

# Hwa Chong Institution

## Project Work

### Category 3

## Inventions Log Book

### (Revised for 2021)

Title of Project: <u>Medical Triage App</u>
Group Name: Project Triage (3-14)
Group Members:  1) Timothy Chan (2) 3A1  2) Dylan Lye (6) 3P3  3) Marcus Ho (16) 3O3

#### **1. Problem Finding** (The beginning...)

Identify a problem you would like to solve. You may want to 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. Some people need medical attention urgently, but medical care may arrive too late due to a big number of patients.
2. Some people discard all sorts of materials into recycling bins, even if they are not recyclable.
3. Some people have trouble finding their items, such as elderly or dementia patients.
4. Diabetic patients cannot eat food with sugar content
5. When it rains, clothes hanging outside will get wet
6. Laptops become hot when in use for too long.

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

The considerations we had when we chose this problem were feasibility, whether the target audience was big enough, the number of existing solutions and cost-efficiency.

In cases where urgent medical attention is needed, patients need treatment as soon as possible. In a triage, you will be sorted by the urgency of medical attention needed. However, due to there being a lot of patients, patients often have to wait for some time before receiving medical attention. This may lead to serious consequences for those in critical conditions such as stroke or a heart attack, where every second counts and medical help cannot wait. Thus, a solution to combat this problem is necessary.

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

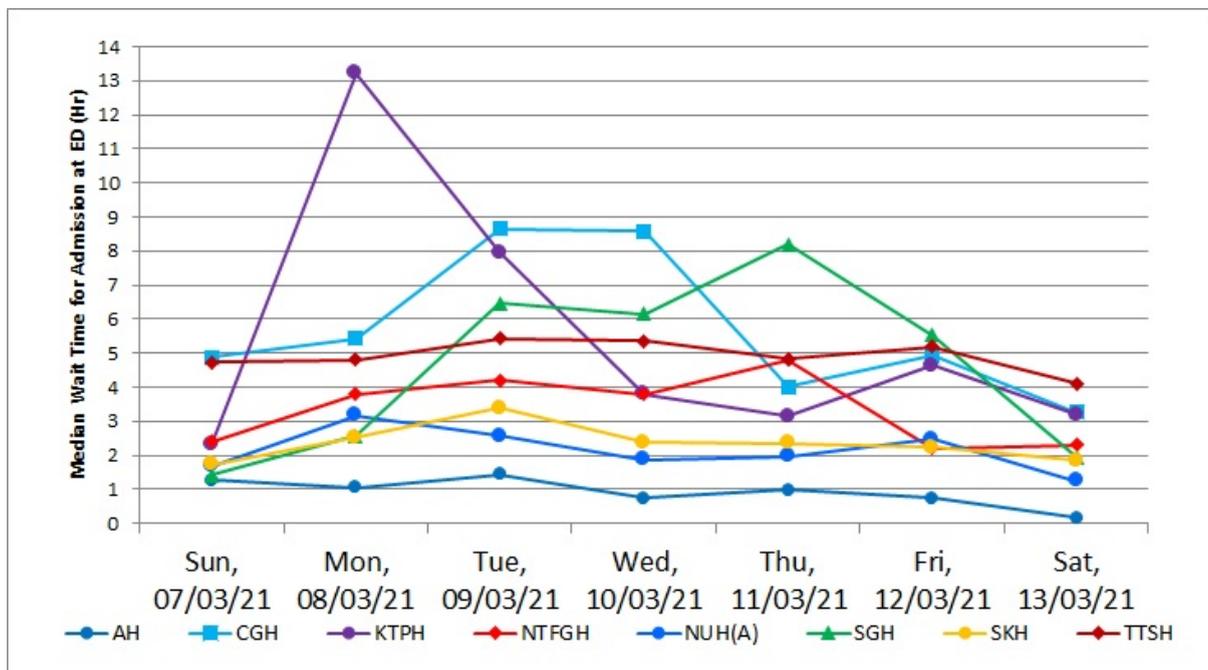
Problem Evaluation Grid

Considerations for Selection	Problems		
	Recycling bin	Urgent medical care	Trouble finding items
Feasibility	3	4	2
Size of target audience	2	3	3
Number of existing solutions	2	4	2
Cost-efficiency	3	3	3
Total Score	12	14	10

## 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)



These are statistics from the Ministry of Health (MOH) website, which show that the average time taken to be admitted into the Emergency Department (ED) is quite a long while. This long waiting time can be detrimental to patients who need medical attention urgently, in cases such as heart attacks where every second counts. Researchers found that in heart attack patients, every ten-minute delay in treatment means there will be an extra 3.3 deaths per 100 patients. Thus, this problem is very serious.

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

#### 1. DoctorAnywhere

This is an app which allows you to access your medical history, records and medical documents. You can schedule a video consultation with local doctors through this app, and they will advise you further. However, this app caters to common illnesses that are less serious, and will not be effective against emergency situations like heart attack and stroke. Furthermore, there are many people who need medical attention, and there is no method of gaining priority access to healthcare quickly, so

those who need immediate help likely will not get it in time, due to there not being enough doctors and manpower to tend to the number of patients.

## 2. JoinTriage

This is an app which helps Paramedics and EMTs quickly and accurately triage patients. It provides several commonly used assessment scales. Question responses, such as the onset time, are used to evaluate symptoms of stroke or cardiac disease. The patient's condition is summarized with a score and accompanied by other useful information such as the probability of severe outcomes, when applicable. A map is presented, showing a list of recommended medical centers best suited to treat the patient. However, as mentioned above, this app is suited to first responders, and it would likely be harder for regular people to judge the conditions and answer the given questions, since they might not understand the terminology used and how to accurately judge the severity of the issue. Hence, the results given might not be accurate, and this app is unsuitable for tending to the problem we are trying to solve.

