

B.Des Design Project II

Introducing **Emergency Response Care** into **School Education System**

A Bystander's Role w.r.t Road Traffic Accident (RTA)

Drishti Das - 18U130013

Guide: Prof. Prasad Bokil



IDC School of Design
अभिकल्प विद्यालय

Declaration

I declare that this written document represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the sources.

I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission.

I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Drishti Das
18U130013

IDC School Of Design
Indian Institute of Technology Bombay
June 6, 2021

Approval Sheet

The B.Des Design Project - 1 titled 'Vocabulary memorization Application for Hindi Medium School Students' by Drishti Das, Roll Number 18U130013 is approved, in partial fulfillment of the Bachelor in Design Degree at the IDC School of Design, Indian Institute of Technology, Bombay.

Project Guide :

Chair Person :

Internal Examiner :

External Examiner :

Acknowledgements

I am grateful to Prof. Prasad Bokil for guiding me throughout this project. His feedback sessions have been extremely motivating and have taught me a lot. His guidance and support over the semester have helped shape my project well.

I am thankful to my panel, Prof. GV Sreekumar and Prof. Ravi Poovaiah for their valuable critique over the course of the project. I am also thankful to all the people who agreed to participate in my interviews and google form surveys, even the road accidents was a sensitive topic for a few, and their valuable inputs that helped structure my project.

I would love to thank my parents and my friends who helped me with my research by connecting me with potential users and supporting me throughout while giving valuable feedback and moral support.

Contents

Abstract	_____
Introduction	_____
Aim	_____
Initial Design Brief	_____
Background	_____
Secondary Research	_____
Market Study	_____
Primary Research	_____
Data Analysis	_____
Mappings	_____
Setting a Direction	_____
Restated Design Brief	_____
Further Research	_____
Ideation	_____
Final Idea	_____
Objectives	_____
Content Analysis	_____
Concept Detailing	_____
Design Output	_____
Evaluation	_____
References	_____

Abstract

Road Traffic Accidents (RTAs) is regarded as one of the leading causes of grave injuries and fatalities in the world. How can the common public help out in taking immediate action based on the injuries? The overall aim is to enable the common public with information about emergency response care, particularly the bystander's role within that, so that they can help out the victim during a road accident.

The approach eventually shifted from having an intervention in the accident scene to incorporating it in a school level. The final output was a course design system about the bystander's role in post crash care, which included performing practical exercise and mock drills with a road accident situation and procedures to follow after that. It is a hybrid model of theoretical content and hands-on activities. It will be introduced in school curriculum, with the theory parts taught along with the Road Safety chapter in NCERT. These exercises can be conducted in the classroom itself with the teacher being your guide, and a manual with all the information and instructions about Emergency Response Care in Road Accidents.

Introduction

Road Traffic Accidents (RTA) are particularly common in India than in other countries due to the high population a.k.a vehicle count and poor traffic management, leading to several near-death/fatal incidents. Most people have experienced at least one on-road accident, first hand or as a bystander, so when it occurs, there's always a small window between the unforsaken accident and an external medical help arriving (ambulance). What should the people be doing? What if the ambulance takes longer than usual to arrive? Those minutes count for the injured's survival.

There are different kinds of accidents that take place in RTA. How can the common public help out in taking immediate action based on the type of injuries? Medical Professionals agree that they would appreciate the common public knowing some basics about emergency care and first-aid as it could save lives and make it easier for the doctors right after. Not to mention, the bystander would've most likely been exposed to misinformation regarding this area while being in an emotionally overwhelming mental state.

I think this is a real problem that hasn't been delved into because it is usually left for the paramedic and the medical professionals to handle the situation. Common people are not aware of how effective of a role they can play in an emergency. It is useful,

- Knowing this general information beforehand, or accessing it when needed,
- What to do/not do in the situation till help arrives.



Figure: Helping out a Road Accident Victim

Aim

The aim of the project is to encourage and enable the common public (Non-medical Professionals) with first-aid information so they can help the victim when they encounter a road accident and take immediate action respectively.

Scope

The expected outcome was uncertain but can range from,

- a booklet present in all vehicles (Eg: safety instructions booklet on flights)
- Posters/Signage on common accident areas
- Incorporating it in school education itself
- Have an application (an information hub) in the phone as it's the most accessible out of all.

Initial Design Brief

To provide the common public (Non-medical Professionals) with a guide/resource to refer to when they encounter a road accident and take immediate action respectively.

Background

RTA: Road Traffic Accidents

The statistics of fatal injuries due to Road Traffic Accidents (RTAs) is increasing over the years in India due to,

- high population,
- vehicle count, and
- poor traffic management.

All of the data about Road Accidents in India has been collected from MoRTH: Ministry of Road Transport and Highways. It shows statistics on the most prominent causes of accidents and type of vehicle collisions, till 2018.

Based on those statistics:

There are many causes of Road traffic accidents (RTAs): Aggressive driving behavior, not obeying traffic signals, overspeeding, drunken driving, defect in motor vehicles, hit and run, poor weather and surrounding conditions.

The common vehicles involved in road accidents are usually motorised two-wheelers, auto rickshaws, cars, buses and trucks. Car accident collisions fall into several major categories : Rear-end collision, side collision, rollovers, head-on collision, single car accident, level crossing accidents.

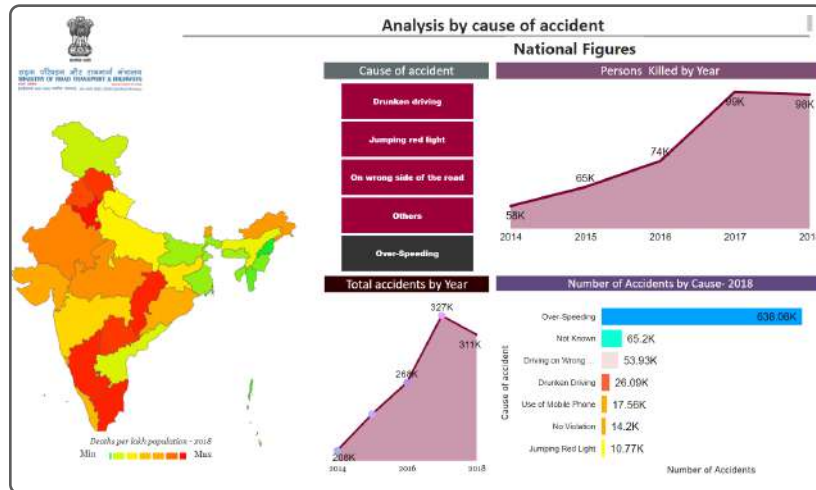


Figure: Common causes of Road accidents till 2018 by MoRTH

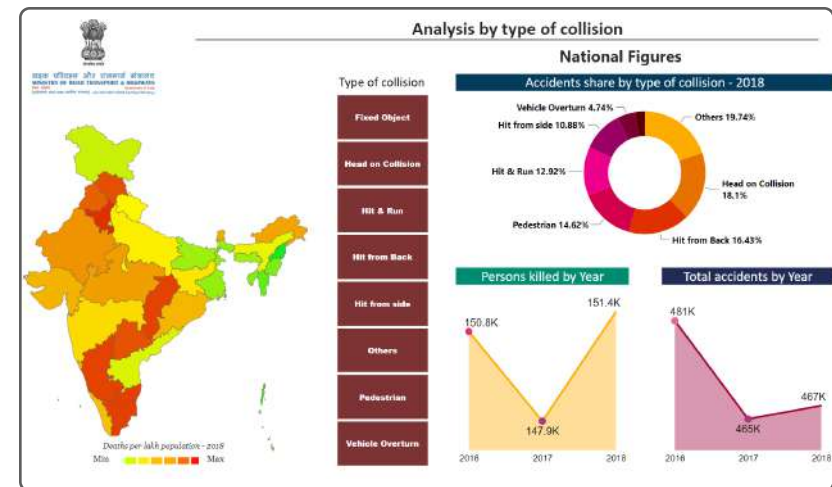


Figure: Types of collisions on vehicle till 2018 MoRTH

Whenever an accident takes place, the people in the scene is the bystanders and people actively part of the accident.

There are different kinds of injuries that is likely to happen to the victim once an accident takes place, and based on the type and degree of the injury it can be categorised into:

- Mortality: Death
- Morbidity: Slight vs Severe Injuries
- Disability: Temporary or Permanent

The immediate actions that need to be taken once a crash occurs and a person is possibly injured comes under Pre-Hospital Care and once the injured is transported to nearby medical facility, it comes under In-Hospital Care.

Pre-Hospital Care includes (post-crash) emergency response care and safe transport. Calling for an ambulance using a helpline is always the first and foremost step. The ambulance usually arrives in 15 mins or less, based on proximity to the accident scene.

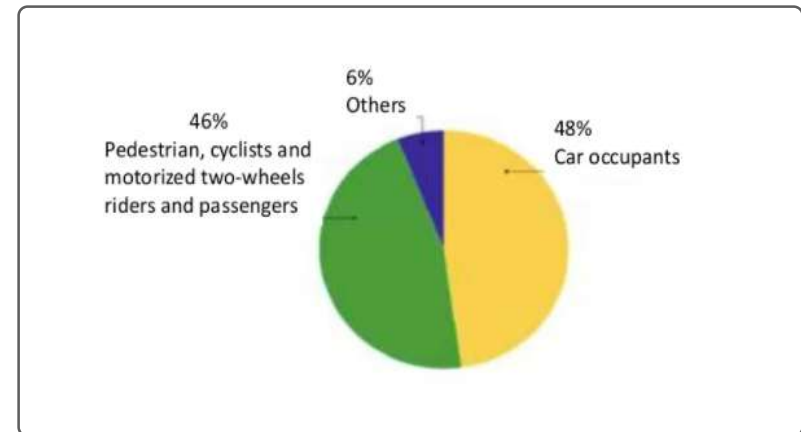


Figure: Road Traffic Deaths till 2018 MoRTH

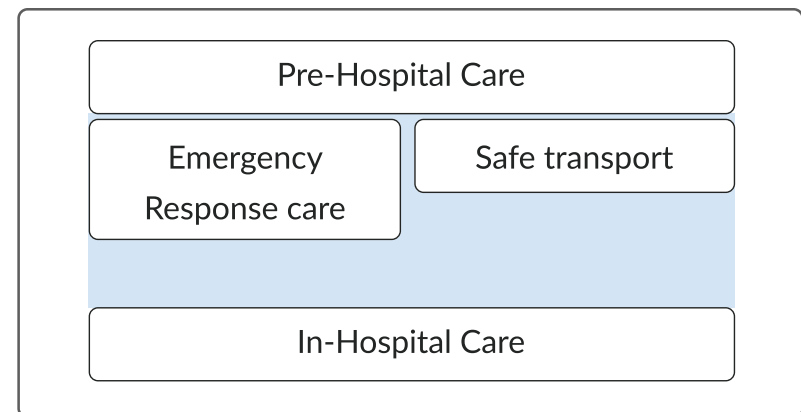


Figure: Pre-Hospital Care - Post-Crash Care

Secondary Research

The first person in the scene is unlikely to be a paramedic or a doctor. To curb the rate of loss due to RTAs, bystanders often need to do a little more than call an ambulance, do their best to provide first aid and reassure victims that help is on their way. The small window till the ambulance arrives is very crucial in case of a serious injury.

Immediate responses in a RTA situation,

Critical 4 mins: One of the most common causes of a road accident death is due to loss of oxygen supply. Normally it takes less than 4 mins for a blocked airway to cause death.

The “Golden Hour”: If proper first aid and definitive care (hospital operating table) is given in the first hour, road accident victims have a greater chance of survival and a reduction in severity of their injuries. It includes the time taken for callout, travel to the incident, extrication and transport to the hospital. - Dr. R. Adams Cowley in 1961

The helpline numbers for India are the follows
(w.r.t Road Safety and Emergency Response Care)

Indian Helpline Numbers

A helpline is a telephone service providing help with any kind of emergency and distress. The helpline numbers vary based on the type of problem and is active 24/7. This system is designed to be simple and straight-forward. The numbers are short and memorable with 3-4 digits and it connects us to professionals and trained individuals who can guide us through the situation till help arrives. The common ones are in-built into our phone. The ambulance arrives within 15-20 mins, as long as there is a paramedic facility in nearby areas.

NATIONAL EMERGENCY NUMBER	112
POLICE	100
FIRE	101
AMBULANCE	102
ROAD ACCIDENT EMERGENCY SERVICE	1073

Figure: Indian Helpline Numbers

Government Policies

Road Safety figures in India are in the rise. With the aim of addressing the problem, the Motor Vehicles (Amendment) bill 2016 was an attempt to create a comprehensive legislative framework for Road Safety in India. There have also been many government policies implemented to urge the non-paramedic individuals to help out the road accident victims and contribute to their safety.

Some of them are: *National Road Safety Policy* and *Good Samaritan Law*.

National Road Safety Policy

Based on the policy, the Government of India is committed to achieve quite an improvement in road safety by Raising Awareness about Road Safety Issues:

Increase its efforts to promote awareness about the various aspects of road safety, the social and economic implications of road accidents and what needs to be done to curb the rising menace of road accidents. This would enable and empower the different stakeholders to play a meaningful role in promoting road safety.

with State Governments and Union Territories as appropriate.

Emergency Medical Services for Road Accidents

The Government will strive to ensure that all persons involved in road accidents benefit from speedy and effective trauma care and management. The essential functions of such a service would include the provision of rescue operation and administration of first aid at the site of an accident and the transport of the victim from accident site to nearby hospital. Hospitals alongside the National Highways and State Highways would be adequately equipped to provide for trauma care and rehabilitation.

