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## Criterion A : Inquiring and Analysing

### Strand I : Explain and Justify the Need

#### Nature of the Problem

The technological age of the 21st century has led to the rise in the demand and supply of electronic components in the market. With newer and sophisticated technologies being innovated every year, the average lifespan of an electronic device has been shortened. This has led to the unsustainable disposal of old electronic devices, and this waste is known as E-waste.



#### Effects of the Problem

The technological age has had a lot of effect on the world we are currently residing in. With negative impacts on the world, we are going to discuss the effects of management of E-waste in an unsustainable manner. These practices are done on a huge scale and bring about great harm to the environment, human health and disrupts the natural balance. In 2016, 44.7 million metric tonnes of waste, approximately was generated globally. Going down this route, it is expected to increase to 50 million metric tonnes of waste by 2020. Few of the current effects of these problems are:

- 1) **Heavy Metal Presence:** Many electronic components like laptops and television sets contain harmful chemicals such as lead, cadmium and arsenic. The emissions of such chemicals can lead to the disruption of the environment and human health.<sup>1</sup>
- 2) **Heavy Metals Affecting our Health:** The harmful emissions can lead to various diseases in different body systems. Since, these chemicals can enter into the body by bio-acummulation, that travels up the food chain and also can enter via the respiratory tract, they cause different diseases like cardiovascular and pulmonary diseases.<sup>2</sup>

<sup>1</sup> Information taken from: <https://www.prb.org/e-waste/>

<sup>2</sup> Information taken from: <https://cleanlites.com/trashing-electronics-the-effects-of-e-waste-on-environment>

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- 3) **Contamination of Fertile Soil:** The introduction of harmful chemicals like hydrocarbons into the soil, is done by the incineration of the disposed waste items. This contamination of soil has led to serious problems in humans at many agricultural regions of China and also affected other species that were grazing from the contaminated land.<sup>3</sup>

## The Target Audience Affected by the Problem

The target audience for this website are the community organizations that are especially affected by this problem. Residential communities are stakeholders for the growing negative implications of E-waste. As average home-owners and people are engulfed with electronics and are the main target audience of technological companies, they are the lead contributors to E-waste (mentioned below). As a result, community organizations or resident welfare associations struggle to manage the E-waste output and completely get rid of them to maintain the cleanliness of the respective communities.

## Causes of the Problem

One of the main causes that leads to the growing problem of E-waste is faster replacement rates from old to new technological components. Due to constant innovations made in the technological industries, and new demands being created, such as smartwatches and wireless earbuds, different types of electronic components are being produced and manufactured to meet the newly created demand. In an economical point of view, this helps raise the profits gained by technological companies, but in an environmental perspective, it only raises the heaps and landfill sizes to accommodate the existing obsolete technologies. By attracting audiences with industry-trending innovations that aim to make lives easier and productive, consumers tend to shift to the new technologies, and this is exactly known as consumerism in marketplaces.

In addition to that, the spread of E-waste in common public places and landfills can be attributed to inefficient or no legislations on tackling E-wastes, and the track of a circular economy or informally called “closing the loop” is being taken up by the technological industries at a very slow or minimal rate. This slow rate of adapting to this practice and inefficient legislations drafted by many nations are other such reasons as well. Lastly, the awareness of the causalities of E-waste amongst the general public is low as well, contributing to this problem even further.

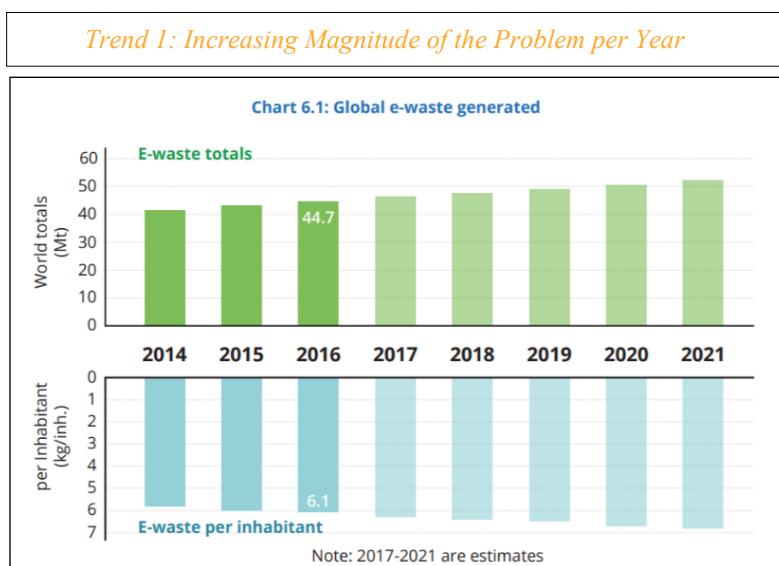
## Scope of the Problem

The scope of this problem is across the world, as the problem is prominent majorly in densely populated and modernized parts of the world. Knowing about the magnitude of the problem can give us an insight into the extent of the problems, as both of them are proportional. This is because, as the magnitude or the scope of the problem increases, the detrimental repercussions also increases in

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<sup>3</sup> Information from: [https://www.researchgate.net/publication/229077373\\_Soil\\_Contamination\\_due\\_to\\_E-Waste\\_Disposal\\_and\\_Recycling\\_Activities\\_A\\_Review\\_with\\_Special\\_Focus\\_on\\_China\\_1](https://www.researchgate.net/publication/229077373_Soil_Contamination_due_to_E-Waste_Disposal_and_Recycling_Activities_A_Review_with_Special_Focus_on_China_1)

different parts of the world. Here are few statistics and real-time data, that will help us gather this significant information:



increase of about 0.3- 0.5 kg/inh (kg per inhabitant) of E-waste produced. Due to this increase per inhabitant, it led to the production of 44.7 Mt of annual E-waste generation in 2016, which is almost 2 Mt higher than the E-waste produced in 2014.<sup>4</sup>

From the graph aside, we can infer and deduce the past scenarios and projected trends that predict the E-waste generated per inhabitant, and in total by the world. It is important to note that, this graph only shows real-time data from 2016, and the graphs from 2017 are projected trends. Firstly, there is a noticeable increase in the amount of E-waste generated annually from one year to another. If we take a look at the waste generated per inhabitant in the year 2014 until 2016, there is an

## Relation to Global Context: Globalisation and Sustainability

This year's global context is Globalisation and Sustainability, this project and its aims, results and research can inherently be a part of this global context. Globalisation is the connect and cooperation between different nations that can exist in an economic, social, political or in any other manner. Whereas, sustainability is the practice of extracting and consuming resources in a mindful manner that preserves them for the future generations of the humankind and other organisms as well. Now, let's connect this project and its topic to few of the global context's explorations:

**Markets, Commodities and Commercialisation:** The integration of regional markets with the help of globalisation has brought out connectivity and increased competition in the market place. Due to the increased competition, in context to the technological industries, there will be lower prices tagged for each company's products that attract potential consumers with lower prices. Lower prices and mass production of such technological components has led to more electronic components being purchased by consumers. In addition to that, the competition created in the market due to global connectivity, makes innovations a key factor and these innovations further attract people to purchase products. This is the main cause of the generation of E-waste across the world, as the life-cycles of obsolete technologies in the ever-growing marketplace makes it smaller. Commercialisation of marketplaces, where companies are only profit-centric are the other reasons behind the slow and

<sup>4</sup> Statistics Collected From: [https://collections.unu.edu/eserv/UNU:6341/Global-E-waste\\_Monitor\\_2017\\_electronic\\_single\\_pages.pdf](https://collections.unu.edu/eserv/UNU:6341/Global-E-waste_Monitor_2017_electronic_single_pages.pdf)

lacklustre approach in circular economies. Due to an inefficient approach of EPRs and its non-wide spread availability in many regions and mid-sized companies, commodities such as metals and other components like lithium-ion batteries, metal frames and computer processors aren't being recycled which could increase the sustainability in global marketplaces.

**Human Impact on the Environment:** The unsustainable utilisation and disposal of electronic waste items that have completed their lifecycles has led to severe negative human-induced impacts on the environment. The exposure of toxic elements such as lead, arsenic and cadmium that are present in the electronic components such as semi-conductors lead to the environment can disrupt natural processes such as crop growth and etc. Electronic components contain these heavy metals that interfere with the soil biota and exhibit their toxic effects on them. Due to this, the fertility of the soil is affected and its run-off to water bodies can lead to bioaccumulation of these heavy metals, that could kill various living organisms, destroying balance in the ecosystem. Therefore, due to this, there is a decrease in sustainability across many countries, mainly due to the disposal of E-waste and it's heavy metals inside them.

## Strand II: Identify and Prioritize the Research

In this strand, I shall identify and prioritize the topics to research based on its importance. In addition to that, by framing research questions for each topic to narrow the research which makes the research more focussed.