## 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.

An app that can sort a list of people in a triage by order of urgency of medical attention needed, so whoever needs treatment can get it as soon as possible. We aim to have a flowchart type system, where patients will answer questions beforehand, and determine whether the patient's condition is critical, moderate, or manageable. Patients going to the hospital can fill up this form, and depending on the urgency of the patient's condition, they will then be prioritized to the front of the queue and get admitted to the Emergency Area if their condition requires immediate medical attention.

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

As shown earlier, the emergency room usually has a waiting time of at least 1 hour. With such a long waiting time to be able to seek medical attention, more time-dependent cases like stroke patients and heart attack patients are left unable to immediately seek medical attention, which could result in permanent damage to the victim or in the worst case, death. The proposed invention would be able to quickly identify key symptoms of diseases or illnesses that are time-dependent (heart attack, stroke etc) and thus categorize cases into 3 different colours of priority: Green, Yellow and Red, with Green being lowest priority and Red being the highest priority. This grading system could then be presented to the attendants, which could immediately provide Red cases with medical treatment. Our proposed invention not only seeks to cut down waiting time, but also reduce manpower required to attend to less serious cases, so that more serious cases get the medical attention they need.

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

Current existing solutions are not suitable for more serious cases, catering to less serious ailments. They are also hard for regular people to use, which would render any information or diagnosis inaccurate, as normal people likely will not be able to tell apart all the different symptoms. Our proposed invention aims to combat these two problems, by focusing on more serious conditions such as stroke and heart attack, and being more user-friendly, allowing normal people to use this app effectively, thus setting us apart from other currently existing solutions.

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

1. The app will likely be challenging to build, since we are not experienced in this area.
2. We might not be able to do everything we intend the app to do, as some parts may not be as feasible as it looks on paper.

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

February: Brainstorming and Proposal

March: Data Collection and Slides

April: Project Evaluation and Prototyping

May and Onwards: Prototyping and Construction

***#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.***

## **4. 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**

Not applicable.

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

Not applicable.

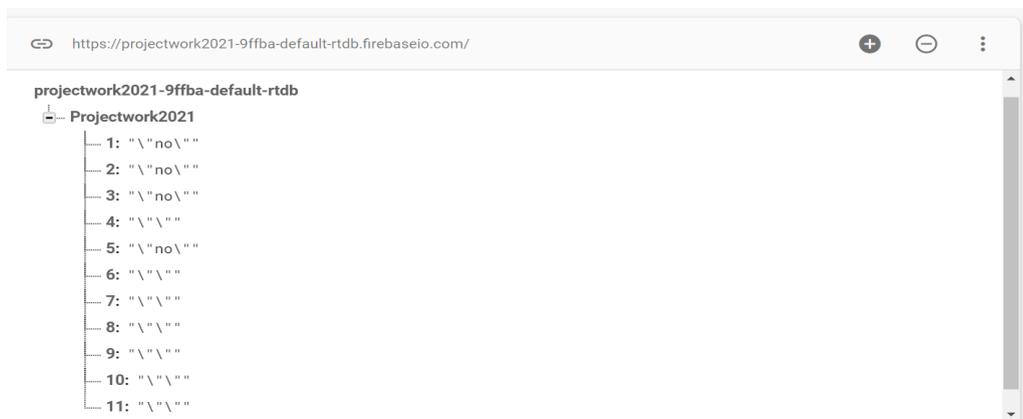
**4 C Propose how the prototype/ product will be constructed or developed. You may use drawings and photographs.**

```
when Button1 .Click
do
  call FirebaseDB1 .StoreValue
  tag "1"
  valueToStore join TextBox1 .Text
  call FirebaseDB1 .GetTagList
  call FirebaseDB1 .StoreValue
  tag "2"
  valueToStore join TextBox2 .Text
  call FirebaseDB1 .GetTagList
  open another screen screenName "Q3 7"
```

This is a picture of the code used to send the input from users to the database where all the information is stored.



This is the database where the inputs from users will be stored.



**Features:**

- An simple instructions page to show how to use the app
- A questionnaire which asks essential information for triaging
- A back button to change answers if needed
- A database which stores all the input to allow doctors to triage patients

Page 1	Page 2
1. Do you have any existing medical conditions? If yes, please state them.	3. Do you feel any numbness or weakness?
<input type="text"/>	<input type="text"/>
2. Are you currently on any medication? If yes, please state them.	4. Do you have trouble speaking or difficulty understanding speech?
<input type="text"/>	<input type="text"/>
<input type="button" value="Next"/>	<input type="button" value="Back"/> <input type="button" value="Next"/>
Page 3	Page 4
6. Do you have sudden onsets of dizziness, trouble walking or loss of balance?	9. How long have the symptoms lasted?
<input type="text"/>	<input type="text"/>
7. Do you feel faint or lightheaded?	10. How bad are the symptoms? (scale of 1 to 10, 1 being least severe, 10 being very severe)
<input type="text"/>	<input type="text"/>
8. Do you feel any of the following: shortness of breath, fatigue, cold sweat, chestpain?	11. Do you feel any pain? If yes, where and how bad is it? (scale of 1 to 10, 1 being least severe, 10 being very severe)
<input type="text"/>	<input type="text"/>
<input type="button" value="Back"/> <input type="button" value="Next"/>	<input type="button" value="Back"/> <input type="button" value="Submit"/>

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.**

Construction is not possible as it is an application.

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

The video will showcase the workings of the app, thus effectively showing how the invention will work. The different considerations of the application will be the features of the application which allow it to function.

**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.

**5 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.)**

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