HRD & Research for Road Safety

The Government will encourage increased activity in programmes of road safety research by identifying priority areas, funding research in those areas adequately and establishing centers of excellence in research and academic institutions. The

Figure: National Road Safety Policy about Emergency Medical Services

According to a National Study conducted by the Save LIFE foundation and TNS India Pvt. Ltd.

- 74% of bystanders are unlikely to assist victims of road accidents;
- 88% of those bystanders gave the following reasons for their reluctance: legal hassles, including repeated police questioning and multiple court appearances;
- 77% of the respondents cited detention at hospitals and having to pay hospital registration fees and other charges as reasons not to help.

The role of the bystander is critical in providing emergency care to the victim.

Good Samaritan Law

One of the most essential feature was of the incorporation of the Good Samaritan guidelines. These guidelines protect Good Samaritans (bystanders who come forward, in good faith, to help road accident victims) from civil and criminal liability and make it optional for them to disclose their identity to the police or medical personnel.

“The Good Samaritan Law allows a person, without expectation of payment or reward, duty of care or special relationship, voluntarily come forward to administer immediate assistance or emergency care to a person injured in an accident, or crash, or emergency medical condition.”



Figure: being a Good Samaritan to your society

Guidelines for Protection of Good Samaritans:

1. A Good Samaritan who takes an accident victim to a hospital will not be asked any questions and can leave immediately. He/she cannot be forced to stay unless they are an eyewitness in which case only their address can be noted and he/she can be examined as part of the investigation by police or during trial but only once.

2. A bystander who calls the police or emergency service to the site of a road accident does not have to reveal his name or any other personal details on the phone or in person. In the Medico Legal Forms which are provided by hospitals, it is optional for good Samaritans to submit their personal information.

3. The Ministry of Health and Family Welfare has issued guidelines which will prevent public and private hospitals to not detain bystanders or ask them to pay for registration and admission costs unless they are a family member of the injured who needs to be treated immediately.

4. If a doctor fails to act to help an accident victim when he is expected to provide care, his actions will be seen as "Professional Misconduct" as prescribed by the Indian Medical

Council Regulation 2002 and disciplinary action will be taken against them. The hospital also has no right to delay first aid or life saving measures on the basis of procedural delays for reasons such as absence of a relative to sign forms etc. According to the law, this is again a punishable offence.

5. All hospitals will put up a notice at their entrances in English, Hindi and the vernacular language of the State or Union Territory stating that no good Samaritan will be asked to provide his/her personal details or pay money for the admission of the victim.

6. A bystander for helping the accident victim could be rewarded by the State government so as to encourage others to come to the rescue of accident victims. The Good Samaritan will NOT be held for any criminal or civil liability.

7. If the Good Samaritan requires an acknowledgement to confirm that he/she has brought the injured person to the hospital with the details of time and place, the hospital shall oblige and the acknowledgement can be prepared in accordance to the format prescribed by the State government.

Market Study

Websites and apps on the phone are the most accessible to the general public through our search engines. Upon exploring and making sure the information about first-aid are from reliable and trusted websites (which was a struggle), I came across a few:

Apollo Website

Apollo is a trusted brand in India, with regards to our healthcare sector. They do have an article called “Handling A Road Traffic Accident” which presents information in a neat, spaced out and precise manner. It has only listed out the bare minimum of what is expected from the bystander, but it works when in that emergency state of mind. It also presents some extra information about the process if a person is reading them in leisure.

Issues: I don’t think the webpage was meant to be used for emergencies. Although I do want to note that even in the unlikelyhood that you are already aware of this webpage, upon searching “apollo first aid”, “apollo accident” or “apollo emergency care” the targeted webpage did not show up. It took multiple failed attempts but the only successful one was “apollo emergency accident”.

This doesn’t seem like a lot but those seconds could lead to increased panic for the bystander with the victim’s wellbeing at stake. Hence, the accessibility factor isn’t met properly.

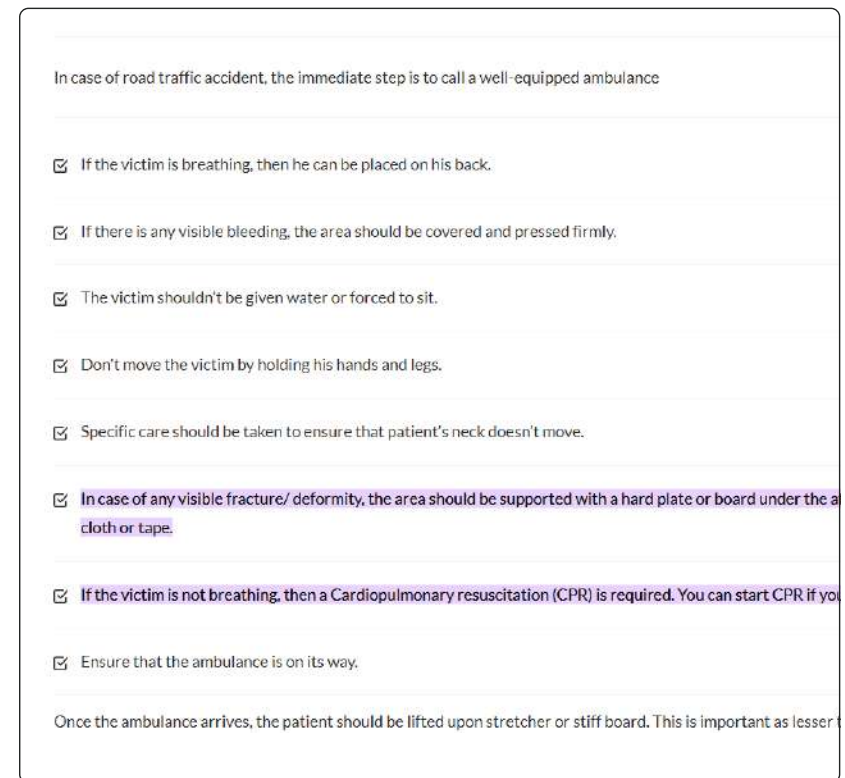


Figure: Apollo's website on aid to road accident injury

India's First-Aid Website

This option gets a plus in accessibility as India's first-aid website called "Indian Red Cross Society" is a reliable source and a widely-known website. I also came across the UK, the US and other countries' websites, just for reference.

The webpage dealing with first-aid within the website opens to a description about the topic and multiple links leading to different first-aid courses.

Issues: Somewhere towards the end is a link leading to a first-aid manual from 2016. But since it's not highlighted in any way, it's easy to miss it. Upon clicking the link, it leads to a 50 pages book and the content is too descriptive to actually help out in the accident situation. The UK website also has a webpage similar to apollo's that was descriptive in nature.



Figure: Indian Red Cross Society Website

Booklet from WHO

While exploring other reliable websites, I looked up the WHO (World Health Organization) which is accessible worldwide. I came across multiple booklets, one in particular dealt with "Post Crash Response" and talked about the multiple factors that contribute to post-crash care and how a bystander's role is important. It also had engaging visualizations and illustrations that were easy to understand, within 24 pages.

Issues: The only problem is that it did not include anything about what a bystander should do exactly when in the accident scene - what I was looking for. Although the booklet was set as an inspiration in the later stages.

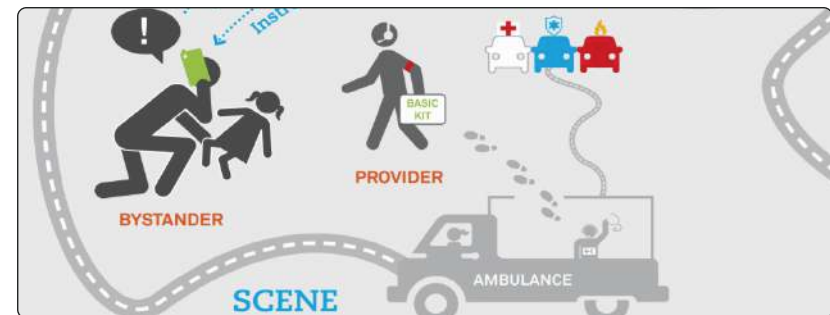


Figure: Illustration on Post-Crash Care by WHO

Independent Apps

Apps are another more accessible option - platform to have important information. There are some independent first-aid apps in the playstore which caters to first aid as an umbrella term and their interface is quite easy to navigate.

Issues: Since these are independent apps, it is not mandatory to have them on our phone. So during the emergency, in case the app is not installed and the bystander decides to look for an app in the playstore, upon searching “road accident”, a bunch of car racing games show up. Only when searching “first aid” the relevant apps are shown but, there are few options that specifically caters to handling road accidents. It can get a little confusing for the bystander.

Emergencies don’t happen often so if you’re expecting people to search and install the app on their own in their leisure time, there’s a low chance they would as it lacks the urgency to consult emergency services. Even if they do, the app is not going to be used very often unless they really need to and in that state of mind, they might just forget about this option.

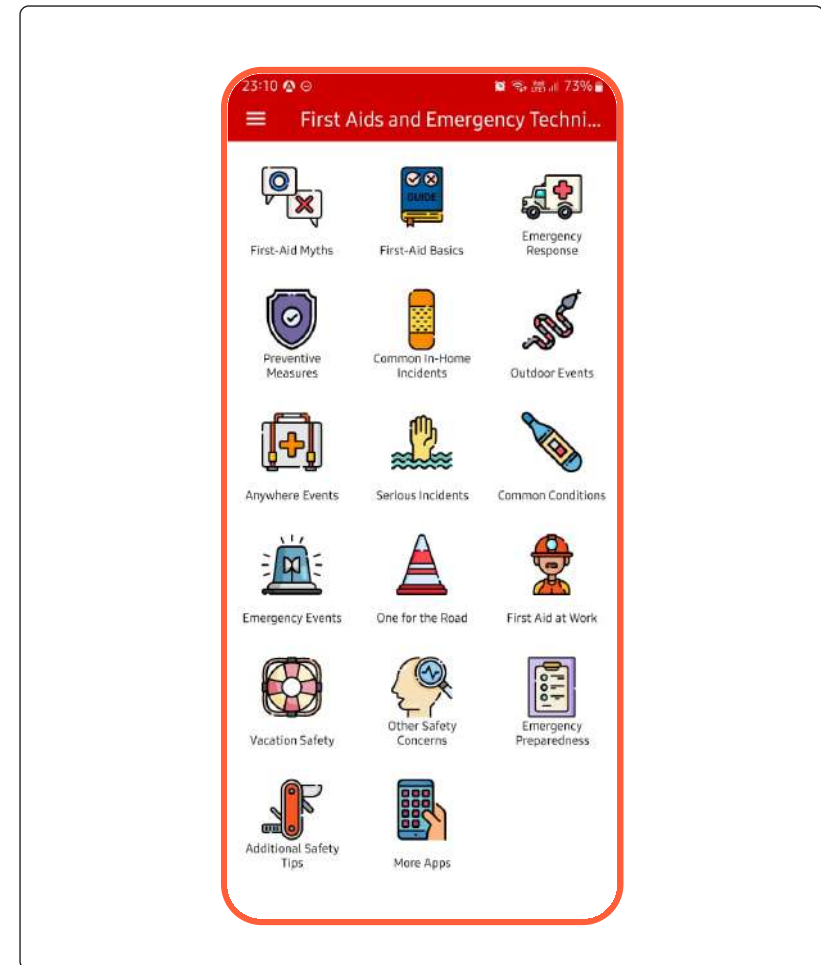


Figure: Apollo's wesite on aid to road accident injury

Mumbai Police Initiatives

When understanding the trust factor that the general public had on certain organizations like the Traffic Police, I came across multiple initiatives from the Mumbai Police websites that incorporates accessibility, technology and trust factor for their Road Safety Management.

VMS:

Under this initiative Electronic Display Boards – Variable Messaging System (VMS) will be installed across Mumbai to display information that will direct public response and help the administration in localizing the impact during emergencies and times of disaster.

Smart mobile apps

They have created mobile apps which are useful to Mumbai Traffic Police as well as citizens. One of them is MTPduty app for Police personnel and MTPapp for citizens.

Smart GPS system:

Identifying the nearest rider vehicle to communicate with wireless messaging and to take appropriate action to meet address any emergency.

Awareness & Educational Programs:

Making RSP Training in schools more interesting by using animated games & other methods by Accidents Counseling Center. Advanced training programs which includes road safety practices and automobile driving skills for city roads.

Alcobooth's Breath Analysis:

A Breath analyser is a device for estimating blood alcohol content (BAC) from a breath sample.

Group SMS system:

Will help police personal and citizens to get alert ,warning and informative messages for safety .

Some of these initiatives are good platforms for further possible interventions.

Primary Research

I interviewed 10 people through *phone calls* and *in-person meets*. The aim was to understand how the general public handles an accident taking place in their vicinity.

Conducted a *google form survey* and 60 people responded. The questions were in similar lines to the interview structure. The aim was to reach out to a larger audience and compare their responses.

A disclaimer was provided in the beginning that the following questions and discussions about road accidents could lead to a trauma or PTSD response as it's a sensitive topic

The interview structure mainly consisted of five parts: Their understanding of RTAs; helping out as a bystander; experience with road accidents; testing misinformation; and preferred exposure to information when in the scene.