S.no	Research Question	Priority	Importance	Sources
1	How does E-waste affect the environment?	High	Analyzing its effects on the environment will help understand the magnitude of this problem.	Primary and Secondary Sources: Survey and
2	Which countries are the major contributors to E-waste?	Low	Finding the countries which generate the most amount of E-waste will help identify the sources of E-waste	Secondary Sources: Facts and Figures from Statistica
3	How does E-waste impact human health?	High	Understanding its negative impacts on human lifestyle can appeal to the client (companies) on the harmful materials they use.	Primary Sources: Interview
4	Analyze the legislations passed for E-waste management.	Medium	Interpreting the practices of E-waste management determines the extent of private firms in curbing E-waste.	Secondary Sources: National Legislations

5	What are the existing awareness campaigns dealing with E-waste?	Medium	Researching on the existing awareness drives on E-waste will help us see the participation by the public.	Secondary Sources: Campaign websites
6	What are the trends in the average lifecycles of the electronic components used by the target audiences across the world?	High	Researching on the lifecycles of the electronic components used by the target audiences gives a better idea about their replacement rates and their contribution to E-waste	Primary Sources & Secondary Sources: Survey and Global E-Waste Monitor report respectively
7	How do the target audiences discard E-waste, and what are the existing methods to discard them?	High	Analyzing the existing ways as to how E-waste is discarded or given away can determine the efficiency of existing	Primary Sources: Survey
8	How are E-wastes and obsolete products handled by workplaces and employees?	Low	Since technological companies such as Dell, Apple heavily rely on computers, laptops to carry out their daily tasks, it would give me an understanding as to how these companies handle obsolete products.	Primary Source: Email Interview

### **Primary Data Collection (1): Survey**

#### ***Research Questions Answered:***

- i) *What are the trends in the average lifecycles of the electronic components used by the target audiences?*
- ii) *How do the target audiences discard E-waste, and what are the existing methods to discard them?*
- iii) *How does E-waste affect the environment?*

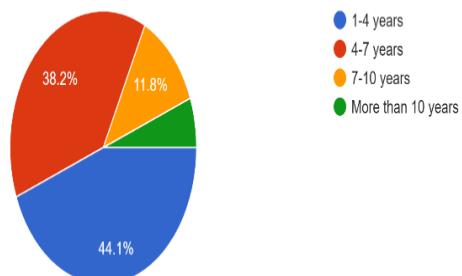
The survey was made in Google Forms<sup>5</sup>, and more than 30 people have answered the survey. With about 15 questions, the survey met two of my goals/objectives that was to collect information and test my target audiences regarding their existing knowledge on E-waste and its effects. In addition to that, the survey questions helped in gathering more perspectives, suggestions and opinions of the audiences, which will make my design idea a more approachable and based on these perspectives. Here is the information, I collected from the survey (Next Page):

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<sup>5</sup> Survey made using: <https://docs.google.com/forms>

What is the average life cycle of your electronic items (smartphones, tablets, and laptops)?

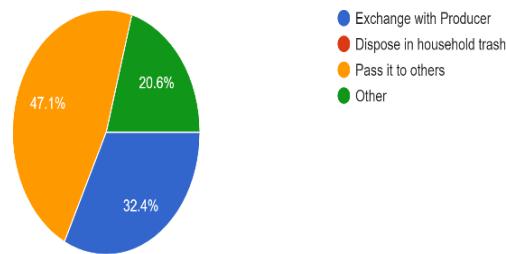
34 responses



Out of the 34 responses from my target audience that I collected, 44.1% or the majority of them use smartphones, tablets and laptops for 1-4 years. The other 38.2%, 11.8% and 5.9 % use them for 4-7 years, 11.8 years, and 7-10 years respectively. However, from this data, I can interpret that the majority of the target audiences' smartphones, tablets and laptops have a lifecycle of 1-4 years, after which they are replaced with new generation electronic products.

How do you dispose your old smartphones, tablets or laptops

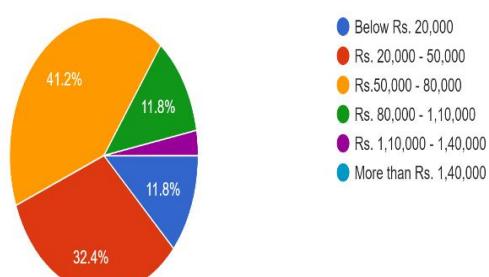
34 responses



From the responses for this question, I was surprised to see how majority of the electronic components of smartphones, laptops and tablets are passed on to others, which shows the reuse culture that is present amongst my target audience. However, only 32.4% of the target audience exchange with the producer with new generation electronic components. A reason for this can be because of the low exchange rates that are offered by the EPRs (Extended Producer Responsibility), and this is maybe why the target audience prefer to pass it to others.

What is the price range of the electronic items that you buy (smartphones, tablets and laptops)

34 responses



For this question, majority of my target audiences' electronic devices, that are smartphones, tablets and laptops belong in the price range of Rs.50,000- Rs.80,000 with 41.2% target audience paying this much. While the second highest price category was between Rs.20,000 -Rs.50,000, with 32.4% of the target audience buying electronic items from this range. If we make an inference from this, with the average of Rs.50,000 and Rs. 80,000 being Rs.65,000 and the majority of their lifecycles are from 1-4 years (from the above data). Therefore, the target audience pay about Rs.65,000 for at the maximum every 4 years to purchase one of these three electronic components.

(Refer to **Appendix C**, for more results gathered from the survey.)

## **Primary Data Collection (2) Interview #1- Email**

***Research Question Answered: How are E-wastes and obsolete products handled by workplaces and employees?***

After interviewing Ms. Sri Vaishnavi, I got an idea as to how workplaces and technological companies handle E-waste. She elucidated on the “temptation” to buy flagship electronic products in normal offices because of their speed and efficient handling of software programs. She also gave me

Regarding an Interview on E-waste [Inbox](#)

Respected Madam,

I am writing this mail to you to conduct an Email Interview, which is context to E-waste. This interview will help me a lot for my Design project.

The following are the interview questions, hope you can answer all of them:

- Q1) What is your general opinion on E-waste?
- Q2) What do you think are the causes of E-waste?
- Q3) As a former employee for a multinational IT company, what is your opinion on technological and IT companies playing a role in contributing to the growth of E-waste?
- Q4) Have you personally ever discarded any electronic items into the household trash can? If so, please name a few
- Q5) As an individual who's done her master's at computer science, what is your average replacement rates for the electronic items such as laptops?
- Q6) Since flagship models of laptops and convertibles are being launched every year, do you feel tempted enough to replace your obsolete electronic item for a better performance?
- Q7) Did your school/university provide you any electronic equipment for studying purposes? If so, were they obsolete or flagship models?
- Q8) As a former employee, do tech employees have a tendency to shift to new electronic products for better performance?
- Q9) From your point of view, what are the three most commonly replaced electronics?
- Q10) Did your previous employer have any E-waste management policies in place? If so, please elucidate
- Q11) What are your suggestions for an amateur web developer, who's building an awareness website for E-waste?

Hope I receive a quick reply!

Regards,  
Venkat Kandukuri

an insight into her previous employer's green initiative (Virtusa's Code Green) to dispose E-waste in a sustainable manner. Most significantly, she discusses about how MNCs (Multi National Companies) have the influence and role in the electronic markets, and the steps these MNCs take. (Refer to **Appendix E** for the Answers).

## **Primary Data Collection (3) : Interview #2**

**Research Question Answered: How does E-waste impact human health?**



By interviewing Dr.Prasad who is a veteran doctor and has specialised in MBBA and Diploma in Hospital Administration has had over 40 years experience in medicine. By conducting an interview, as to how toxic metals like cadmium, lead and arsenic corrupt the human system gave me a much deeper insight as to how human physiology is vulnerable to these hazardous metals. With several health cases that he has seen over the years of being a practitioner of medicine, heavy metals such as cadmium that are used in batteries and Printed Circuit Boards (PCBs), cause neurological and cardiovascular effects that reduce the chances of cellular regeneration, and inhibits protein synthesis, in which proteins are made

that are quintessential for the sustainable maintainance and growth of our body. (Refer to **Appendix D** for transcript).

## **Secondary Data Collection (1): Global E-waste Monitor<sup>6</sup>**

**Table 3.2: Smartphone life cycles by countries, in months, for 2013 - 2015**

	USA	China	EU5	France	Germany	Great Britain	Italy	Spain
2015	21.6	19.5	20.4	21.6	18.8	23.5	17.7	20.0
2014	20.9	21.8	19.5	19.4	18.2	22.0	18.7	18.2
2013	20.5	18.6	18.3	18.0	17.1	20.0	18.6	16.6

Source: Kantar World Panel 2016

**Research Question Answered: What are the trends in the average lifecycles of the electronic components used by the target audiences across the globe?**

<sup>6</sup> Tabular Data and Information taken from: [https://collections.unu.edu/eserv/UNU:6341/Global-E-waste\\_Monitor\\_2017\\_electronic\\_single\\_pages\\_.pdf](https://collections.unu.edu/eserv/UNU:6341/Global-E-waste_Monitor_2017_electronic_single_pages_.pdf)

After collecting information on my target audience and the average life cycle's through primary source (1), I realized that the data is insufficient as it only involves about only 30 people from my country, that is India. Due to this, I researched the global trends in different countries that can be seen from the above table, and if we analyze the trends of 2015, target audience from Germany, have the lowest smartphone lifecycles that are approximately 19 months or, 1 year 7 months which shows a trend of faster replacement in smartphones. Even in China, the replacement rates of smartphones are heavily high, and this is due to the economically priced smartphones by companies like Xiaomi, Oneplus and Huawei as China has a very competitive smartphone and other electronical product market.

## **Secondary Data Collection (2): E-BOOK<sup>7</sup>**

***Research Questions Answered: How does E-waste affect the environment?***

TABLE 1.2 Concentrations of pollutants near informal recycling sites in Guiyu, China (33–39)				
Contaminant	Air (ng m <sup>-3</sup> )	Sediments (mg kg <sup>-1</sup> )	Soil (mg kg <sup>-1</sup> )	Water (µg L <sup>-1</sup> )
Cadmium	7.3 <sup>a</sup> 7.3 <sup>b</sup>	N.d.–10.3	5.51–43 <sup>c</sup> N.d. <sup>d</sup>	0.073–0.362
Copper	483 <sup>a</sup> 126 <sup>b</sup>	17.0–4.5	1.374–14,253 <sup>e</sup> 29.5–42.7 <sup>d</sup>	5.92–67.3
Lead	444 <sup>a</sup> 392 <sup>b</sup>	28.6–590	856–7,038 <sup>e</sup> 80–93 <sup>d</sup>	1.33–2.24
Nickel	10 <sup>a</sup> 7.2 <sup>b</sup>	12.4–543	85–722 <sup>c</sup> 5.5–20 <sup>d</sup>	29.8–66.0
PAHs	40.0–347 <sup>a</sup> 22.7–263 <sup>b</sup>	0.1–0.51 0.24 <sup>d</sup>	0.593 <sup>e</sup> 1.0–3.2 <sup>c</sup> 0.09 <sup>d</sup>	
PCDD/Fs	0.065–2.77		0.013–0.090 <sup>f</sup> 0.004–0.01 <sup>g</sup>	
PBDD/Fs	0.008–0.46			

<sup>a</sup>Associated with total suspended particles  
<sup>b</sup>Associated with particulate matter with diameter less than 2.5 µm  
<sup>c</sup>At open burning site  
<sup>d</sup>At reservoir  
<sup>e</sup>In printer roller dump soils  
<sup>f</sup>At acid leaching facilities  
<sup>g</sup>At duck pond close to open burning site  
N.d.: Not detected

From this source, the author was able to identify the negative impacts that the E-waste has on the environment. Firstly, E-waste has a huge effect on MSW (Municipal Solid Wastes) landfills, as harmful chemicals such as lead, cadmium and nickel are present in electronic components such as cathode ray tubes, laptop screens and mobiles. Especially, landfills that aren't lead-lined, well managed and not modern face a huge risk of exposure to these toxic elements. Another impact on the environment is due to informal E-waste recycling and management.

