via the sense of taste	Potentially cause problems adapting to the device Cost is very high (\$10,000)
Colour Name	Is free to download onto the phone	Depends on Lighting Poor Lighting can result in colour identified to be inaccurate Colors identified are too complex

- **eSight 3 glasses** - Allow the wearer to be able to see and identify color again, however the cost is very high at approximately \$10,000 while our product helps visually impaired people identify color through the sense of color and does not cost much to produce
- **SmartSpecs** - Captures real time image and enhances the contrast for legally blind user, while our product only allows the visually impaired to identify colours. The cost for this product is once again much higher than our product
- **BrainPort** - Helps the visually impaired regain optical sensations through the sense of taste, while our product uses the sense of touch to help the visually impaired identify colors. Once again, this product is way too expensive when compared to ours
- **Color Name** - This App helps the visually impaired identify colour by utilizing the phone camera. However, this App is incredibly flawed and it is too difficult for the visually impaired to use



Most products are expensive and flawed, hence our product provides a cheaper and less flawed solution to the identified problem

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 group's proposed invention is a patch that will be attached to the back of the shirt with the color of the shirt to be on the patch in braille. This way, the blind can easily identify the color of clothing that they are wearing and dress appropriately / accordingly.

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

This way, the blind can easily identify the color of clothing that they are wearing and dress appropriately / accordingly.

This means that they can give people a better first impression of them, giving them more opportunities and be more able to climb the social ladder

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

This proposed invention would be different as it is not bulky / expensive as the hardware required to identify colors for the blind and also apps that can identify color for the blind is also unreliable as the effectiveness of the application relies on a number of factors such as lighting, camera proficiency etc.

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

Problems faced:

- 1) Learning how to sew and attach the invention onto the shirt
- 2) 3D Printing and modifying the digital version of the prototype
- 3) Durability of product (Prototype was very thin)
- 4) Whether the product would affect the user negatively due to the nature of the hard material

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

The first milestone we achieved was during our brainstorming process when we finally decided on the problem that we wish to solve, and use the SCAMPER process to come up with a feasible invention to tackle the problem.

The second milestone we achieved was building our first prototype.

4. Construction 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.

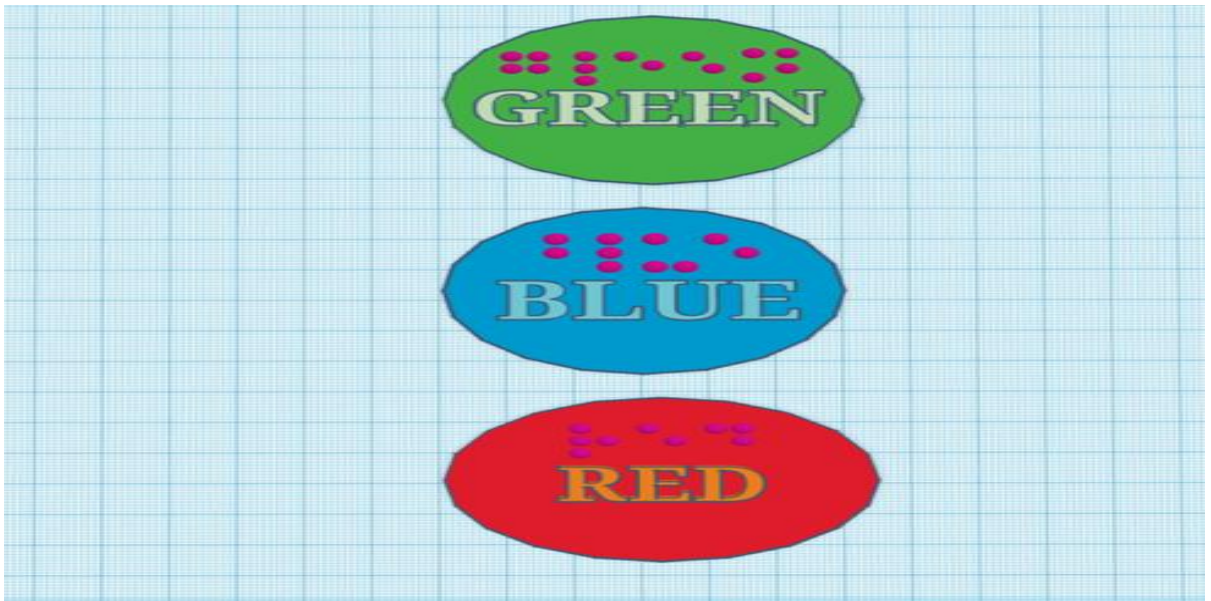
Plastic Filaments were used for the construction of our prototype due to 2 reasons:

- 1) Plastic Filaments are hard enough to differentiate between the cloth of the clothing and the product itself
- 2) Plastic Filaments are durable enough to not be worn out and keep the braille text on even after repeated washes
- 3) Plastic Filaments are readily available and malleable as they are used in the 3D printer

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

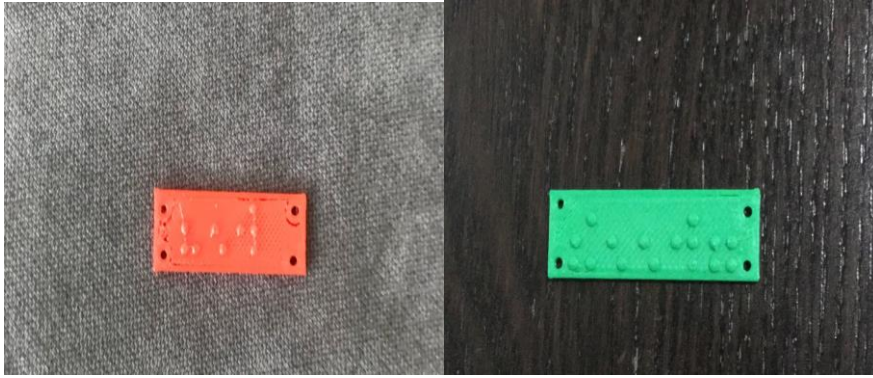
- Some considerations that we have of the construction of the product are:

- User's comfort
 - Efficient and suitable for use
 - Durability
 - User's comfort was a particularly major area of consideration
 - Must be made of a certain material and placed in a suitable location to ensure comfort of user
 - Braille Text could feel uncomfortable rubbing against user's skin
 - Material too hard→ stiff and inflexible
 - Efficiency and practical use of product was another area of concern
 - Whether the user can accurately determine the braille on our product
 - Material of the braille must be hard enough for the user to be able to feel
 - Durability
 - Made sure that patch would stay on even after washing
 - Stitch used had to be appropriate to ensure that product would stay on after washing and ensure that it is not a one-use product
- 4 C Document the prototype/ product development stages. You may use drawings, photographs or videos.**



^Original Prototypical Design for the Color Patch

- **Circular Fabric Patch with Braille Text on top**



^First Prototype for the Colour Patch

- Instead opted for a rectangular plastic tag with the Braille text embedded on top and holes on the 4 corners to attach it with ease via sewing
- Was not very comfortable as braille dots would rub against the skin and cause it to feel irritating



^Second Prototype for the Colour Patch

- Cloth to cover the braille patch
- However, it was not very feasible as the cloth took too long to dry after wash



^Third Prototype → added cloth to the exterior of the braille patch

- Was quite effective as it served the same purpose as the original concept but it did not have the problems that the first prototype had (Eg: Too uncomfortable)

5. Modification and Evaluation

(Oops...)

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 1: Durability Test	Tick			Remarks
Test Date: 5/7/2018	Pass	Fail	Potential Failure	
Test Criteria 1 Washing Machine Washable	✓		✓	Test was good on second and third attempts. Color Patch stayed on, however, the first attempt when we sewed the patch on diagonally, it fell off
Test Criteria 2 Durability of Braille Text		✓	✓	Person who tested prototype felt that it was a good invention that would benefit him but felt that it could be improved to improve the comfort of user
Test Iteration: 2	Tick			Remarks
Test Date: 1/8/2018	Pass	Fail	Potential Failure	
Test Criteria 1 Effectiveness of Patch	✓			The person who tested the prototype felt that the Braille was sufficiently prominent to allow for ease of deciphering.
Test Criteria 2 Accessibility of Patch	✓			The person who tested the prototype felt that the Braille being located on the outside of the collar was easy to locate when retrieving the shirt from the wardrobe
Test Criteria 3 Comfort of Patch	✓			The person who tested the prototype said that placing the Braille patch on the outside of the collar was a good idea as he experience no

				discomfort when wearing the shirt
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*Add more rows for more criteria

** Repeat table for next test iteration

6. References

(Thanks...)

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.)

Matchar, E. (2015, July 13). These Glasses Could Help the Blind See. Retrieved March 02, 2018, from <https://www.smithsonianmag.com/innovation/these-glasses-could-help-blind-see-180955797/>

Jolly, J. (2017, February 16). High-tech glasses are helping blind people see. Retrieved March 05, 2018, from <https://www.usatoday.com/story/tech/columnist/2017/02/15/high-tech-glasses-helping-blind-people-see/97960470/>

Kendrick, M. (2009, August 13). Tasting the Light: Device Lets the Blind "See" with Their Tongues. Retrieved March 02, 2018, from <https://www.scientificamerican.com/article/device-lets-blind-see-with-tongues/>