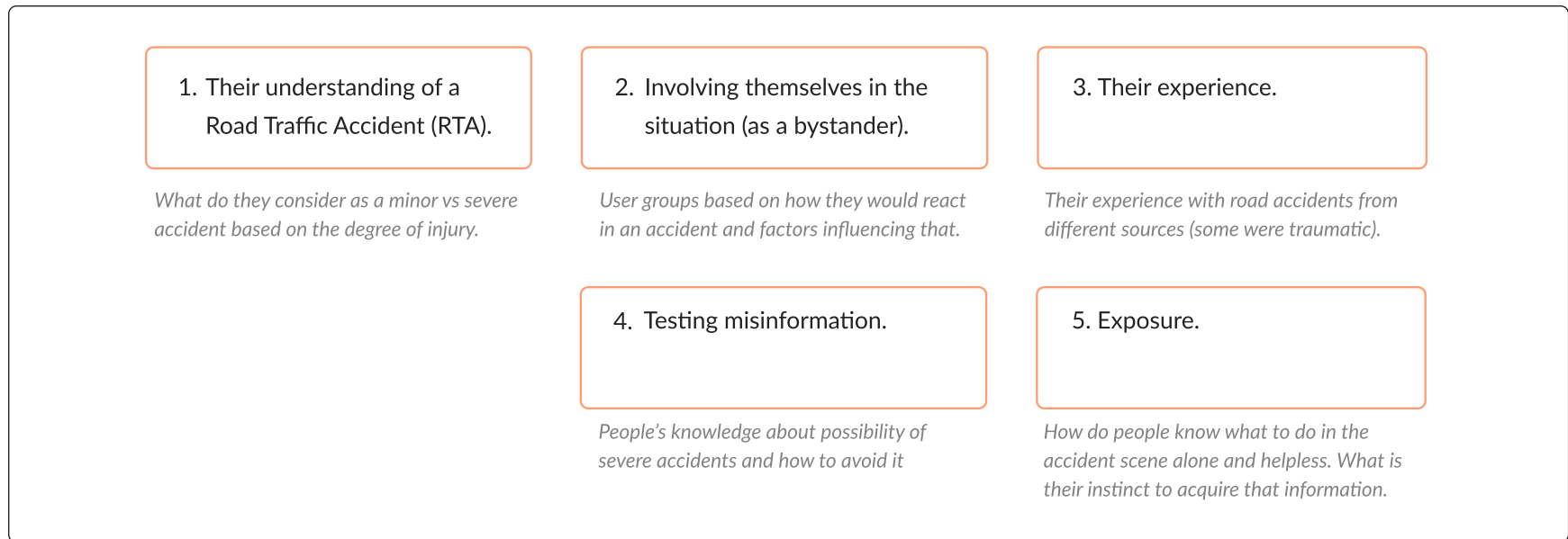


Figure: Interview Structure

Data Analysis

These were the main derivations:

1. Distinction between a minor and severe road accident.

Minor accidents are very common and don't lead to excessive consequences. Most people have witnessed minor road accidents here and there but they did not categorise them as an "accident" accident, which is when the differentiation between minor and severe accidents came up. Minor accidents are not really considered serious as external help is not always required.

Most people, thankfully, have not come across many severe accidents, but what are the factors that would categorise an accident as severe or severe enough for the general public to take notice. Many said that having a *noticeable injury or huge vehicle damage* was a key distinction.

2. The severity of an injury defines the extent of involvement from a bystander.

The range of injuries vary from a small cut to a complete bloodbath. After compiling and comparing their responses, based on the severity of the injury and the ideal immediate response, here are some distinctions and what degree of action needs to be taken:

a. *Slight injuries* that require immediate assistance like bleeding wounds, and cuts could be a minor accident as long as the wound is fixed through first aid knowledge.

b. Injuries like *sprain or fractures* are not necessarily fatal but require to be taken to a hospital for further care. Immediate assistance here would be identifying the fracture, assessing it, and stabilizing the situation.

c. *Fatal injuries*, which includes internal bleeding, would be a severe accident. These are particularly traumatic and need to be taken to the hospital immediately.

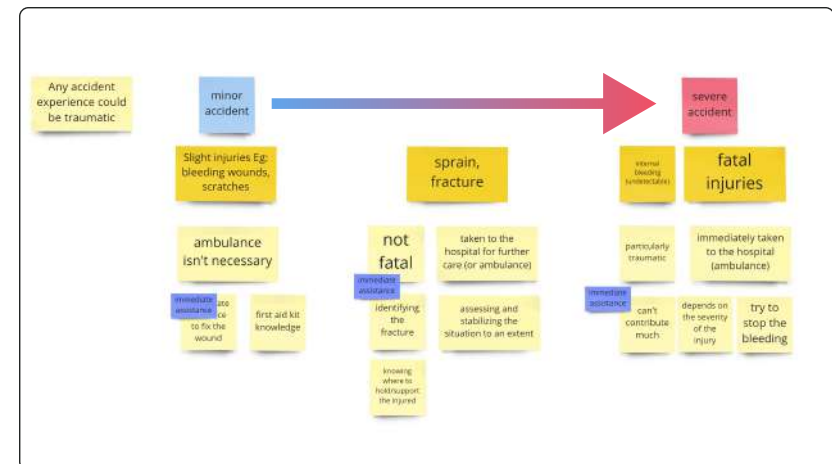


Figure: Degree of Injury from Minor to Fatal

3. Their involvement in the road accident scene

These people were into three user groups. The three deciding factors that set this distinction was:

Their existing knowledge about first-aid, excessive people involved in the scene, and distrust or unwillingness.

They are,

UG1: *Knows enough and is willing to contribute:*

They seem to know what they're doing so they will help out. They might attempt to lead the situation, in doing so, they could be silenced by others who think they know better, perhaps by older and more mature people. There is no proof of trust or knowledge from the bystander's side as they are dealing with human life.

UG2: *Doesn't know enough but wants to help:*

In case of too many people around the scene, they are likely to fall behind or not get involved entirely as they trust that others know better because they claim to. If they are alone, they would just do the basics, call an ambulance and make sure the injured is conscious enough by talking to them.

UG3: *Reluctant to be involved entirely:*

This user group finds crowds to be suffocating and choose to not get involved unless there is no other option. Their reasons for reluctancy could range from PTSD, distrust on themselves, dreading blood and gore scene, the chaos it creates, and so on. They are also likely to do the basics as it is known by everyone, till external help arrives.

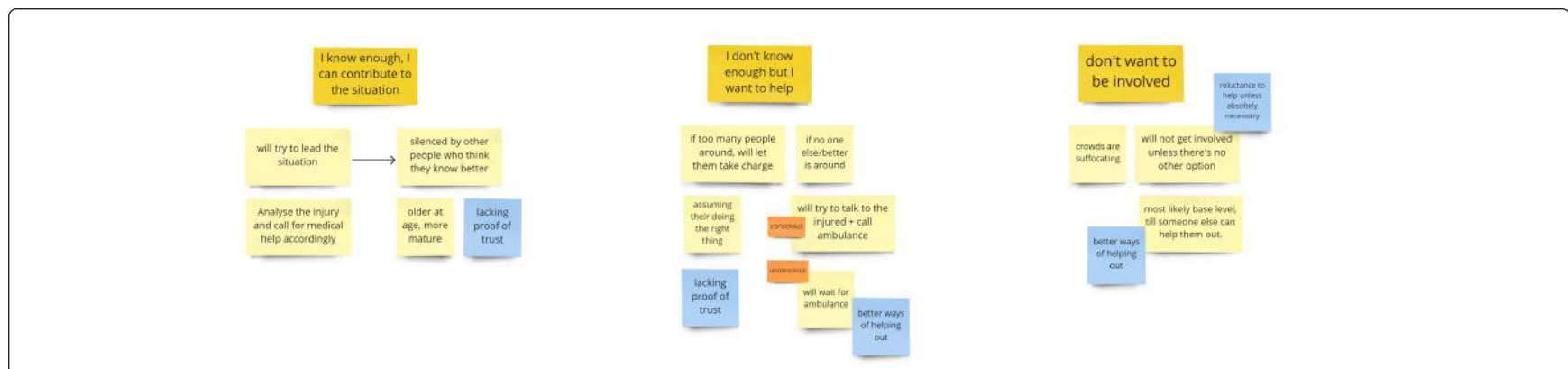


Figure: Categorization into User Groups

4. Emotions and thoughts in their previous experiences with road accidents (if any)

The accident experiences collected were overall from multiple perspectives: first-hand (involved in the scene), as the injured, as a bystander, and through word of mouth.

Some of their experiences, in a nutshell, were falling off a cycle, slipping while driving scooty, cars hit on a T-junction, car hitting a student etc.

In an attempt to understand the emotions and thoughts of the bystander and the injured in the scene, the underlying emotion for either was just scared. The victim is usually unaware and confused about the injury and their surroundings as their mind is still processing from the shock. “I didn't know what happened to my body and I was scared to find out, all I saw were a bunch of faces staring at me” They either have a response of “I'm okay”, “don't worry” or are overly cautious. From the Bystander's perspective, they are also scared but more mentally alert and sombre to help. A bystander usually asks questions while checking for consciousness and does basic necessities like providing shade, water and a pinch of moral support.



Figure: The accident scene from different perspectives

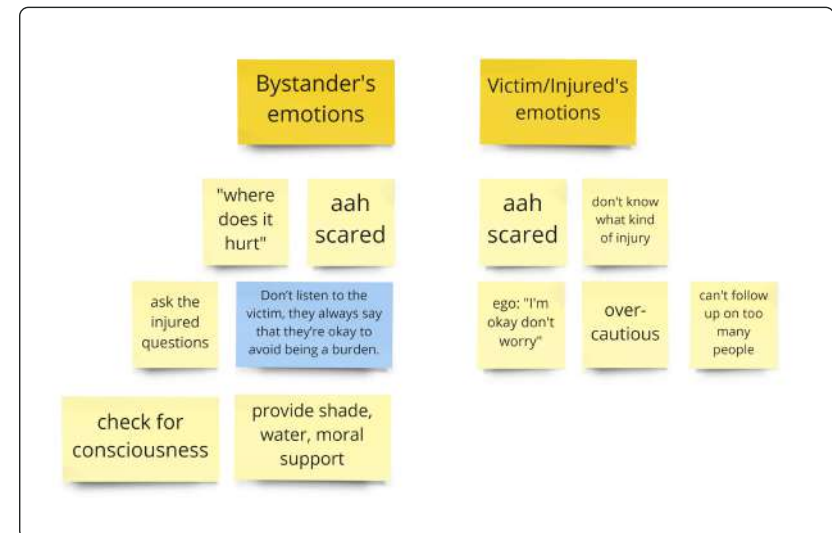


Figure: Emotions and Thoughts in the accident scene

5. First move when helping out in the accident scene.

When given a scenario of being alone in an accident scene and they didn't know what to do, what would be their immediate instinct to find out information to help out (after calling an ambulance). Most agreed that asking for professional help, calling a friend who has more knowledge about this and for moral support, stopping other vehicles because no one wants to be alone in that situation are some of their likely responses. Basically, in-person help was preferred, rather than following an instruction booklet

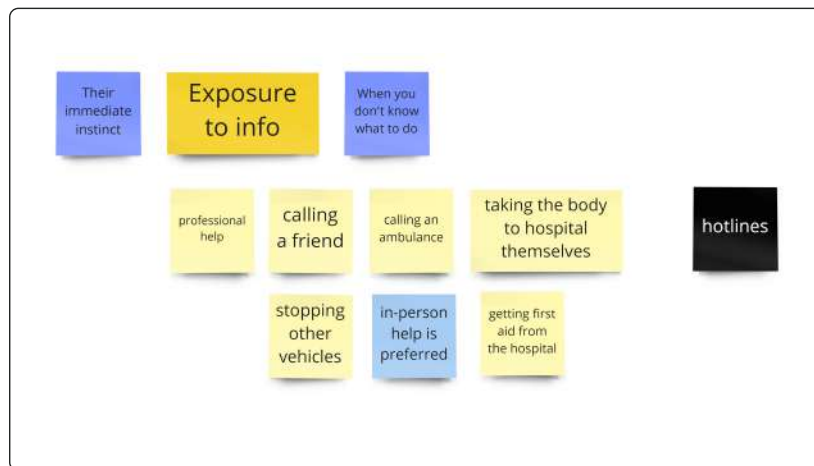


Figure: Immediate action in the action scene

Mappings

I created two flow charts to understand what happens immediately after a road accident, the decision delimma from the perspective of someone in a position to help.

The first diagram is based on the presence of an injury and the degree of the injury, which of these is a minor vs severe injury and what are they likely to ans should do.