The incineration and burning of electronic components for retrieving metals like copper and also dissolving circuit boards in acid, to extract gold from these boards. In this particular source, the author talks about heavy metal contamination in Guiyu, China as shown in the table above. Due to the presence of these heavy metals in water, life stages of fish, especially their larvae and eggs are the most affected due to these pollutants, causing an imbalance in the marine ecosystem. Heavy metals in soils also disrupt micro-organism life-cycles as well.

## **Secondary Data Collection(3): India's E-waste (Management) Laws, 2016<sup>8</sup>**

***Research Question Answered: Analyze the legislations passed for E-waste management***

India has a growing manufacturing and IT industry, sufficient and effective national legislations are required for the country to handle the tonnes of E-waste it generates annually. The E-waste (Management) Rules,2016 were published by the Government of India, in the Ministry of Environment, Forest and Climate Change. The laws are detailed and include taking specific actions

<sup>7</sup> E-book Taken from: <https://ebookcentral-proquest-com.library.britishcouncil.org.in:4443/lib/britishcouncilonline-ebooks/reader.action?docID=981726&ppg=22>

<sup>8</sup> Information Taken from: <http://greenegov.in/wp-content/uploads/2018/01/EWM-Rules-2016-english-23.03.2016.pdf>

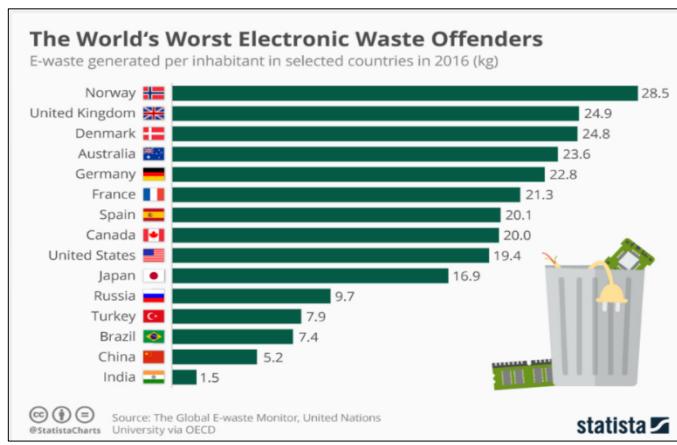
by citizens and manufacturers in the country. In chapter 2 of the laws, the government states the responsibilities of the manufacturer, producer, collection centers, dealers, refurbisher, consumer, dismantler, recycler and state government. The responsibilities of each of these roles differ, as the manufacturer must channel the E-waste generated during manufacturing to recyclers. The producers must implement EPRs (Extend Producer Responsibility) programs and collect the obsolete or unwanted E-waste and reuse the products. The collection centers must collect E-waste for the producers and manufacturers and also collect orphaned E-waste. In chapter 3 of the document, the government states the rules for applying for authorisation of running certified EPRs, and other grants to producers, manufacturers, recyclers and etc. Chapter 5 of the laws, ensures that the manufacturer mustn't incorporate any hazardous substances such as mercury, lead and cadmium that contaminates the environment.

Therefore, the E-waste (Management) Rules, 2016 are a set of rules that guides the producers, manufacturers and others in the chain, from the production of the electronic component to its recycling and disposal.

### **Secondary Data Collection (4):Statistica<sup>9</sup>**

***Research Question Answered: Analyze which countries are the major contributors to E-waste?***

It is vital for the analysis and inference of the highest source of generation of E-waste across the world. The graph below was created back in 2016, and gives us information on the types of countries such as LEDCs or MEDCs who produce more waste. Below are the statistics, with the analysis:



From the graph aside, we can infer data about the highest E-waste generators from selected countries, who are prominent in producing E-waste higher than the world average. In the graph, there is a noticeable trend that can be observed, which is important in analysing the scope of the problem in these countries. Out of the 15 countries in the list, 6 of them are European countries, in which Norway, United Kingdom and Denmark are in the top 3 of the

E-waste offenders list. Whereas, another trend is that the top 10 countries of the list are MEDCs (More Economically Developed Countries). Due to the higher per-capita income of these 10 countries, the purchase and shift to newer electronic products from obsolete ones is highly likely. This is one of the main causes of E-waste generation and increases the magnitude of the problem as there is a noticeable growth per inhabitant generation every year.

<sup>9</sup> Statistic Taken from: <https://www.statista.com/chart/17175/e-waste-generated-per-inhabitant-in-selected-countries/>

## **Secondary Data Collection (5): Greene**

**Research Question:** What are the existing awareness campaigns dealing with E-waste?

The Ministry of Electronics and Information Technology (MeitY) conducts awareness drives and programs across India. For example, E-waste awareness for public was conducted by showing an Ad film across all theatres in the country. The government also does skill and capacity building and produces “trainers” across the 29 states in the Indian subcontinent. These training programs include how to manage E-waste and etc. An example of such programs can be viewed in the picture below.

### **3 Day Training programme on E –Waste Awareness & Management**

March 5th, 2019

13 Mar 2019 - 15 Mar 2019

## **Strand III: Analyse a Range of Existing Products**

For managing and curbing E-waste effects on the environment, there were already existing products such as websites and apps. I analysed these products using the SWOT (Strength, Weakness, Opportunities and Threats) template.

### **Product 1: Erase E-waste app**

App information: <https://play.google.com/store/apps/details?id=zenviroindustries27.com&hl=en>

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"><li><input type="checkbox"/> The app has an easy to use interface that allows for simple navigation and greater user indulgence and learning about the problem.</li><li><input type="checkbox"/> The app facilitates door-to-door collection of E-waste and paper wastages, having a wider scope and a greater impact.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Not a widely used app and does not have cross platform accessibility, which means that it is only present on android phones.</li><li><input type="checkbox"/> Does not include any information on E-waste, management practices in the app.</li><li><input type="checkbox"/> The major drawback with this app is that it is location specific, causing the pick-up drives to only be focussed on particular regional places.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Increase awareness on E-waste drives and pickups as a plausible solution to solve E-waste.</li><li><input type="checkbox"/> Include general tips that can be performed by average individuals to manage E-waste efficiently.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Allows for direct contact between certified recycler and consumer, leading to flow of knowledge on how E-waste recycling and other aspects work.</li><li><input type="checkbox"/> The app allows for donation of obsolete electronic goods that is a much more accommodates another approach to tackle E-waste</li></ul>

### **Product 2: Greene Website**

Website: <http://greene.gov.in/>

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"><li><input type="checkbox"/> Supported by the government of India and is sponsored by various brands. The funding received can have a country-wide impact on the users.</li><li><input type="checkbox"/> Through the website, E-waste workshops and drives are conducted and users can participate in drives and programs</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> No information recorded on the hazardous effects of E-waste and its causes of generation in India.</li><li><input type="checkbox"/> Users visiting the website cannot access information or training given in workshops</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Increasing publicity of the website</li><li><input type="checkbox"/> Adding quiz-lets and information on the effects of E-waste</li><li><input type="checkbox"/> Include workshop videos for the users to access learning and conduct activities like in the workshop, at their homes.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Website contains sponsors and receives funding to conduct workshops, this increases credibility of website</li><li><input type="checkbox"/> Has a country-wide scope due to its influence in various cities and states</li><li><input type="checkbox"/> Includes gallery of pictures of events conducted and workshops.</li></ul>

## Product 3: Informational News Video by CBS This Morning

Video: <https://www.youtube.com/watch?v=UyIpG7UJKyI>

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"><li><input type="checkbox"/> Informs user about solutions, effects, causes and magnitude of the problem.</li><li><input type="checkbox"/> Includes interview and real-life footage adding credibility.</li><li><input type="checkbox"/> Information on E-waste generated by countries is provided.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> The video on YouTube does not include any further links in the description on solutions and reading material</li><li><input type="checkbox"/> Viewer doesn't get information on legislations and programs on E-waste</li><li><input type="checkbox"/> Video doesn't have any interactive elements, for which the user can know about other information as well.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Spreading awareness of the video</li><li><input type="checkbox"/> Including hyperlinks in the description for further reading on E-waste</li><li><input type="checkbox"/> Encouraging the user to join E-waste drives and programs</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> The news report has high credibility and has huge scope, as CBS is widespread in USA and the video will get more views due to the credibility of the news organization.</li><li><input type="checkbox"/> The video includes expert opinion and interview of editor of Cnet, adding more primary information</li></ul>

## Product 3: E-waste Information Pamphlet

Pamphlet: <https://vmc.gov.in/pdf/e-wasteinformationpamphlet02252016102229216.pdf>