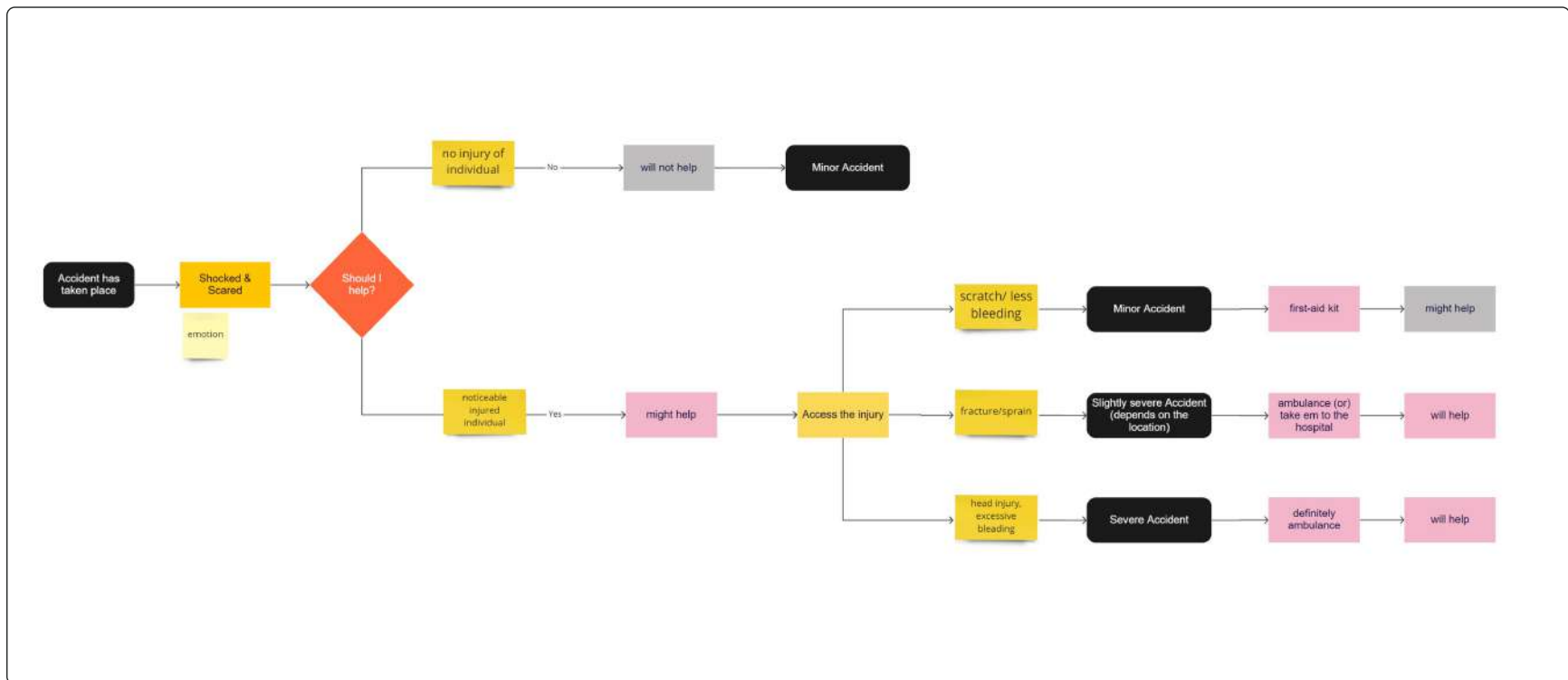


Figure: Flow diagram of accessing the injury

The second diagram follows a severe accident scenario and comparing the responses based on their willingness to help and circumstantial conditions.

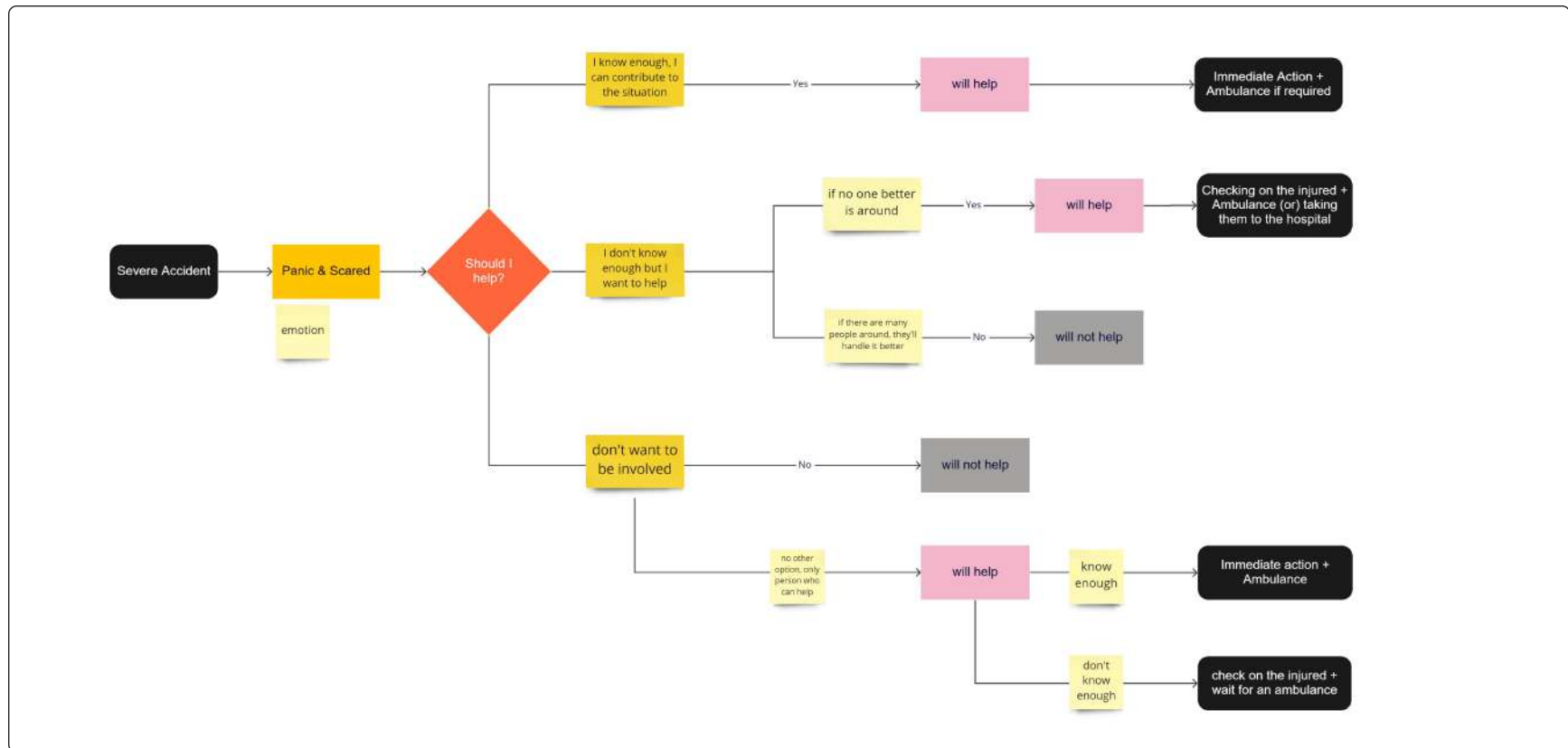


Figure: Flow diagram of the bystander accessing the accident and their willingness to help

Reviewing my initial outcome possibilities

Coming back to my possible outcomes that were discussed earlier, I tried reviewing which approach made more sense now.

Booklets in vehicles could still be an option but having a person/helper with proof of knowledge was considered ideal. (not sure how that's different from waiting for a paramedic)

Posters and signage in common areas may seem accessible as it can be present in multiple locations but as proven earlier, reading or consulting from an upright poster from a distance is not as simple as it seems.

Incorporating it in school level is a good option but it is already done to an extent as most people mentioned learning about road safety & first aid in school but they go blank about what to do when facing the accident situation.

When collaborating with a reliable public organization Eg: traffic police the trust factor remains but other factors like accessibility fall in short.

Having an emergency help app on phone was not as helpful as expected due to it's accessible nature. It is mentioned in market study that this approach falls short in areas where usability is concerned.

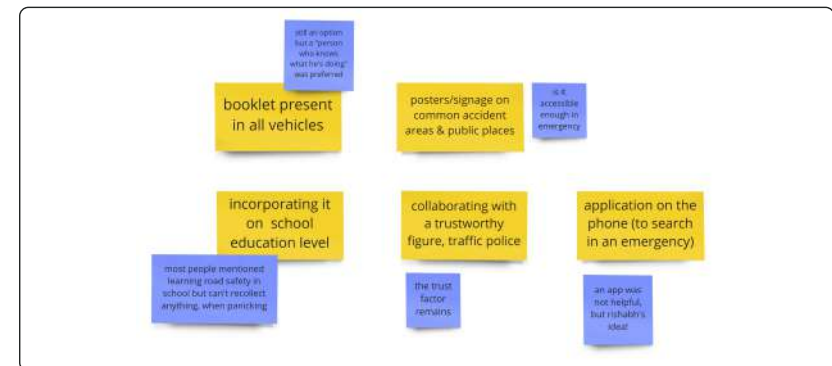


Figure: Analysing previous directions

Setting a Direction

Initial Explorations

Based on my initial brainstorming with the classified three user groups, I thought of some immediate ideas to their problems.

- For someone who *doesn't want to be involved*, the aim would be to encourage them. Most are willing to help and do their best if it's the last option which is great, but there are some who are knowledgeable about how to treat the injured but might be reluctant to help. Maybe a *reward system for helping out* or making sure to *aid their moral satisfaction* for doing the right thing could be a way to go.
- For people who *don't know how to help but are willing to*, providing them with *resources* when needed or being in the *presence of a helping, trusting and knowledgeable person* would be preferred as they can also provide *moral support* so the next time someone tries to help, they won't associate it with that much trauma. (Based on the people's responses and my speculation, I don't see how a paramedic is any different. One way to aid this is having mandatory first-aid training programs for general public)

- For people who know they can contribute enough, the key would be to give them some sort of *certification or tag for others to trust them* when helping out and it could even set a sense of hierarchy when there are too many people at the accident scene so that it doesn't get confusing as to whose instructions they should follow.

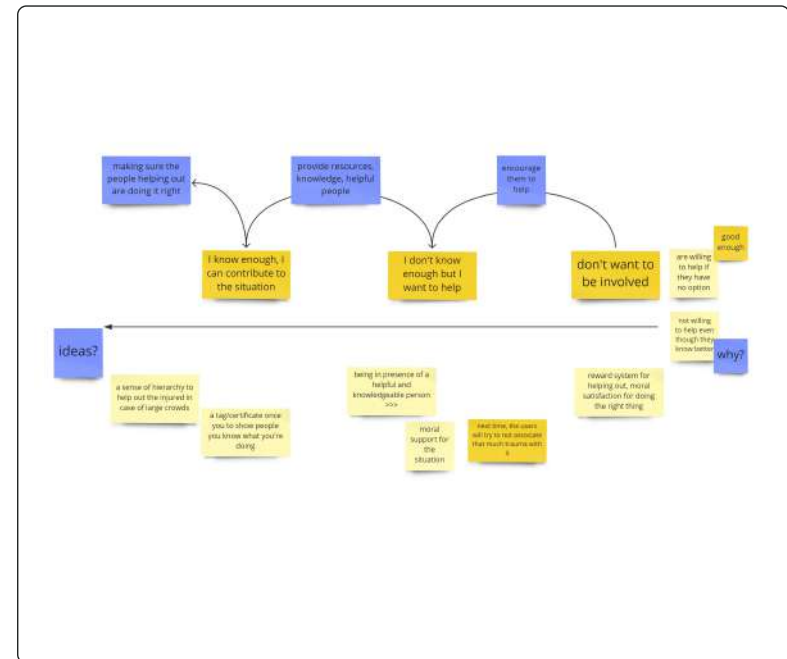


Figure: Brainstorming in setting a direction

Initial Design Brief:

To provide the common public (Non-medical Professionals) with a guide/resource to refer to when they encounter a road accident and take immediate action respectively.”

Issues with this approach:

After analysing some of the issues that kept coming up in the initial approach, I realised how a switch to a different direction could eliminate them all to an extent. Hence, my focus shifted from intervening during the accident scene to educating it on a school level.

In my initial design brief, there were two main points:

- having an intervention in the accident scene itself, and
- making sure the bystanders know how to help.

Most of the issues stemmed from the first point because of the simplicity of human nature. As soon as we are faced with a danger-inducing situation, our mind immediately goes to a fight or flight mode, due to our inherent animal instincts. In this case, most people would want to escape this situation, even though we're not directly in danger. In that process, panic settles into our minds and we tend to mess up even the simplest tasks like reading.

Perhaps people with a strong moral compass might forgo this issue but that's unlikely. When they don't know what to do, they're immediate instinct would be to look it up on the internet, likely from unreliable sources and would propagate misinformation.

This important information should be mandatory for people to know. Hence, learning this information should be a priority as it adds up to the goal of *knowing how to help*.

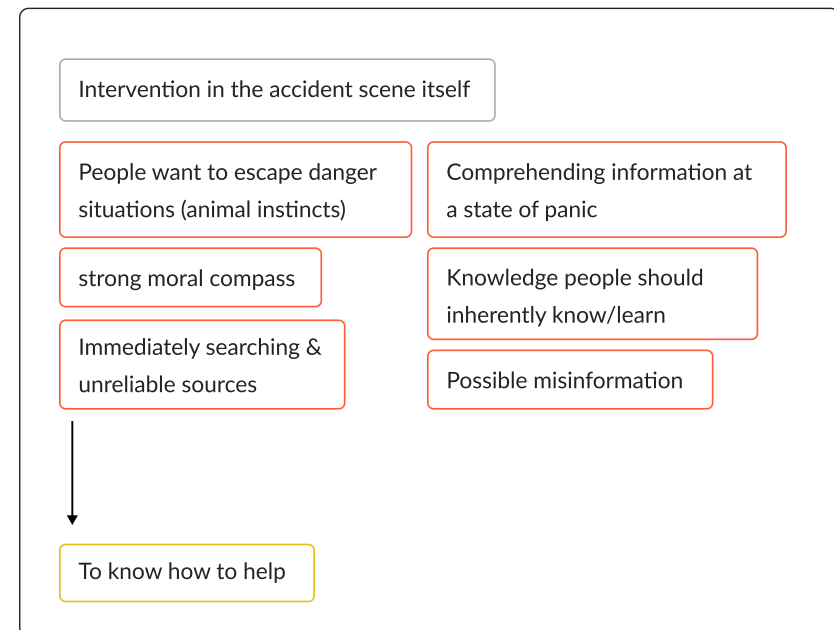


Figure: Intervention at the accident scene is a bad idea

Shifting to a New Direction

A suggested approach was to incorporate learning about Emergency First-aid and Road Safety, in *School Education* itself so the bystander's at the accident scene will inherently know the right procedure. That would lead to less panic and more level head to begin with, even though the anxiety of dealing with a dangerous situation would still be there.

It's the best way to make sure everyone learns this important information and since it's a part of school education, there's a high chance it getting imprinted in our brains as they'd be taught while our minds are still young and ready to grasp the right information, potentially eliminating misinformation.

How it's Taught in Schools

There are two major cons to this approach:

- It has already been implemented in schools and yet, we don't see a clear impact later on as a bystander.
- So far, the topics introduced are Road Safety and First-aid, separately. There has not been any intervention that specifically caters to post-crash emergency care.

The three common ways these topics have been introduced:

- Road safety chapters in high school curriculum and,
- Mandatory fire safety awareness, which also discusses emergency first aid.
- Event-based, Eg: First-Aid Programs like smile, red cross visiting local schools for a day and Road Safety Week.

Interventions for students were: school skits, nukkad natak, campaigns with slogans, talks from outside organizations, catchy songs, workshops, quiz & assignments. The ones who actively participated in these events remembered what they learned the best.



Figure: Introduced in the School Environment

Restated Design Brief

“To design a system for introducing “Post-Crash Emergency Care” into the school curriculum and to be taught in a way so that the bystander at the accident scene can easily recollect what needs to be done to ensure the injured’s wellbeing, till the paramedic arrives.”

The bystander should be able to retain information learned in school when at the accident scene, with the assumption that the bystander will help if they know how to.

Brainstormed some keywords for the curriculum:



Figure: Key-words for Ideation

Further Research

The goal is to understand the best way to present or learn information at the school level in order to have optimum retention as a bystander in a road accident.

Retention during the state of anxiety

When in the accident scene, the mind and body enter a more alert but stressed state as it is an emotionally arousing event (eg: he was startled by that car accident). The spectrum of emotional arousal of the bystander could range from having a clear head to slight confusion, and anxiety to extreme panic based on the injured's condition and external damage. Hence, the intensity of the psycho-emotional state is indirectly proportional to the likelihood of retaining learned information. It is easier to forget what you remember when in an anxious state.

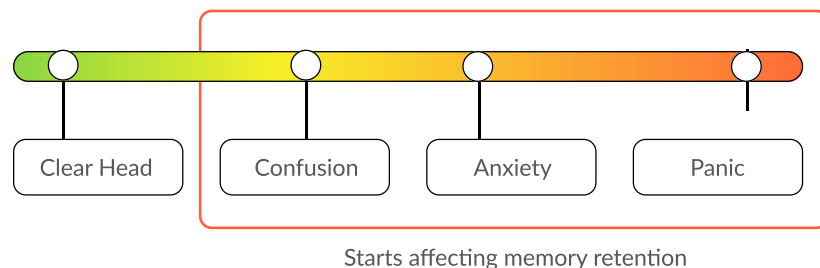


Figure: Spectrum of Emotional Arousal

Influence of Anxiety on Working Memory

When people experience anxiety, it impacts the performance of our working memory. Anxiety triggers our cortisol levels a.k.a the stress hormone which clouds our working memory making it hard to recollect recently learned or exposed information. This also justifies our reasoning for not having an intervention in the accident scene itself. Excessive anxiety would impact our working memory, therefore, not making us function properly as we would in a stable mind.

The bystander could be walking idly or driving a vehicle and could be one of the factors that affect the extent of recollection. Based on research about how anxiety and panic influence memory retention and loss, it was observed that when being idle with nothing in particular in mind, the bystander is unlikely to have good memory prior to or during the accident scene.

The key goal is to make sure that whatever is taught in school education has to be settled in long-term memory. But when recollecting information, it still goes through our working memory which is how our anxiety affects the retention process.

The intended approach should be to find ways for the retention process to be smooth, direct, and straightforward. It is to make sure we don't spend our time "thinking" about what to do a.k.a accessing the working memory for a long time. It needs to be taught in a way that sticks to our long term memory and can easily be retrieved

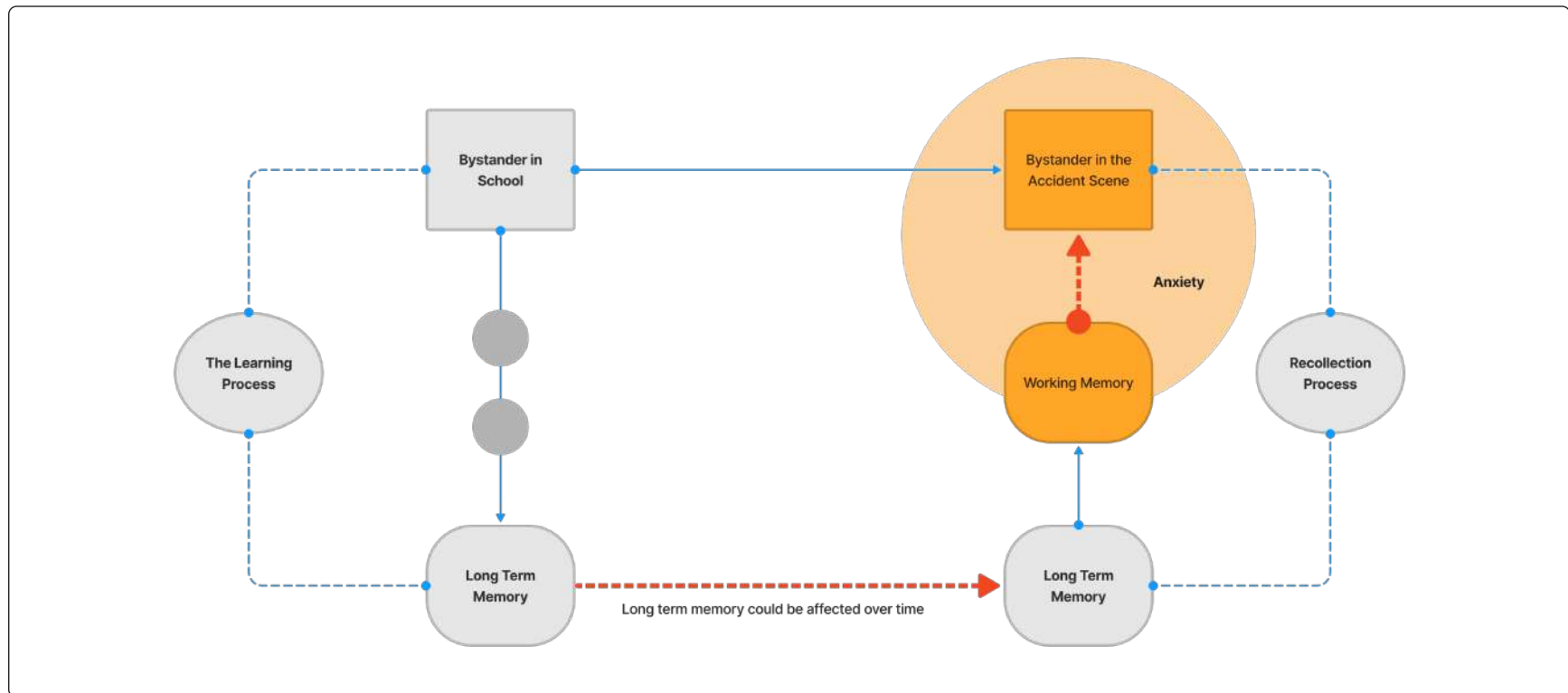


Figure: Anxiety affecting Working Memory at the Accident Scene

Ideation

Initial Inspiration

In an attempt to consider indirect instruction explorations, some of my initial inspiration for quirky ways to introduce road safety and first aid to the general public were pop culture references, creative visualizations and ads, etc.

There I was looking for factors that would spike interest and thought, looking for an unconventional approach yet relatable to the younger generation but it didn't sit right with me to have a system so out of line with the existing way it's taught. It would ignite curiosity in the beginning, but it would eventually fall into the same lines of curriculum-based direct instruction in the classroom.

I also realized that incorporating fun and interest shouldn't be the right goal. Accident Prevention and Basic First-Aid are important information to learn and deal with, hence, over time it would become mandatory to know. As long as the instruction system is designed to keep you attentive and engaged during class and teaches you to be alert no matter the accident situation, it would do the job and would also complement, not distract, the current education system.

Direct instruction in Classroom

When following our school education, direct instruction in the classroom is followed, which is a teacher-directed teaching method. The teacher stands in front of a classroom and presents the information to the students. The teacher also acts as a guide. So for a design intervention to take place, it should slide and fit in well with the current way it's taught w.r.t the classroom environment and the school schedules.

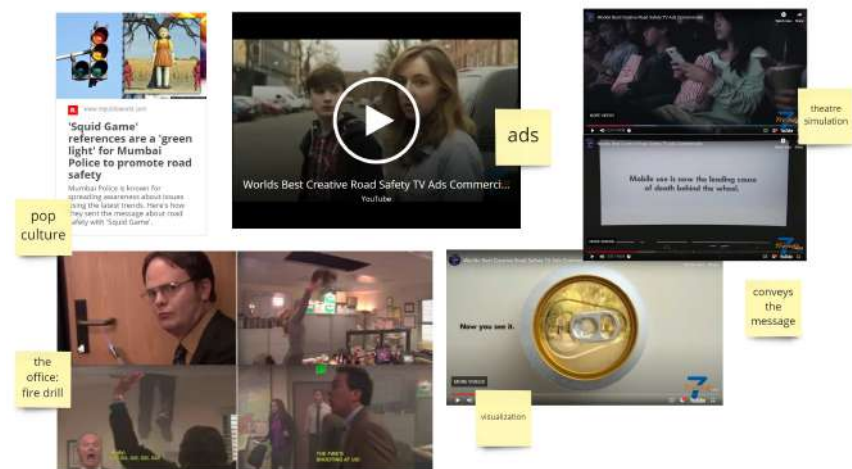


Figure: Inspiration Board for Indirect Intervention

Event-based (Eg: first-aid programs, road safety week)

These usually follow a dedicated few-days model (a week) which is short yet effective. This encourages involvement of students in their exercises and activities and nourishes constructivist learning. It is also successfully gaining their momentary interest as it comes across as an event to them. It is also an exciting addition and change to their schedules for school students.

Curriculum-based (Eg: road safety chapter)

The curriculum approach is not as random as event based, when learning something, the one key is consistency which this approach religiously follows. It also leads with a proper structure which has been followed for ages. Through curriculum based approach you can guarantee that there is uniformity in what is taught, for example, if you are willing to introduce a course through the curriculum, you can vouch for the course reaching to everybody. It's the choice if you wish to introduce mandatory course. There are also assignments, grades, tests etc for proper evaluation.

When comparing the two, they are both great in their own ways but maybe there is scope for creating a hybrid model out of the two, to take the best of both worlds.

Constructive Approach - Workshops

Initially I made a mistake of considering a behaviorist approach for teaching emergency response care by correlating the idea that the actions that need to be learnt would eventually translate into behaviours. My thought process of constantly comparing it with learning how to ride a bicycle, learning how to swim etc.

Constructivist approach for post-crash care makes more sense than behaviorist's as constructivism is all about experimentation and hands on learning i.e. what's been incorporated in workshops. It could be why, workshops don't last long but seem to be quite memorable. In constructivist classrooms, unlike the conventional lecturer, the teacher is a facilitator and a guide, who plans, organizes, guides, and provides directions to the learner.

Final Idea

Post Crash Care consists of both theoretical and practical content, so a way to go about it is to introduce a hybrid model. This would include the theoretical topics being taught as direct instruction while the practical topics could be taught as activities and exercises which is more hands on.

The intervention could happen in the classroom space or in case of dealing with a lot of students at once, a large assembly hall or the school ground. One condition is to make sure they can make space for the exercise.

Since the complexity of learning and implementing “post-crash care” range from intermediate to advanced, it would likely be introduced at the high school level (9th and 10th) along with the chapter on Road Safety by NCERT in the 9th standard. Incorporating this strategy would add one more week to the coursework.

The design output would focus on post-crash care. The idea is to incorporate a mock drill as an exercise - doing first aid yourself - booklet (one for a group). The main intervention is designing a system of conducting emergency first-aid practical activities in the classroom environment.

The practical sessions will consist of mock drills of a road accident situation and they would be conducted in groups, in their allotted period or in the afternoon-evening classes, once the theory learning for post-crash care is completed.

There is no equipment required other than a manual that would guide the students through these exercises, which is my design output. This exercise is meant to help students conduct a rapid assessment of the post-crash care system in their settings and conduct basic first aid accordingly.

Objectives

Role of lay bystanders - first responders

Those who are present or who arrive first at the scene of a crash can play an important role in various ways. They transition into “first responders” in the scene.

The first and most basic tier of a system can be established by teaching the common public about basic first aid techniques in school education itself. These “first responders” can be taught to recognize an emergency, call for help and provide treatment until formally trained healthcare personnel arrive to give additional care.