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"><li><input type="checkbox"/> Provides basic information on various topics such as its definition, laws, why is it harmful and etc.</li><li><input type="checkbox"/> Gives additional information on the E-waste 2011 law and lists all the devices that come under each E-waste category.</li><li><input type="checkbox"/> The pamphlet targets regional audience as it includes the same information in regional languages.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> The pamphlet is constricted to the information present in it and the information can provide limited understanding to the user.</li><li><input type="checkbox"/> It is an old pamphlet that talks about 2011 E-waste law, whereas there has been an amendment to the same law in 2016. Therefore, information not updated</li><li><input type="checkbox"/> Pamphlet is not interactive in any manner, having an insignificant impact on the user.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Adding further information like blogs and articles to widen user's perspective.</li><li><input type="checkbox"/> Adding a statistics section to make aware the user of the present scenario of E-waste.</li><li><input type="checkbox"/> Include pictures that contribute to greater understanding by the target user on E-waste.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> The pamphlet is made in accordance with a state government in India, giving the pamphlet greater credibility.</li><li><input type="checkbox"/> Due to wide-spread offices of Gujarat Pollution Board, the audience can receive first-hand information regarding E-waste from government officials.</li></ul>

## Strand IV: Develop a Design Brief

After conducting a diverse and rigorous research through primary and secondary data collection, I have collected information on E-waste laws in India, highest contributors of E-waste, E-waste disposal and policies in workplaces and its impact on human health. This array of information has given me an informational standpoint and I felt the emergency of spreading awareness in the general public to overcome this problem. In order to determine the best platform for spreading awareness, I have conducted a SWOT analysis test that scrutinized the strengths, weaknesses, opportunities and threats of existing objects. This test has given me an insight into the weaknesses in existing products, that I can capitalise on, borrow strengths from existing products to make my design product an efficient, well-rounded and informative to genuinely solve the ever growing issue of E-waste. Also, by understanding scope, causality, audience affected by the problem in strand I, I was able to understand the fundamentals of this human-induced issue.

I believe that a core weakness that was observed across all the above existing products was the absence of breadth of information, that is vital in providing details on multiple aspects of a particular

issue. In addition to that, the Erase E-waste app is location specific and doesn't have a wide spread influence on the target users. There is no interactivity present in pamphlets and videos too.

To overcome these existing weaknesses and amalgamate and borrow strengths from the products above, I decided to use a digital media platform that allows for the following advantages:

- Interconnectedness through internet and digital devices allows for viewing the product by multitudinous people.
- Higher interactivity and navigation can lead to quality user experience, thus impacting the user even further.

## Criteria B: Developing Ideas

### Strand I: Develop a Design Specification

For this strand, I developed a design specification that would help me analyse on how to build a website and what to include in it.

Specifications	Detailed Explanation
<b>Customer</b>	The target audience of this website will be the community residents' welfare organizations who have a difficult time in coping with the disposal of E-waste in an unsustainable manner.
<b>Visual Appeal</b>	The background image that will be used throughout the website must have a resolution of 1500 x 1000 resolution for having a greater visual appeal to the user. All the pictures must be clearly visible and non-blurred.
<b>Aesthetics</b>	The product should be a dynamic website, with an attractive colour scheme, where the colours are complimentary to each other. Also, for the visual appeal, appropriate languages like CSS will be used to improve the visual appeal of the website.
<b>Content</b>	The website must give a breadth of information to the target user to obtain decent knowledge on this growing problem. For this, the website will include- Basic information on E-waste and its causes; Tips to manage E-waste for the general public; Blogs and Articles on E-waste to provide multiple perspectives; information on drives and programs for the user to participate and receive first hand information.
<b>Hosting and Publishing Cost</b>	The cost can vary from Rs.500 to Rs.1000 as it requires money to upload the website onto the website host.
<b>Availability</b>	The intended audience are the people in demographics of 10-75, as mentioned before. However, this website will be available to everyone as it won't be location-specific and can be accessible from all around the world.
<b>Simplicity</b>	The website should have a simple UI (User Interface) to provide a better User Experience (UX). The dynamic website should include easy-to-access tabs to various sorts of information.

<b>Ease of Navigation</b>	The website should be easy to use, this should be done by using credible and latest coding languages, as they are less prone to glitching/ hanging that can affect the UX of the website.
<b>Load Time</b>	The load time must take less than 4 seconds for initially loading the website. However for intra-website navigation, it must take less than 2 seconds to load respective web-pages. This must be the expected result when a user has a decent internet speed to load these web-pages quickly.
<b>Browser Capabilities</b>	The website must run smoothly in Google Chrome and the new Microsoft Edge, considering both these web engines are built on the same Chromium platform.

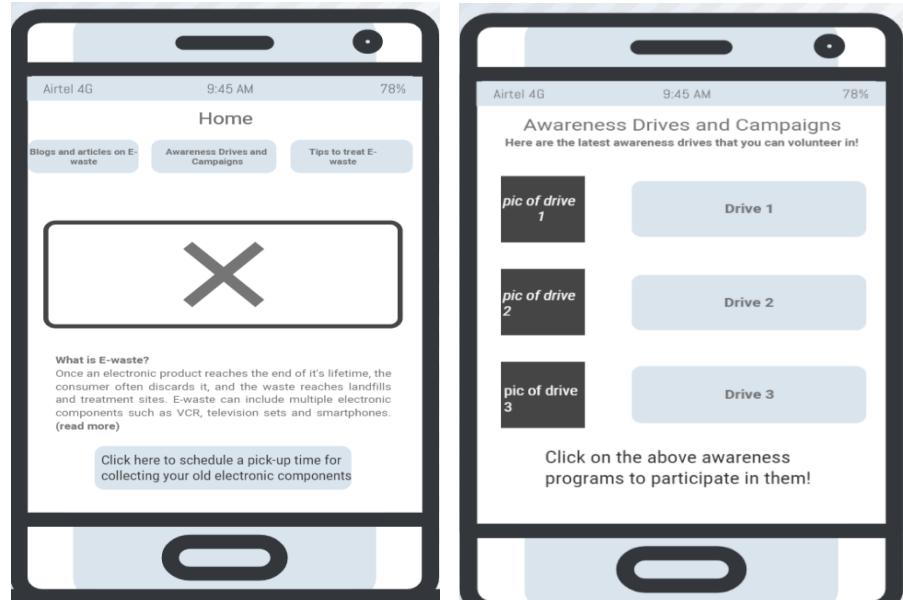
## Strand II: Design Solutions

After creating a general design specification, it was imperative for me to brainstorm design solutions or media platforms that would be the most effective in teaching the target audience about E-waste, its impacts on the global community ;managing E-waste ;drives and programs; and blogs and articles to show different perspectives, methodologies and potential voluntary works that my target audience can view and participate to get a greater understanding on the topic.

While brainstorming for the design solutions, I evaluated the design idea with its extent of compliance with the design specification and self-evaluated each media platform. By awarding a maximum of 5, and a minimum of 1 in evaluation, I believe the chosen design solution will be effective and practical in solving the growing issue of E-waste, and fulfill all the design specifications.

### Design #1: Mobile App

The intial idea was to develop a mobile application and include all the aspects such as awareness campaigns, tips, blogs and feature to schedule pick-up times. The mobile app can also include other vital elements such as notifications, that can notify the users about instantly regarding any major updates and events for first-hand learning on E-waste. Also, the app can have multiple functionalities and reference videos for increasing the breadth of user's knowledge on E-waste.