Possible scenarios

When at the accident scene, there are three main scenarios that a bystander could find themselves in when in a road accident:

- accident occurs with people around
- accident occurs when you’re alone (bystander)
- accident occurs and you’re the victim and alone

The number of people in the scene is deciding factor as it determines the surrounding and the amount of help you can receive. It’s always better to have people with you when in a danger-inducing situation.

These are the objectives of what a bystander (first responder) is expected to know i.e. the student learns by the end of the course:

1. Contacting the emergency services (ambulance 108), and calling for help.
2. Taking action to secure the scene: preventing further crashes, preventing harm to rescuers and bystanders, and controlling the crowd gathered at the scene, helping to put out any fire.
3. Organizing people and resources by regulating overcrowding and keeping others away from the injured so that you can help out properly. Organizing people into groups (one group for comforting the victims, their friends, and their relatives)(another group for transporting the patients and another group for actually administering the first aid)
4. Analysing the type of injury and applying first aid wherever necessary till the paramedic arrives.
5. Transporting the injured persons to a hospital if no ambulance is available.

Content Analysis

The *Decade of Action for Road Safety (2011–2020)* was established by UN General Assembly Resolution (2010) to accelerate coordinated international action aimed at reducing the number of deaths due to road traffic injuries. The 2030 Agenda for Sustainable Development has recently reiterated this priority by setting a target for **50% reduction in road traffic deaths and injuries by 2020**.

The Decade of Action provides a framework for key activities that governments, international agencies, civil society organizations and other stakeholders can use to guide their efforts to implement road safety policies and action plans that address the following five pillars:



Figure: Pillars of decade of action for Road Safety (2011-2020)

Pillar 5 concerns emergency post-crash response:

- to avoid preventable death and disability,
- to limit severity of the injury and suffering caused by it,
- to ensure the crash survivors' best possible recovery and reintegration into society.

Post-crash response seeks to set in place capacity for.

- immediate attention and stabilization on crash sites,
- appropriate transportation with a medically equipped vehicle to a medical facility,
- medical trauma care capacity at the hospital, and
- rehabilitation services as necessary and possible to permit a reintegration into active life.

Emergency care for injury is at the core of the post-crash response. Effective care of the injured requires a series of time-sensitive actions. But even the most sophisticated emergency care system is ineffective if bystanders fail to recognize a serious injury or do not know how to call for help.

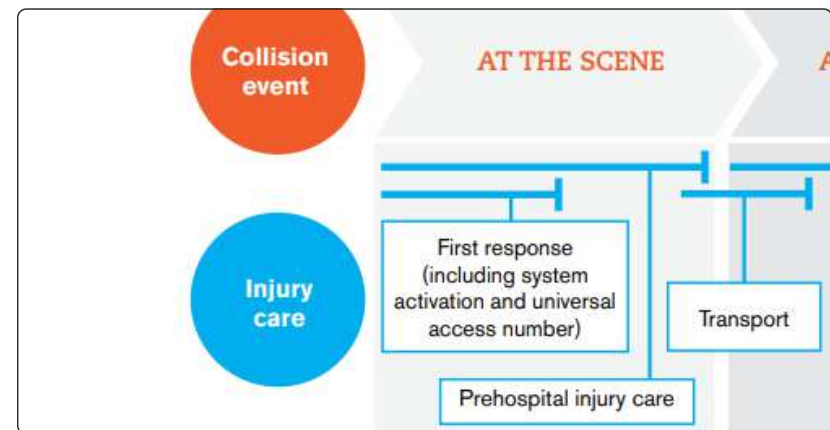


Figure: Key Components of Emergency Care at the Scene

First-Aid

These are some brief instructions from the Apollo website on how to access and help stabilize the condition of an injured person in a road accident.

Road Traffic accidents (RTAs) are as grim as any other medical emergency and one should know how to handle it.

The immediate step is to call a well-equipped ambulance. Once the ambulance arrives, the patient should be lifted upon a stretcher or stiff board. This is important as the lesser the movement, the lesser are the chances of worsening the injuries.

The ambulance team assesses the patient and commences appropriate resuscitative measures en-route. The Emergency Room is alerted at once to await the arrival of the injured patient.

- *If the victim is **breathing**, he can be placed on his back.*
- *If there is any **visible bleeding**, the area should be covered and pressed firmly.*
- *The victim shouldn't be given water or forced to sit.*
- *Don't move the victim by holding his hands and legs.*
- *Specific care should be taken to ensure that patient's neck doesn't move.*
- *In case of any **visible fracture/ deformity**, the area should be supported with a hard plate or board under the affected part and immobilized using a cloth or tape.*
- *If the victim is **not breathing**, then Cardiopulmonary resuscitation (CPR) is required. You can start CPR if you are trained in it.*
- *Ensure that the ambulance is on its way.*

Concept Detailing

Streamlining the Content

While the overall content is about Post-Crash Emergency Care, few of their topics with this area were delved into. The aim at the end was to create an information architecture for the output and within that, organizing respective information into maps, charts and diagrams for easy understanding.

I started with looking into the key elements of Post Crash Care from the WHO Booklet.

- Research and Information
- Legal support and Legislation
- Injury Care
- Mental Health Care

While all of these factors influence in management of Emergency Response System, based on the design brief, this project and the design output is only concerned with “Injury Care”, diving a little bit into “Mental Health Care” and “Research and Information”. These are the only areas where a bystander could have a role in the accident scene, rest all are for the professionals to handle their job.

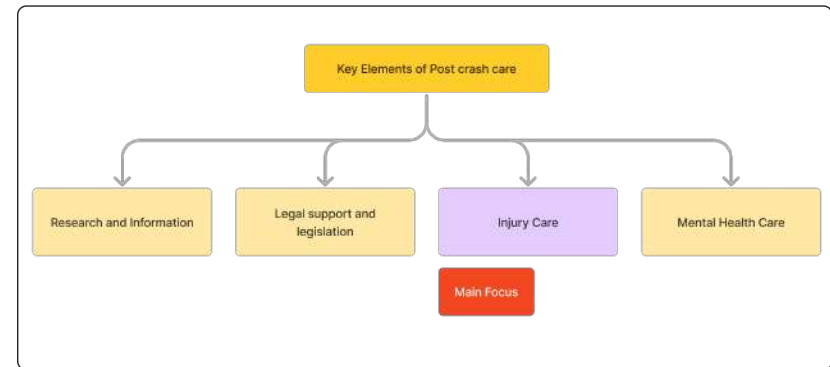


Figure: First Aid - Emergency Care

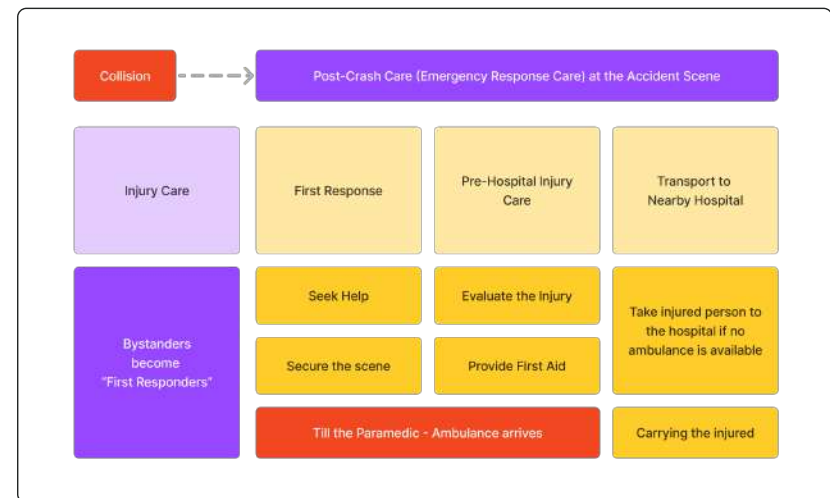


Figure: First Aid - Emergency Care

Injury Care while in the accident scene is divided into three parts: First Response, Pre-Hospital Injury Care and Transport.

The bystander's role within each category is:

- First Response: It involves making sure the accident scene is safe and calling for help.
- Pre-Hospital Care: it includes evaluating the condition of the injured person and provide first aid accordingly.
- Transport: if the ambulance is unavailable, the first responder is expected to take the injured to the hospital.

Theoretical vs Practical

In the next stage, I attempted to understand what parts of Post-Crash Care would be taught theoretically and what parts would be under practical exercise a.k.a the design output (booklet) is a guide for that.

It is easy to spot theoretical topics as most of them deal with “explanations” and “about first aid” etc instead of manuals and guides that are properly action-based. While dividing them I'm sure I didn't come across enough of them to create a structure for a chapter on Post Crash Care, which could've been an additional output. I divided them into two parts with different colors for easy understanding when required for reference and in the process covered most relevant areas with Post Crash Care.

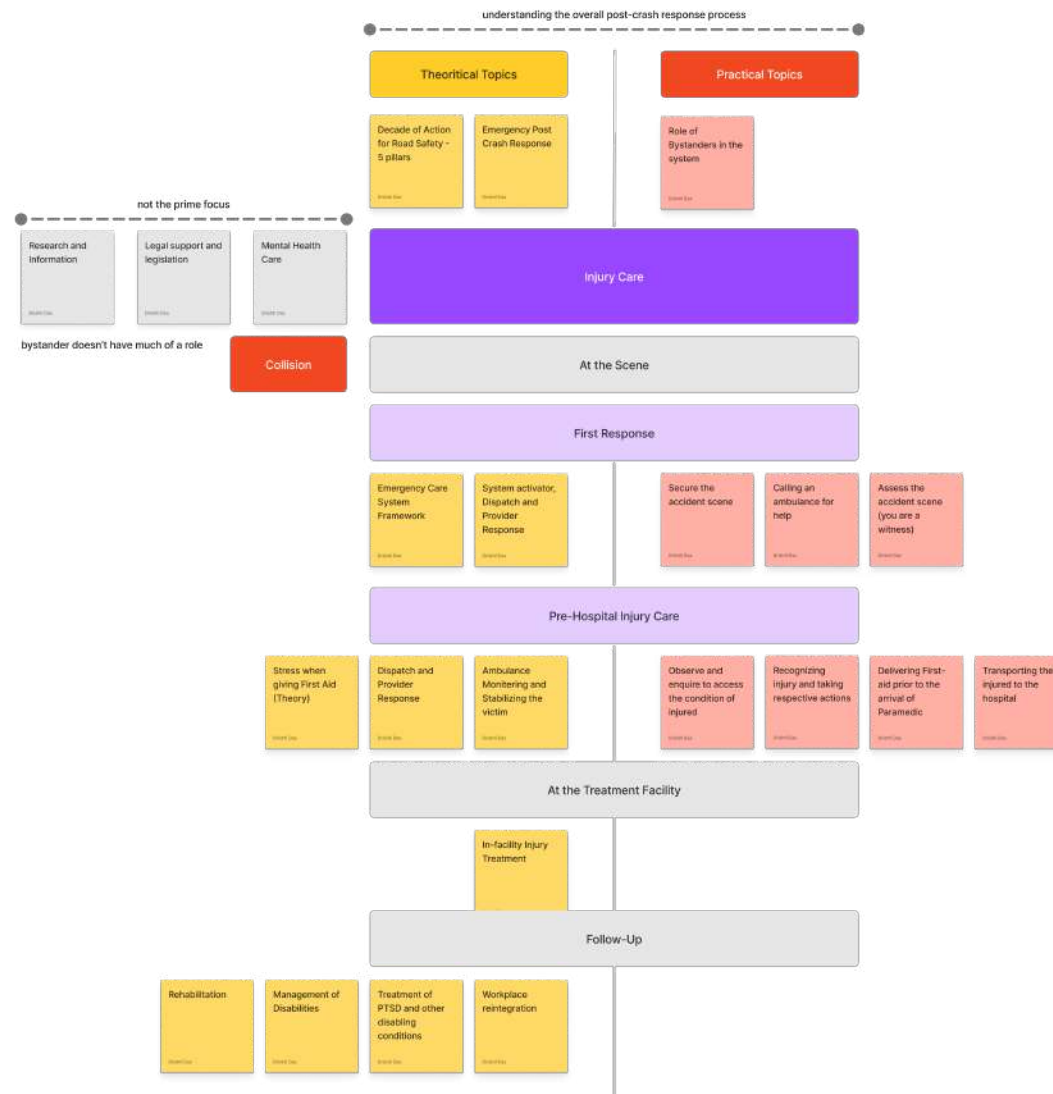


Figure: First Aid - Emergency Care

Running the Practical Exercise

1. Setting Learning Objectives

Using the Mager format of forming learning outcomes (condition - performance - criterion)

Since it is a group activity,

Given a mock road accident situation (condition), the learners must be able to judge the situation and perform the necessary “emergency care” actions (performance) in a step-by-step order without the reference manual, till the paramedic arrives i.e. within 15 mins (criterion).

This activities would be conducted once the theory learning of post-crash emergency care is completed, either during the class period or few days of afternoon-evening classes. There is no equipment as such for the exercise, except the manual. The final evaluation of their performance could be done in-person in the classroom or recorded for evaluation.

2. Learning Activities

The actions within the mock road-accident are the following and should be followed in the same order.

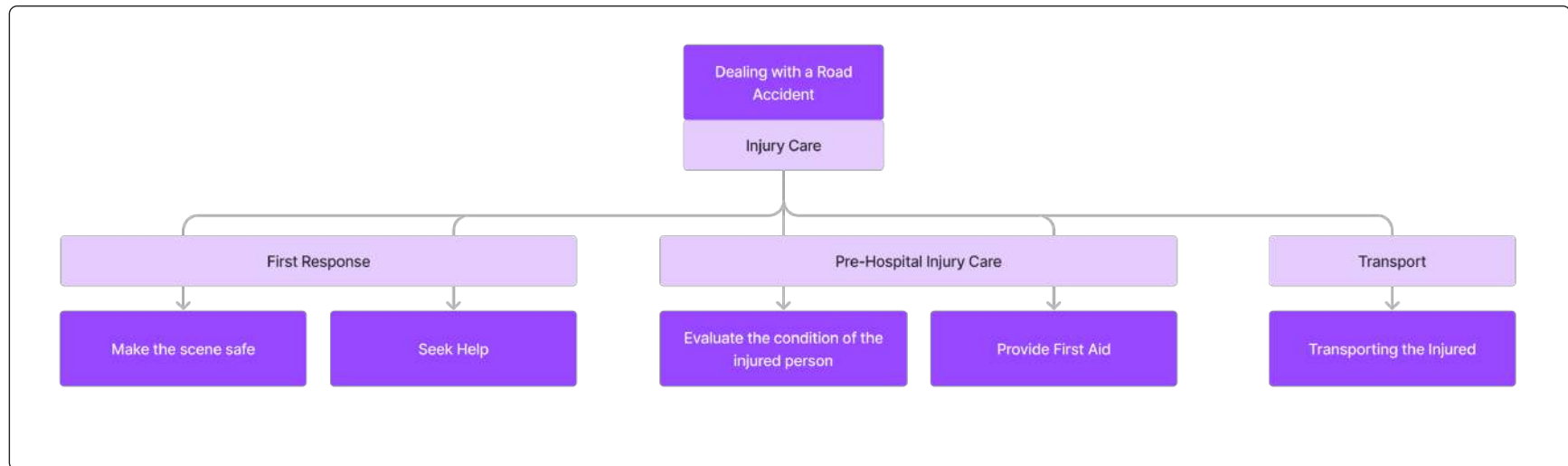


Figure: First Aid - Emergency Care

The Information architecture was created from a mix of content from different first aid websites. The structure could get more detailed and complex at the same time. When a new course is being introduced, you shouldn't expect it to be hard and complex or else not a lot of students will show interest in them.

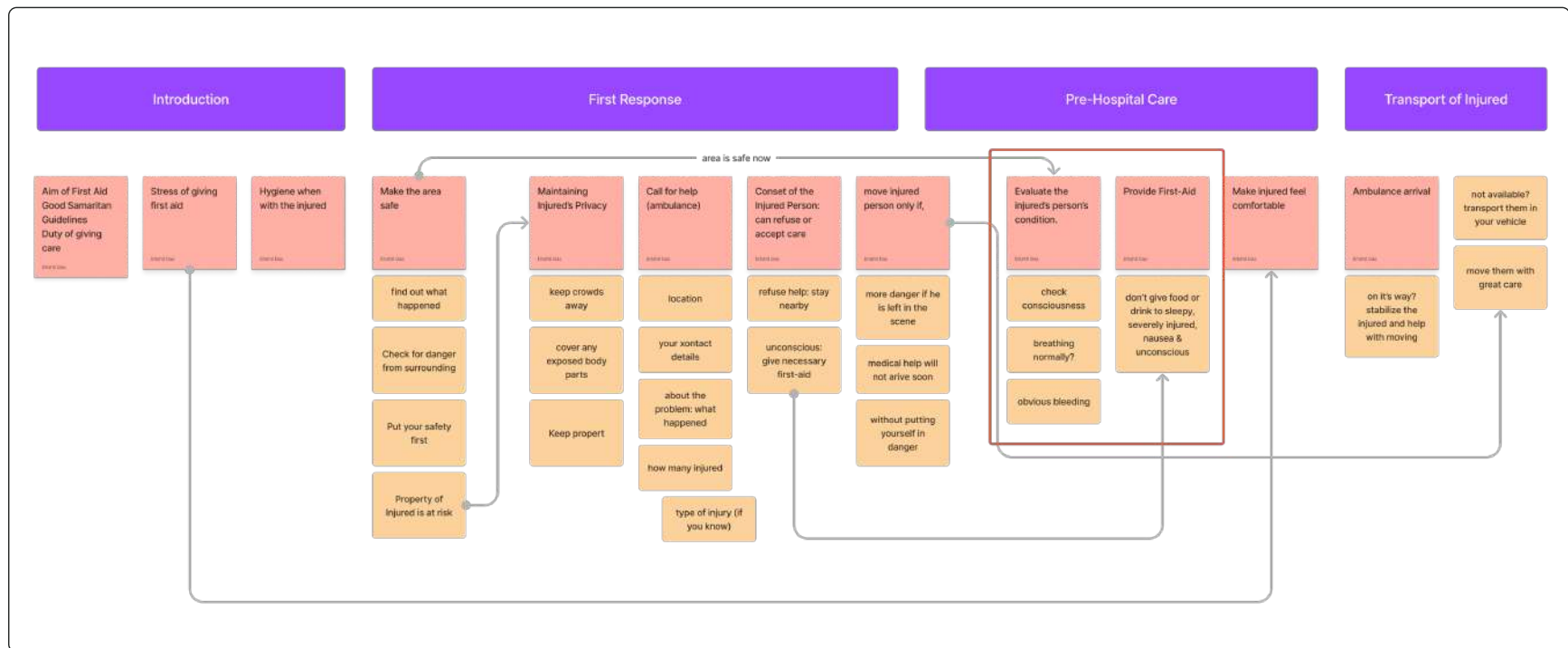


Figure: Information Architecture

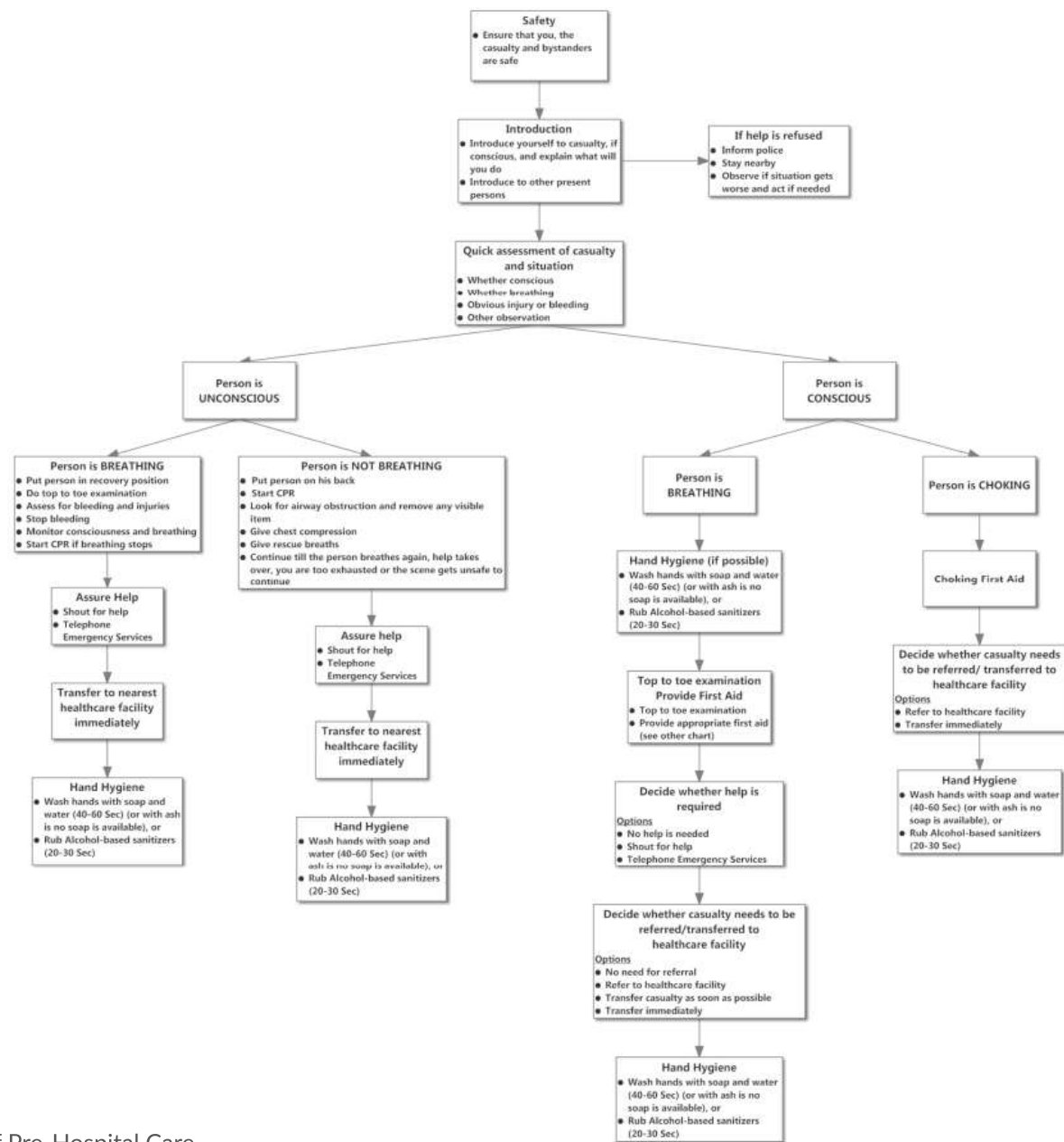


Figure: Close-up of Pre-Hospital Care

3. Managing the Learning/Activity Environment:

The set i.e. the area where the exercises take place will be determined by the school's convenience as long as it has enough open space for groups of five (ideally) to perform the mentioned activities. Although the preferred set would be an open hall or the open ground, but the classroom is also good.

As an overview in the beginning of the class,

- The exercise will be introduced by the teacher, who would act as your guide throughout the exercise. Your guide will keep engaging with the students (groups).
- The outline/structure of the exercise will be presented.
- To divide them into short manageable sections, here are the three main divisions:
 - a. First Response,
 - b. Pre-Hospital Injury care, and
 - c. Transport to nearby hospital.They will be introduced one after the other.
- The learning outcomes and evaluation criteria will be discussed with the students.

- All the students will be made aware of the general hygiene notes and safety rules when treating the injured.
- Once the day's activities are done, we reflect on the key learning points and summarize them.
- There will be no homeworks as such, the students are expected to take some time and go through the manual at home so that these actions come in flow the next time.

4. Four-step Approach

Around fifty percent of the class/session time is going to be allotted to this step: repetition strategy.

Step 1: Silent Demonstration (guide)

- The guide performs the actions in a flow, speaking only when needed. The learners focus purely on the physical movements of the task.

Step 2: Demonstration with explanation (guide)

- The actions are performed again by the guide, and the flow is broken down into stages and with a clear and concise explanation of what needs to be done at each stage.
- The guide highlights key points and exaggerates the actions and keeps checking that learners understand what they need to do at each stage.

Step 3: Learners talks through the flow(guide)

- The learner talks through the action's steps while the guide performs the task, articulating the process.
- This helps the learners to assimilate key components.

Step 4: Learner performs the task (student)

- The learner performs the actions and talks through what they are doing while the faculty observes, supports, and provides feedback.

5. Evaluation and Feedback

Once the theory and practical halves of the course is done, for the final evaluation, a group will be given a Road Accident Scenario (not task) and the group must complete all the required steps, all by themselves, without the reference material as reference, withing the timeframe of 15 mins or less. The final evaluation could be done in-person or recorded for evaluation.

The time, the difficulty and the duration of these exercises will change in the beginning of introducing this course as we would still be experimenting with the strategy.