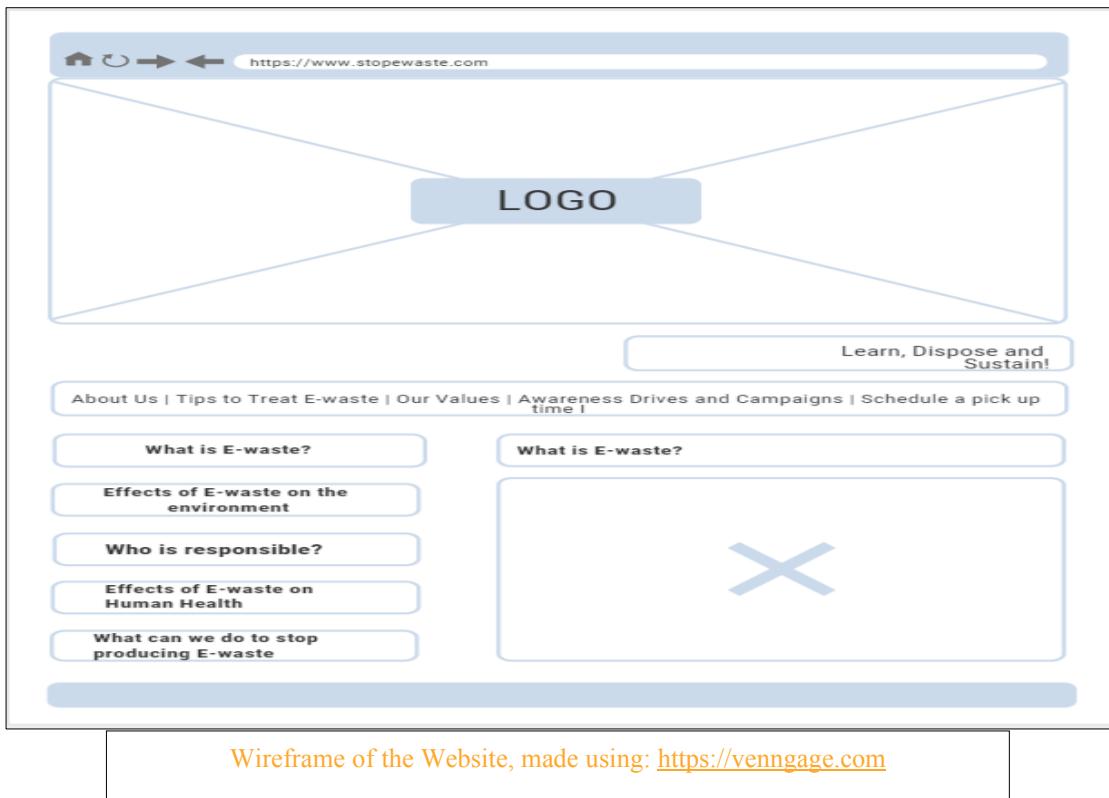


## Evaluation of Mobile App Solution

Specifications	Score (1-5)	Explanation
<b>Customer</b>	4	This aspect of specification gets a 4/5 score since the information, blogs and tips will reach to the core of the customer. Therefore, it can target the right amount of individuals, and the respective age group
<b>Aesthetics</b>	5	This particular aspect receives a 5/5 as, by using the appropriate font, background and colour combination, I can make the app aesthetically pleasing.
<b>Visual Appeal</b>	5	The ability of easily changing the visual appeal of the app by setting the resolution, and by adding complimentary colours will make the app look attractive.
<b>Content</b>	5	This aspect gets a 5/5 as the mobile app can have the right amount of content and include regular in-app updates.
<b>Ease of Navigation</b>	4	The ease of navigation in a mobile application is quite intuitive. The app's design and customization will make it easy to use.
<b>Availability</b>	3	The rating is 3/5, since this app will only be published on the play store only, as the publication of the app on the app store is more expensive.
<b>Maintainability</b>	4	The maintainability of this app is comparatively easy and it is easy to roll-out instant updates to the user.
<b>Load Time</b>	4	The load time of this app receives a 4/5 score, since the load time will be quite fast, depending on the speed of the internet and the device's processing power.
<b>Development Effort</b>	3	It is quite difficult to develop an app, comparing to the other ideas I have. Since, this involves constructing the app, testing it for bugs and rolling it out on the play store.
<b>Hosting/Publishing Cost</b>	3	For hosting this app onto the play store, the host must pay \$25, to purchase a Google developer's account.
<b>Total</b>	40	

## Design #2: Website

The second idea for the outcome was to build a website that will contain similar aspects that were discussed above in the mobile app. It will contain an awareness drives and programs page; tips for managing E-waste; what is E-waste; blogs and editorials. The website can be widely accessible and updatable with new information through which the target audience could access up-to-date information. Since navigating the website has become intuitive due to the target audience going through different websites in the past, the user doesn't have to get familiarised with the features on the website, and can connect instantly.



Wireframe of the Website, made using: <https://venngage.com>

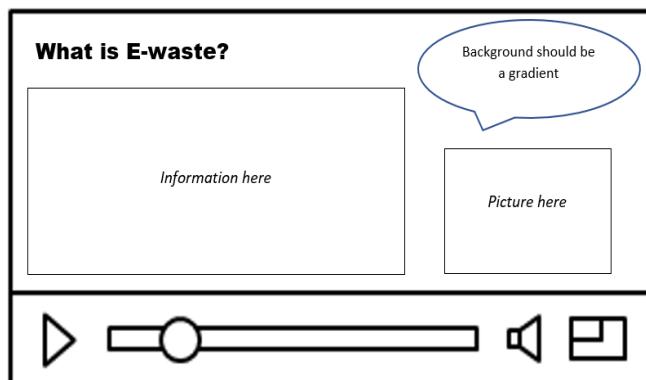
## Evaluation of Website Solution

Specifications	Score (1-5)	Explanation
<b>Customer</b>	5	This specification receives a 5/5 score, since the customer can access quality information like tips, awareness campaigns, blogs/editorials and be able to schedule pick up times from any media device that contains a browser.
<b>Aesthetics</b>	5	By using the right colour combination, appropriate website developing tools and font style, the aesthetics of the website received a 5/5 score.
<b>Visual Appeal</b>	5	The visual appeal of the website can be determined based on the resolution of the website, with the website being at a resolution of 1366 x 768. By using grapho-semantics, the visual appeal of this website can be well established.
<b>Content</b>	5	All the content such as tips and campaigns can be easily added to the website and the user can access the entire content on E-waste on the website.
<b>Ease of Navigation</b>	4	The ease of navigation is quite easy, as it is a dynamic website, accessing other tabs can be dependent on the internet connection. However, the website is easy to navigate from tab to tab.
<b>Availability</b>	3	The availability of this website is across the world, as it won't be made location specific. This will lead to a wider range of people to go through my product, and effectively spread awareness.

<b>Maintainability</b>	5	The website is comparatively easier to maintain on the app. Bugs and glitches can easily be fixed and the website can be re-uploaded quickly, thanks to the efficiency of the latest coding languages.
<b>Load Time</b>	4	The load time of the website depends on the internet speed of the user, however the load time will be quite fast as there won't be any high resolution graphics in the home screen.
<b>Development Effort</b>	4	To develop a website, it is really effortless as the languages such as HTML, CSS and Javascript are quite straightforward. Also, constructing and uploading the website is really easy.
<b>Hosting/Publishing Cost</b>	3	The publication cost is lesser than the google developer's account, and it varies from domain to domain.
<b>Total</b>	43	

### Design # 3: Informational Video

Another idea, that could very possibly be an outcome was building an informational video. By using the right film techniques, semiotic codes, content and pathos, the target audience would emotionally be attached to the growing concern of E-waste. Thus, this may be a suitable idea in terms of spreading awareness.



### Evaluation of Video Solution

Specifications	Score (1-5)	Explanation
<b>Customer</b>	3	This specification receives a 3/5 score, since the customer can directly access a range of information in a limited amount of time. However, the viewer cannot access further information and cannot schedule pick up times.
<b>Aesthetics</b>	5	The aesthetics of this video can be enhanced by using the right text styles, vibrant colours, and formatting. This is why this specification received a 5/5 score.
<b>Visual Appeal</b>	5	The visual appeal of this video can be enhanced by rendering and uploading the video in 1080p / 1440p . This makes the visual appeal and clarity stunning. Also the visual appeal can be enhanced by using different pictures.
<b>Content</b>	3	All types of content associated with E-waste can be uploaded. However, the viewer cannot interact with the content like in a website or in a mobile app.

<b>Ease of Navigation</b>	3	The only navigation in an informational video is the video scroller, which is easy to use, but takes the viewer time to reach to a different section of the video.
<b>Availability</b>	5	The video can be uploaded on a widely-used video portal like YouTube, whose platform is across the world.
<b>Maintainability</b>	2	In order to maintain a video on YouTube is difficult as, the editor has to take down the video, make the required changes and re-upload the video.
<b>Load Time</b>	4	The load time of the video is quite quick, as it again depends on a good internet connection to load a 1080p/1440p video on YouTube.
<b>Development Effort</b>	4	Developing a video is easy, and it can be done by using pre-installed apps on devices like iMovies. By just adding pictures and content, with a hint of a gradient background, there's not much development effort.
<b>Hosting/Publishing Cost</b>	5	There is no publishing cost to upload on YouTube, which is a huge boon, compared to other ideas like the website and the mobile app.
<b>Total Score</b>	39	

### Strand III: Present the Chosen Design

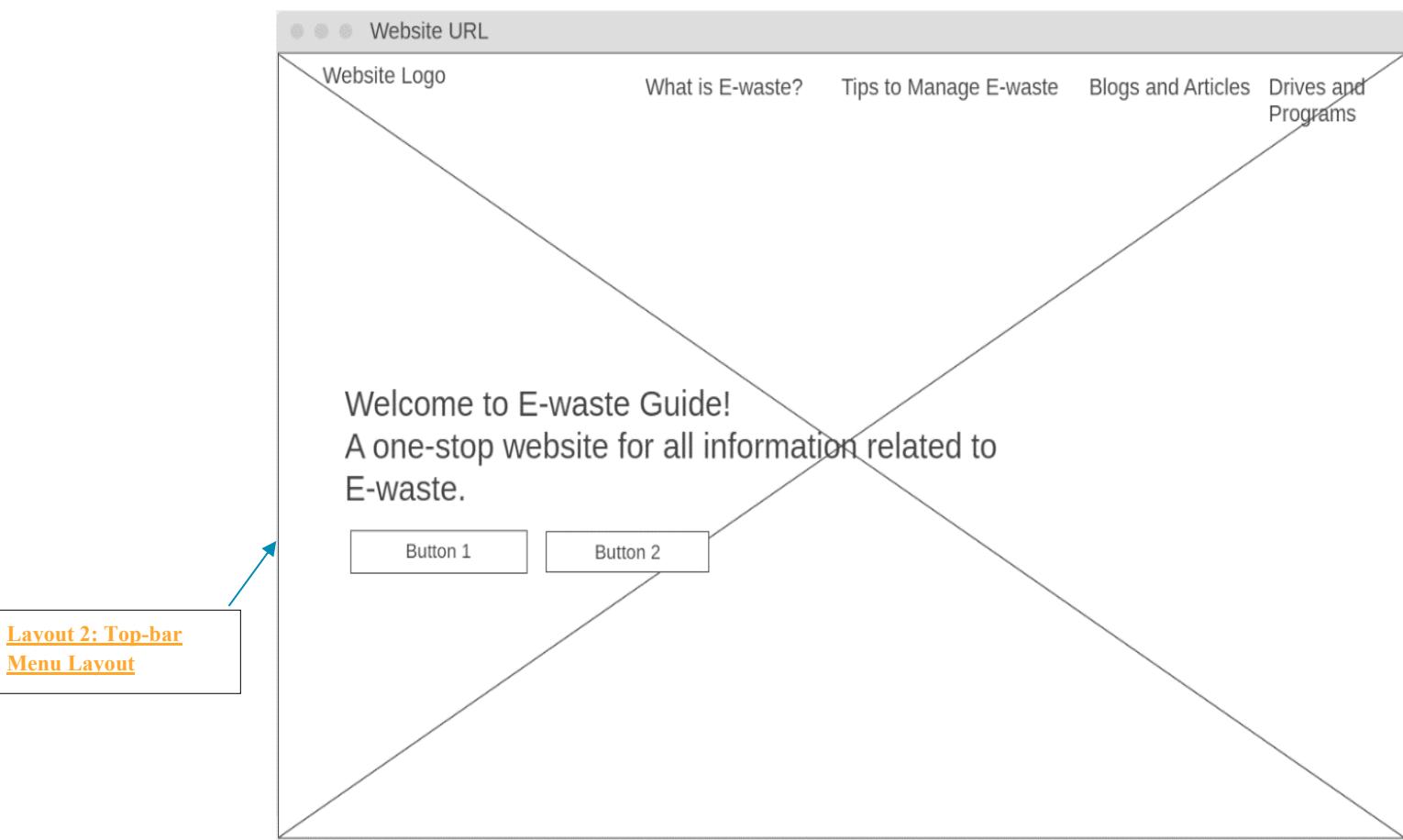
From the above three ideas, I decided to choose the website idea considering its ease of accessibility across various media devices, like tablets, laptops, smartphones and smart televisions. It was a tough decision between the website idea and the mobile app, and the website idea had a slight edge over the app, and this was because of two reasons. First, was that the website can be accessed across more media devices that have an in-built browser, and second was that the chance of the app being downloaded is quite low, as in the end, it is the user's choice to have such a type of app on his/her smartphone. Whereas, the website can be visited and scoured by users, and there doesn't have to be any downloading involved. This is why, the website design solution has received a 43/50. The video option received only a 39/50, which is lower than the website, as there is not much interaction involved between a video and the user, except for scrolling through the video, pausing and playing. Due to this, I believe that the video wouldn't have that much of an impact compared to a website or an app.

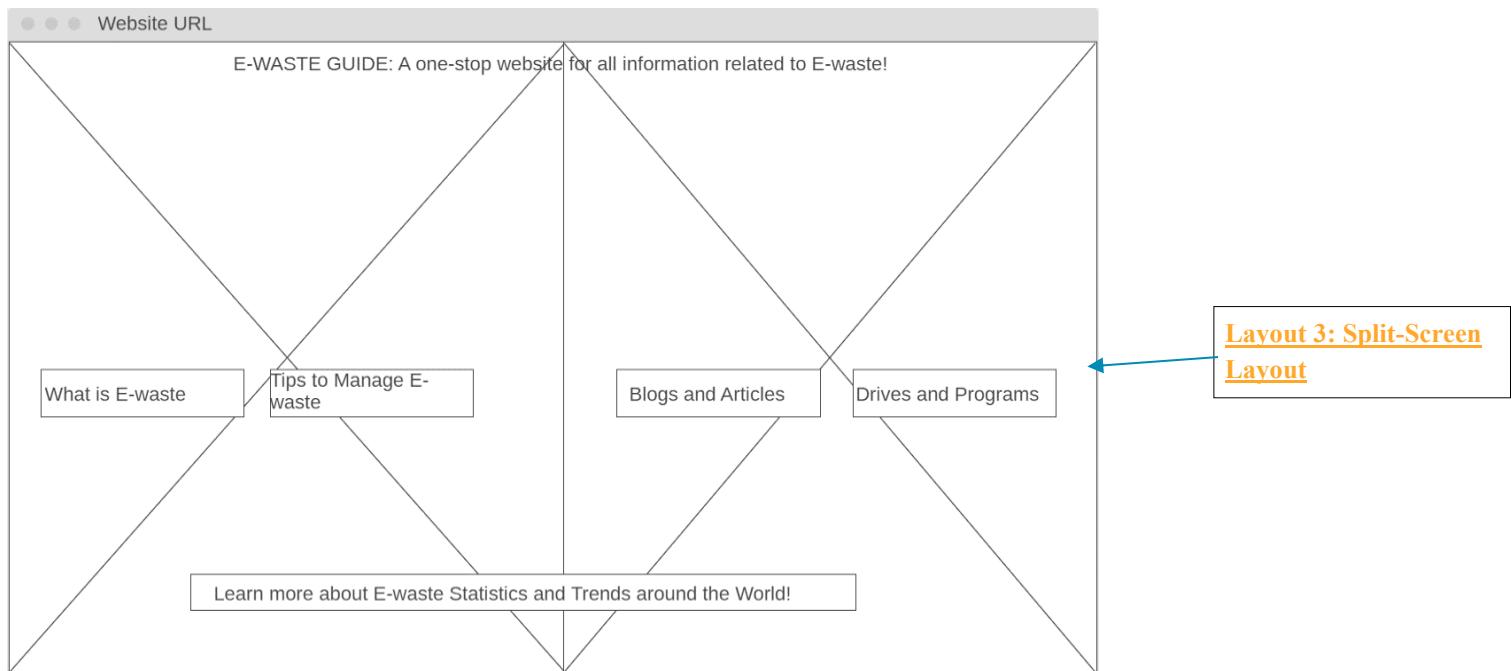
Subsequent to finalising my media platform, I headed for designing and analysing different website layouts and choosing one from them, based on satisfying the design criteria. Website layouts are important as they can be creative, making them visually appealing and aesthetically pleasing fulfilling 2 out of 15 criteria. In addition to that, websites like Chekhov<sup>10</sup> have a unique layout known as a split-screen layout. Diker<sup>11</sup> is another such website, that has a top-bar menu, and a background

<sup>10</sup> Website: <https://chekhov.withgoogle.com/alive>

<sup>11</sup> Information taken from & Diker Website layout: (wireframe.cc n.d.) (Lucidchart n.d.)

picture that is their brand identity. So, I compared three layouts which were split-screen, multi-coloumn and a top bar menu. Look below for the wireframes of the preferred layouts.





Initially, I decided to go with the multi-column layout, however the columns cluttered the page and I believe it doesn't make the home menu visually attractive with a lot of information. Next, the split-screen layout was an attractive choice with it being a unique website solution. Eventually, I decided to go with the top-bar menu layout and this was because of the advantages associated with the Diker website, as mentioned above. This layout allows and gives an effect of being more spacious and non-cluttered, which makes it visually appealing. In addition to that, with the background image taking up the whole homepage, the website doesn't look cluttered but instead looks visually appealing.

## Strand IV: Detailed Drawings and Requirements for Creating the Chosen Solution

Since, I've finalized my design idea, it was imperative to start modelling the solution by drawing diagrams and fill in the requirements.

### Requirements for Website Building:

Languages	HTML5, CSS3 and Javascript
Chrome Engine	Chrome v8
Integrated Developers Environment	Visual Studio Code
Font Styles	<a href="https://fonts.googleapis.com/">https://fonts.googleapis.com/</a>
Logo	<a href="https://infograph.venngage.com/templates/logos">https://infograph.venngage.com/templates/logos</a>
Navigation	Hover able Top Bar Menu

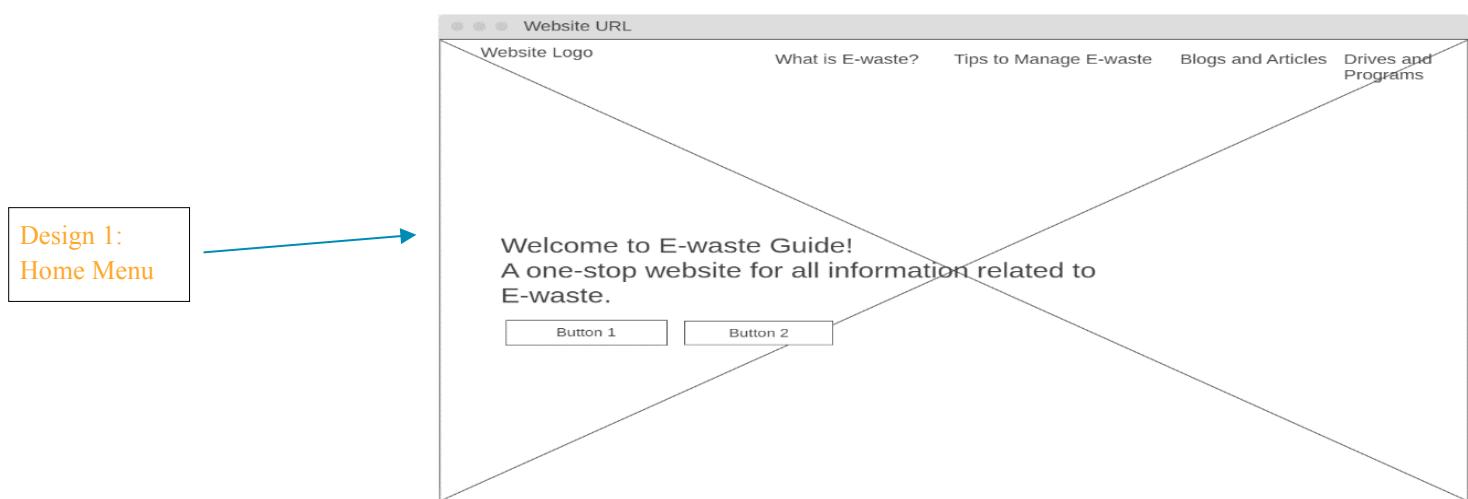
### Layout:

Font type	Montserrat
-----------	------------

<b>Design of the Website</b>	The website's homepage will include a website logo on the top left-hand corner, and the hoverable top bar menu on the top right-hand corner. The title of the website will be in the mid-left side with two buttons below it.
<b>Background Image</b>	Background image will be of E-wastes, and add a property in CSS known as “linear gradient” of {rgba 97,73,73,0.6} and {rgba 0,0,0,0.6} that gives a faint red tint to the background image, making it visually appealing.
<b>Navigation Menu</b>	Will include a turquoise hover underline, whenever cursor hovers over a menu item.
<b>Pictures</b>	<b>Background Image:</b> Resolution- (1920 x 1080 resolution) Horizontal resolution (Dots Per Inch)- 96 Vertical resolution (Dots Per Inch)- 96 <b>Logo:</b> Resolution- (472 x 188)
<b>Buttons</b>	Hoverable Buttons with turquoise coloured letters and a border property of 0.5px. When hovered with cursor, buttons turns white

## Design for Each Webpage

Now, I decided to add the content for each webpage. I had two main priorities before I created the content for each of my webpages, and those were the **ease of comprehending the information** and **further extension of knowledge of the user**. In order to meet these two priorities, I used simple diction, and a simplified approach in the form of headings and sub-headings to provide context of information to the user for easier understanding. For further extension of knowledge of the user, I will hyperlink useful and informative primary and secondary resources that will increase the depth of knowledge. In addition to that, I added separate tabs like Blogs and Articles for introducing different perspectives of E-waste to the user, and I also have included a drives and program webpage, for the user to actively participate in the awareness drives on E-waste in their locality. For the below wireframes, I didn't decide upon the images that will be used for each website, and also the video that will be uploaded on the website, will be made by me.