Grades could be allotted but shouldn't be given as much priority. Although, other gamification strategies could be incorporated to make these exercises interesting, fun and competitive. (the exercise not the first-aid actions)

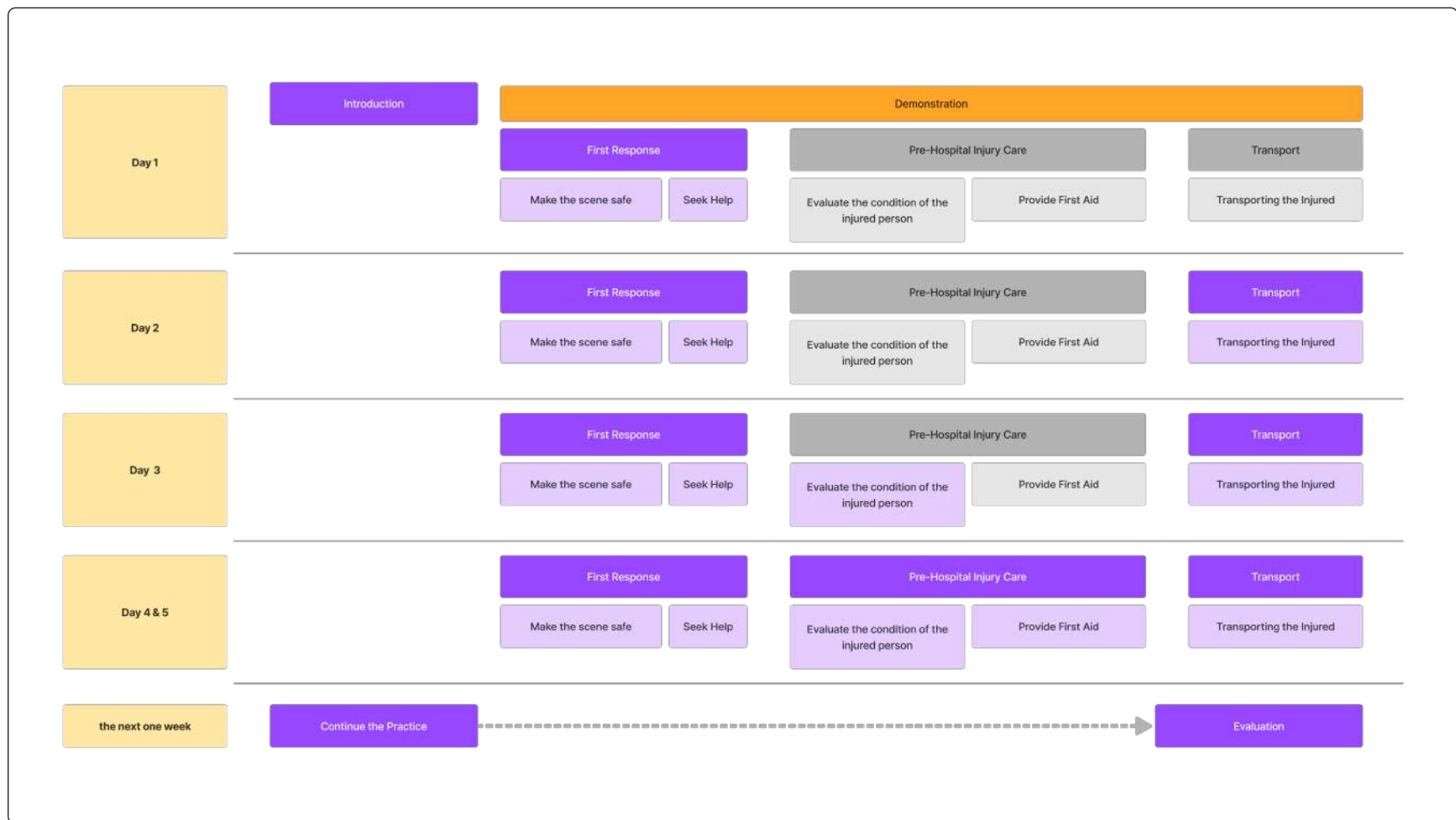


Figure: First Aid - Emergency Care

Design Output

Visual Elements

For the format and design of the manual, I wanted to make sure there was clear visual hierarchy for quick navigations. The instructions are in text with minimal use of first-aid illustrations, unless necessary. I made sure to not use the visual elements and the large text together as they would be too distracting and fight for attention. It's either this or that. There can only be one alpha and in this case I've chose huge block text because the instructions need to be conveyed in a split second and text is the eo do that.

I went with an A4 portrait for dimentions instead of square, which I was leaning towards, because these booklets wll likely be carried around with other school books and textbooks and all of them follow the classic A4 and A4 letter dimentions, convenience.

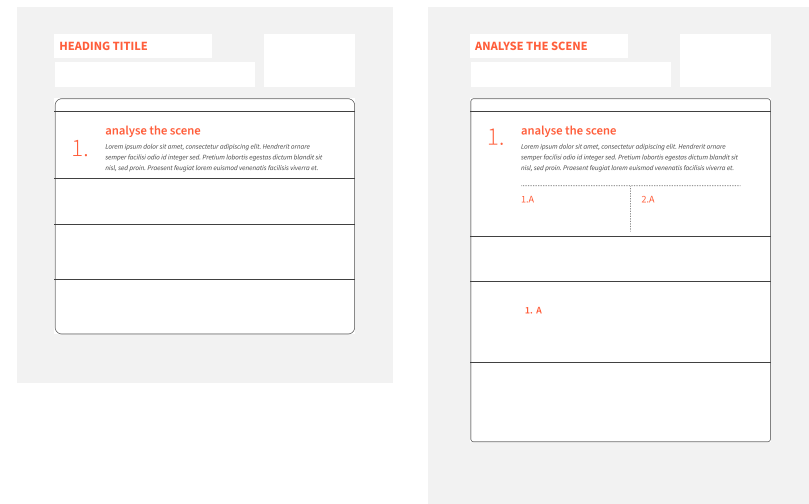


Figure: Layout Explorations

guide	
00	INTRODUCTION <i>Aim of First Aid</i> <i>Stress as the bystander</i> <i>Hygiene around the injured</i>
01	FIRST RESPONSE <i>Analyse the scene</i> <i>Maintain injured's privacy</i> <i>Call for Help</i> <i>Consent to accept care</i>
02	EVALUATE INJURED'S CONDITION <i>Basic Assessment</i> <i>Top to Toe Assessment</i> <i>Analyse the Injury</i> <i>APVU Scale: conscious & breathing</i>
03	PROVIDE FIRST AID <i>Choking First Aid</i> <i>Recovery Position</i> <i>Stop bleeding</i> <i>Fracture</i> <i>Burns</i> <i>Respiratory System</i> <i>Blood Circulation</i> <i>Wounds and Injuries</i> <i>Bones & Joints</i> <i>Heat exhaustion</i>

Figure: Contents Page

1.a. Analyse the Scene Aim: Make sure the scene and it's surroundings is safe before any attempts to help out the injured.	
1. find out what happened <i>Witness to the accident or not, if you're willing to help you must first know what just happened because accidents happen in the blink of eye</i>	
2. check for any danger <i>Is there a fire, threat from traffic, electricity cables etc? Yes?</i> 2.a put your safety first <i>Never approach the scene of an accident if you are putting yourself in danger.</i> <i>Seek police or emergency help if an accident scene is unsafe and you cannot offer help without putting yourself in danger.</i>	
3. warn the traffic <i>Place a warning sign (if possible) at a good distance from the accident.</i> <i>Do not forget to remove the warning signs afterwards.</i>	
4. stabilize the vehicle <i>Switch off the engine of every car involved in the accident.</i> <i>Try to apply the handbrake to prevent them from moving. You can also put something against the tyres to prevent rolling.</i>	
Next Step: Seek help from the police or emergency services	

Figure: Contents Page

The first page is the contents page where the numbers and the headings stand out. It isn't called contents because if you refer to this to find something within the manual, it becomes your guide.

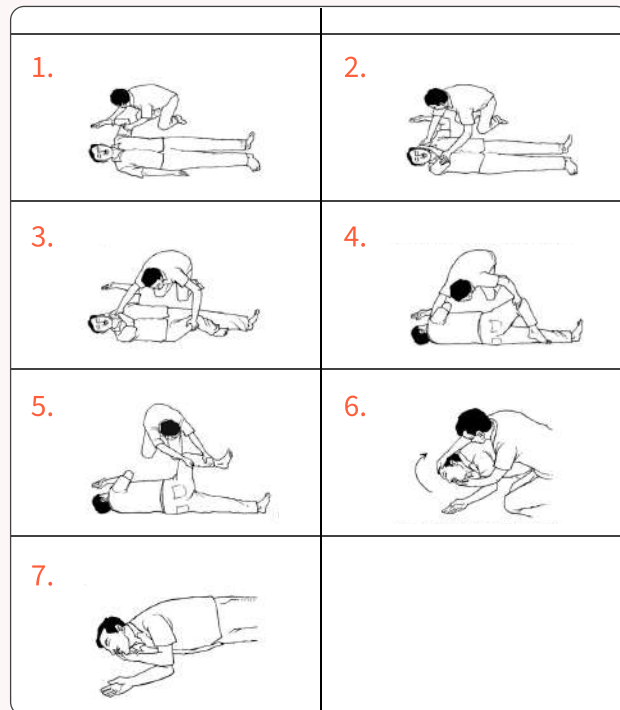
The next page is an action from "First respond" called analyse the scene. It gives you proper four steps instruction of what to do, along with a small explanation text block below that to read in order to understand the action and why it's taken, or, could lead to a decision and the action accordingly. The aim of the action is at the top with a small illustration of the person doing one of the points. This is the format followed for all the actions based on each task in the manual.

The third page called recovery position is a method of putting the unconscious in a recovery position. It comes under "Pre Hospital care". This is the format consisting of all visuals and no text to distract you from the illustrations and the action it conveys, except for numbers which enable you to follow the order. The actions in this convey what needs to be done, better than how it would have if it were full of text.

The last page is an example of that. It has the same information as the previous page but in all text and in detail, in case the visuals were hard to decipher. Some long series of instructions will be presented this way as well.

4.b. Recovery Position

Aim: Make sure the unconscious is well rested using the Recovery Position (through img.)



Next Step: Recovery Position instructions

4.b. Recovery Position

Instructions on how to put the unconscious well rested in a recovery position.



1. Put the person on the floor if he is not there already.
2. Remove the person's spectacles if necessary.
3. Kneel down by the side of the casualty.
4. Make sure both of his legs are outstretched.
5. Lay the person's other arm across his chest.
6. Hold the back of this hand against his cheek on the side at which you are kneeling.
7. Keep that hand in that position.
8. With your other free hand, grasp the leg on the other side of the person's body under the knee.
9. Raise that leg, but leave the person's foot on the ground.
10. Pull the raised leg towards you.
11. In the meantime, keep the back of the person's hand held against his cheek.
12. Roll the person towards you so he turns on his side.
13. Position the person's upper leg in such a way that his hip and knee are at right angles.
14. The person is now in a turned position and will not turn on his back.
15. Tilt the head of the person backwards to keep the airway open.
16. Make sure the mouth is angled towards the ground. This will prevent the risk of choking on blood or vomit.
17. Adjust the hand under the cheek if necessary so that the head remains tilted backwards and the mouth remains at a downward angle. A casualty lying position is commonly referred to in the 'recovery position'.
18. Do not leave a casualty alone and continue observing his condition and monitoring his breathing.

Next Step: Check for signs of internal bleeding

Figure: Recovery Position: all images

Figure: Recovery Position: all text

Evaluation of the System

These were the main derivations:

1. There is no proper way of evaluating this system from the changes in overall road safety statistics as it is quite far fetched. But there's a slight but good opportunity that if the expected outcome is reached, and similar courses like this is implemented in other schools and platform, that is likely to impact the fatalities in Road Accidents positively.

2. Rather immediate indications to judge the system are to look into the following factors in students while the exercises are conducted, in large scale, engagement, interest and learning factors based on their responses to the activity, along with the evaluation criterion could be considered.

3. The expected outcome from the school students learning this course is that the students should be able to do those tasks towards the end of the course, without the assistance of the manual. While that is likely, it is also likely that the outcome of the system turns out to be students relying more on the guide instead over time, which is the exact opposite, if that happens, the intervention has thus far failed.

4. Since there is no real feedback to the system so far, I would like to take it a step ahead and introduce this system to nearby schools and their principals, even approach a school curriculum board and hear their thoughts.

References

Feldman, R. (2018). Understanding Psychology (14th ed.). McGraw-Hill Education.

Park's Textbook Of Preventive And Social Medicine (26th ed.). (2022). Banarsidas Bhanot Publishers.

Red Cross Training & Certification, and Store. (2018). Red Cross. <https://www.redcross.org/take-a-class/first-aid/performing-first-aid/first-aid-steps>

Helpline numbers , social network , learnings. Indianhelpline.com - Helpline Numbers , Social Network , Learnings. (n.d.). Retrieved June 13, 2022, from <https://indianhelpline.com/>

Good Samaritan - Ministry of Road Transport and Highways. (n.d.). Retrieved June 12, 2022, from <https://morth.nic.in/good-samaritan>

Handling a road traffic accident. Apollo Hospitals. (2020, November 20). Retrieved June 13, 2022, from <https://www.apollohospitals.com/departments/emergency-trauma-care-services/identify-emergencies/handling-a-road-traffic-accident/>

First aid. Indian Red Cross Society. (n.d.). Retrieved June 13, 2022, from <https://indianredcross.org/ircs/program/FirstAid>

Initiatives: Mumbai traffic policemumbai traffic police. Mumbai Traffic Police. (n.d.). Retrieved June 13, 2022, from <https://trafficpolicemumbai.maharashtra.gov.in/initiatives/>

Activity-based teaching, student motivation and academic achievement - eric. (n.d.). Retrieved June 13, 2022, from <https://files.eric.ed.gov/fulltext/EJ1216784.pdf>

World Health Organization. (n.d.). Post-crash response: Supporting those affected by road traffic crashes. World Health Organization. Retrieved June 13, 2022, from <https://www.who.int/publications-detail-redirect/post-crash-response-supporting-those-affected-by-road-traffic-crashes>

Hammett, E., 1, emma on J., 7, E. H. on O., 12, emma on S., 5, E. H. on J., 5, emma on D., 8, E. H. on M., 16, E. H. on M., 5, E. H. on A., 30, E. H. on A., 24, E. H. on M., 28, E. H. on A., 28, E. H. on N., 7, E. H. on J., 27, E. H. on J., 20, E. H. on A., 19, E. H. on J., & *, N. (2021, October 20). Accidents on the road - how to help safely. First Aid for Life. Retrieved June 13, 2022, from <https://firstaidforlife.org.uk/accidents-road-help/>

Conclusion

plans

Final Thoughts

A helpline is a telephone service providing help with any kind of emergency and distress. The helpline numbers vary based on the type of problem and is active 24/7. This system is designed to be simple and straight-forward. The numbers are short and memorable with 3-4 digits and it connects us to professionals and trained individuals who can guide us through the situation till help arrives. The common ones are in-built into our phone. The ambulance arrives within 15-20 mins, as long as there is a paramedic facility in nearby areas.