## Design 2: What is E-waste?

**WHAT IS E-WASTE?**

**What is E-waste?**  
Electronic waste, is one of the major issues that adversely effects our environment in the 21st century. E-wastes are basically electronic components, that have been disposed by the owners for various reasons (discussed below). These obsolete pieces of technology contain harmful elements like toxic heavy metals that lead to a negative impact on the environment. All E-waste are categorised into hazardous and non-hazardous (based on the materials that they constitute of)

**What are the Causes of E-waste?**  
E-waste has multiple causes that cause it to be generated and spread across various landfill or disposal sites. Two reasons below are one of the main reasons of the spreading and generation of E-waste:

- 1) Technological Advancements:**  
Technological companies that produce new electronic components and advertise them for creating a demand and, leading to a rise in supply. As sophisticated, updated and flagship models take over the common market, the obsolete technological components are ceased to be utilised by the owner and this causes the generation of E-waste. As there is an increase in the rate of more flagships models of components like smartphones, laptops and tablets are created, there is an increase in the rate of replacements by the user as well.
- 2) Inefficient Legislations and Policies:**  
Inefficient government policies and legislations that either have a loose framework or the authorities do not implement the postulates of the policies also cause unsustainable spread of E-wastes into landfill sites. An example of this is India, where the E-Waste (Management) Rules, 2016, have set a framework for the supply chain from the manufacturer to the decomposer, and India's generation of E-waste increases by about 25% every year.

For Further Reading:  
[Link 1](#)  
[Link 2](#)  
[Link 3](#)

**VIDEO**

**Picture**

## Blogs and Articles

### Blog : What are the Biggest Electronic Waste (E-waste) Problems?

By: Rubicon Global

The blog discusses and introduces the concept of E-waste to the reader and questions the reader about the lifecycle of their electronics, what type of electronics do they use. Then, the author talks about the effects of E-waste on the environment, and at the last provides an insight into the facts and statistics of E-waste around the world. Read this blog, to know the basics of E-waste and its consequences!

Link: <https://www.rubiconglobal.com/blog/electronic-waste-problem/>

### Article: Almost everything you know about e-waste is wrong

By: John Lepawsky

This opinion article given an in-depth perspective on how consumer waste and manufacturer waste from disposing and mining and manufacturing effects the environment , respectively. He also discusses about plausible solutions and expects a call-to-actions that are highly practical and those that can be done from you as well! Read the opinion article for more information:

Link: <https://www.eco-business.com/opinion/almost-everything-you-know-about-e-waste-is-wrong/>

## Design 4: Blogs and Articles

## Design 3: Tips to Manage E-waste

**Tips to Manage E-waste**

**Back to Home Menu**

**Why is Managing E-waste Important?**  
Managing E-waste is important for curbing the negative impacts of the ever-growing problem of E-waste and to avoid the adverse repercussions of this issue. In order to this, there are multiple solutions to manage E-waste, simply put, an average joe like me and you could perform these activities and contribute to saving the environment!

**Solutions to Manage E-waste**  
Below are the solutions that are for the consumer and producer, that are effective to manage the disposal of E-waste:

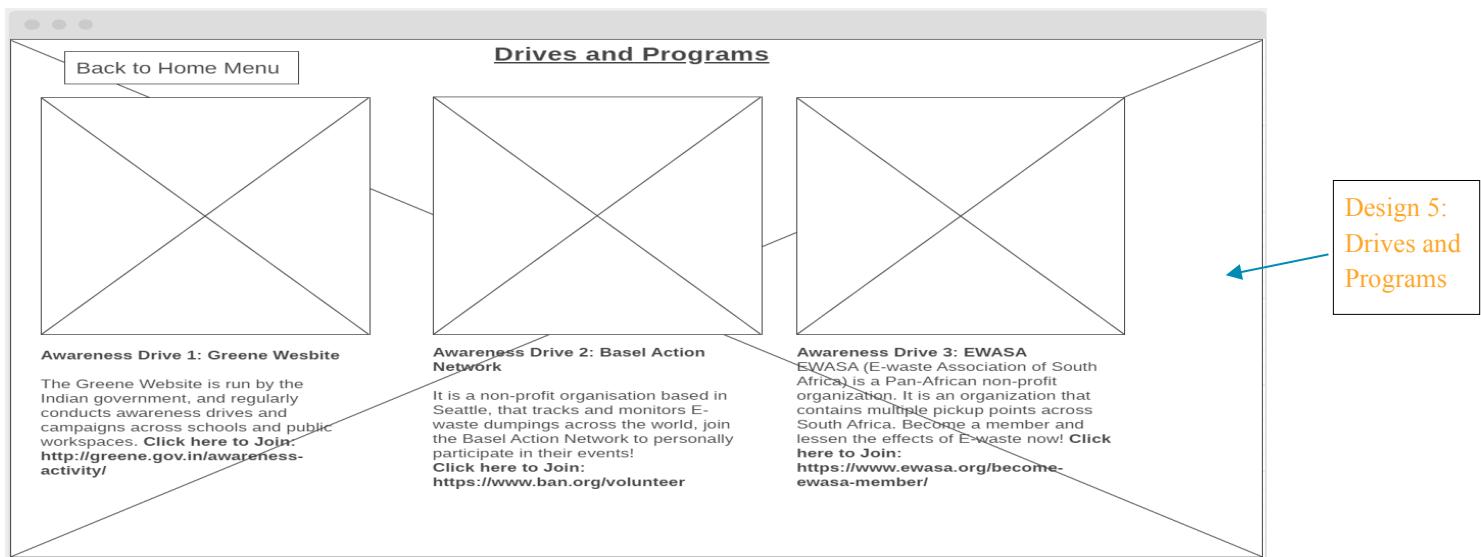
- 1) E-waste Disposal Hubs:** E-waste disposal centers can be found in multiple countries, ran by the government or different enterprises. For instance, EcoATM is an ATM where you can sell your obsolete phones, tablets and smartphones instead of disposing it unsustainably. These products are then taken to the EcoATM's processing centers, and the products are recycled, hence "closing the loop." Find one E-waste disposal center and commit to a positive cause for saving our environment!
- 2) Household E-waste collection:** E-waste collection from your household also is a vital solution to manage E-waste from the source of disposal, that are average individual households. In China, the Baidu App developed by the Chinese UNDP, also leads to users to directly interacting with the E-waste management officials, like disposers and manufacturers. There are other waste collection apps, that collect other types of wastes as well, like Waste Ventures India, collect door to door collection of E-wastes, and other segregated wastes.
- 3) Extended Producer Responsibility:** EPR programs have been doing rounds across technological companies, where consumers return obsolete technological products for new or flagship models, and these obsolete product's parts are recycled and refurbished. A classic example is the exchange program offered by Apple Inc. The traded in obsolete products reduce the original selling price of the flagship new models, leading to much more of an incentive for consumers to pursue this option.

**Picture of Solution 1**

**Picture of Solution 2**

**Picture of Solution 3**

**Further Reading**  
[Link 1](#)  
[Link 2](#)



## Criteria C: Taking Action

## Strand I: Construct a Logical Plan

For developing a pragmatic and logical plan, I have made a GANTT chart that allows me to have a proper timeline for finishing the product on time. Also, I made a flow chart to understand my user's intra-navigatino throughout my website and built according to this flow chart. I divided my GANTT chart into three sections that are: before building the website, creating a website, testing phase. I've done this to categorise my time-line and work in a much more structured and chronological manner, displaying self-management skills. Displayed below are the pictures of my GANTT chart and flow diagram.



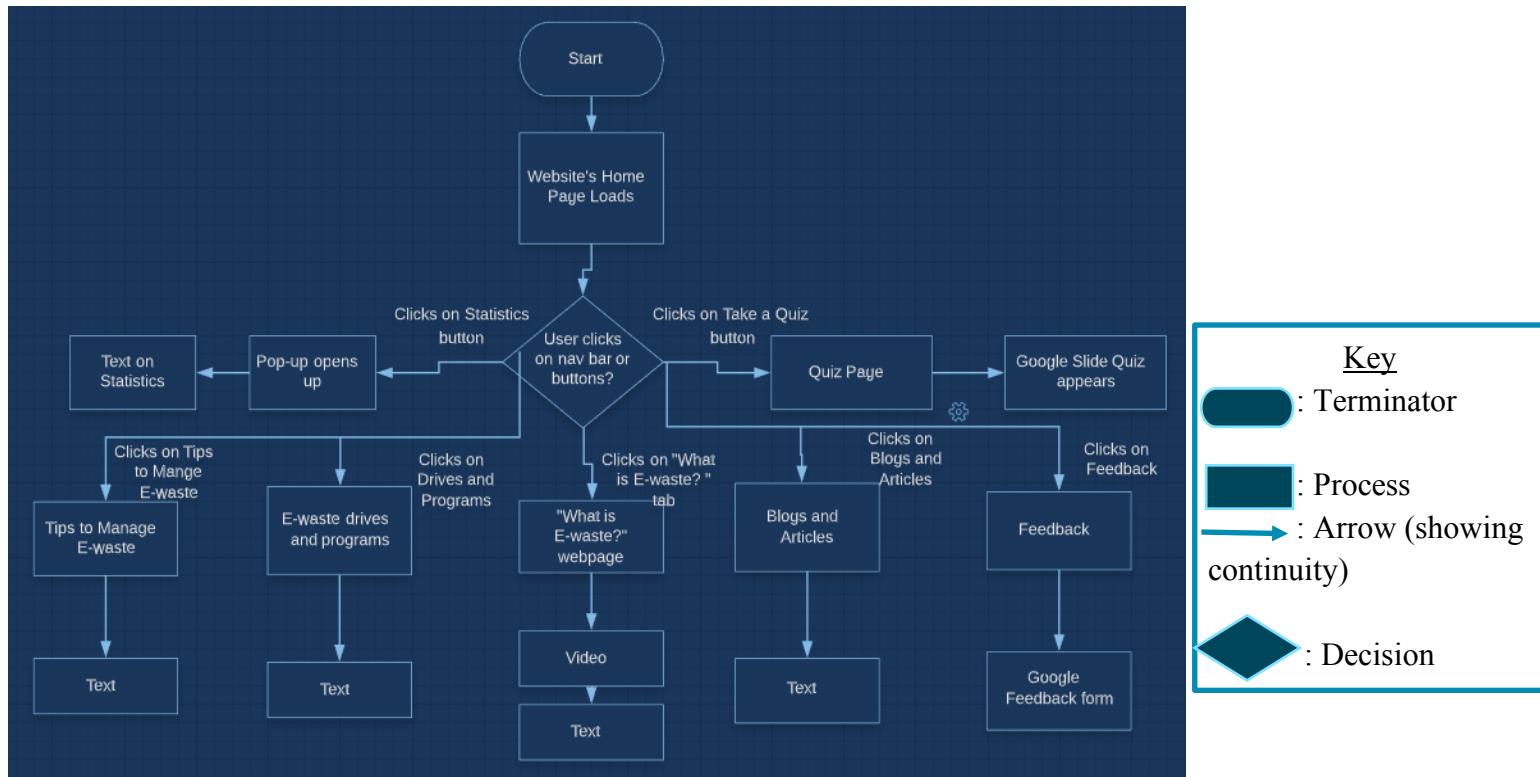
## Color Representation

### **: Pre-Website Phase**

## Lesson 1: Creating a Website

#### **: Alpha Testing Phase**

## Flow Diagram



## Strand II: Applying Technical Skills

During the development of the website, I applied multiple technical skills that I have learnt from the courses that I took from w3 schools. These technical skills were essential for adhering to the design specifications that were mentioned in strand I of Criteria B. Here are the following technical skills that have been applied:

### I Adding a Navigation (nav) Bar and Hover Property

As per the design of a top-bar menu website, the main aspect that I needed to add was a navigation bar. For the navigation bar, I first created a div class and named it “**row clearfix**,” under this container, I added my logo by using href (Hypertext Reference) to the image saved in the images folder. Then I included the tabs and referenced it to their respective webpages. Using CSS3, I used the property “**display: inline-block**” to place the navigation tabs adjacent to each other. For adhering to the design that I have decided, that is a top-bar menu layout, I used the property “float:right” to move the list tabs to the top right-hand side of my webpage. When a user hovers his/her cursor over the tabs, a turquoise line that is 3pixels thick, comes under the tab where the cursor is placed. I used turquoise as the hover color as it is visually appealing.

```

.main-nav{
    padding: 10px 0;
    float:right;
    margin-top:75px;
}

.main-nav li{
    display:inline-block;
    margin-left:50px;
}

.main-nav li a:hover{
    border-bottom: 5px solid #turquoise;
}

.main-nav a{
    color:#fff;
    text-decoration: none;
    font-size: 70%;
    font-weight: 100px;
}

```

CSS code for adding the hover property and text decoration for the nav tabs.

```

<!DOCTYPE html>
<html>
    <head>
        <body>
            <header>
                <nav>
                    <div class="row clearfix">
                        <img href="index.html">
                    </a>
                    <ul class="main-nav">
                        <li><a href="what is e-waste.html">What is E-waste?</a></li>
                        <li><a href="tips to manage e-waste.html">Tips to Manage E-waste</a></li>
                        <li><a href="e-waste drives and programs.html">E-waste Drives and Programs</a></li>
                        <li><a href="blogs and articles.html">Blogs and Articles</a></li>
                        <li><a href="Feedback.html">Feedback</a></li>
                    </ul>
                </nav>
            </header>
        </body>
    </html>

```

HTML code for adding the nav bar and lists that include my tabs.



The Top Navigation bar and a sample of hover option working.

## II) Background Image and Linear Gradient: Aesthetics and Visual Appeal

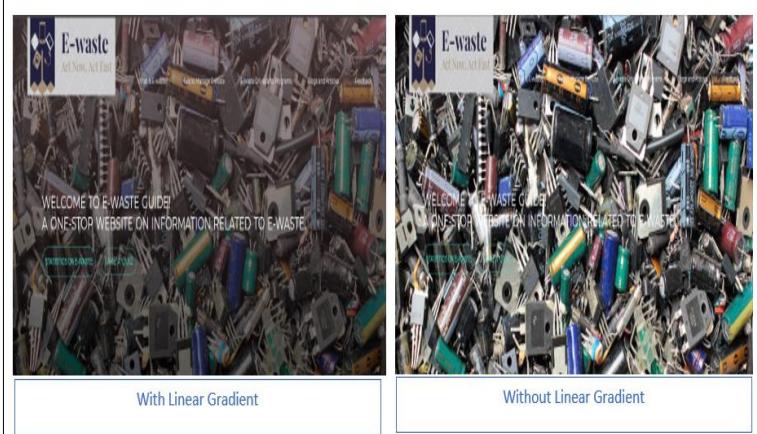
As the background image takes up majority of the screen-space, it was imperative for me to first search for an image that has a good resolution. Through Google Images, I chose a background image on E-waste, with a 1920x1080 pixels, and a 96 dpi for both horizontal and vertical resolution, for an enriched detail. Apart from this using CSS3, I was able to add a property known as “**linear gradient**” of values **rgba (97,73,73,0.6)** and **rgba (0,0,0,0.6)** to add a light red-ish tint to the background image, that makes it visually appealing and aesthetically pleasing. During web-development, majority of the times, background images repeat themselves to fill the screen-space. In order to avoid this in my project and stick to the design of the planning stage, I used a CSS property known as “**background-**

```

header{
    background-image:linear-gradient(rgba(97,73,73,0.6), rgba(0,0,0,0.6)),
    url('../images/E-waste.jpg');
    background-size: cover;
    height:100vh;
    background-repeat: no-repeat;
}

```

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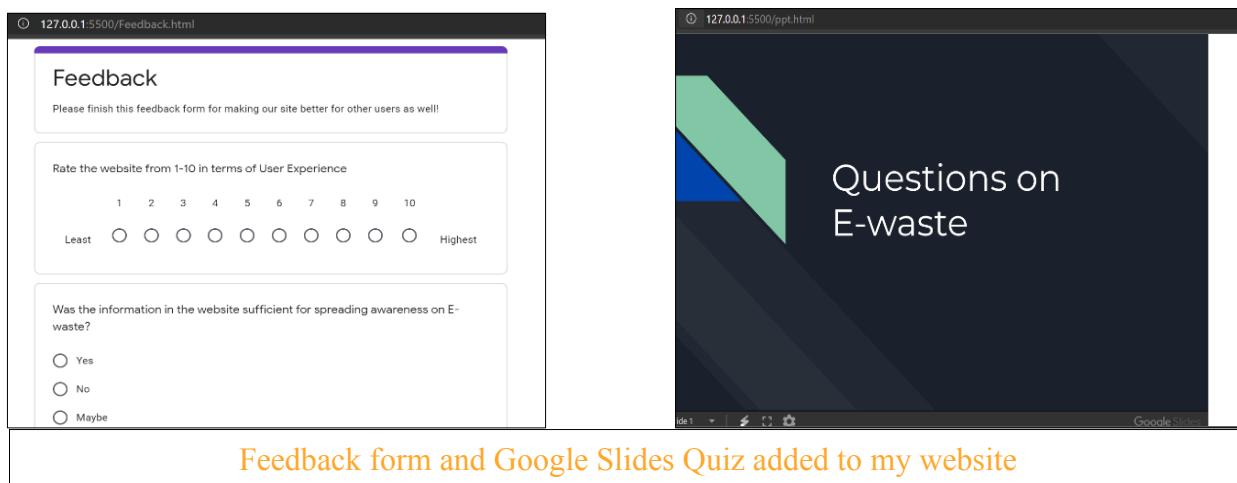


With and Without Linear Gradient

**repeat:no-repeat.”** From the pictures above, we can understand how essential linear gradient is for meeting important design specifications which are visual appeal and aesthetics of the website.

### III) I-Frame Tags: Adding Feedback form and Quiz for Interactivity

An I-frame stands for Inline Frame, and using this tag enabled me to add a google feedback form and a quiz. The I-frame tag has the following syntax: <iframe src= “URL”></iframe>, from this syntax we can understand that the code takes into account of the source of the file that will be displayed. To add components into my project in an efficient and quick manner, that delivers the same interactivity and visual appeal , I used Google Forms and Google Slides to build my feedback form and quiz respectively. Both these services have the option to **embed** the feedback form and presentation into a HTML code, and generate the i-frame tag in the exact same way as the syntax mentioned above. For saving time and adhering to the GANTT chart, I built a google slide quiz. Firstly, I chose the type of questions that should be put in the quiz, and provided 4 options for each question with one being the right answer. 3 of the 4 options were hyperlinked to the slide that displays “**Incorrect**” and also, the user can go to the next question from this slide. 1 out of 4 options were hyperlinked to the slide that displays “**Correct**” option, and the user goes to the next question. Have a look at the pictures below for a better understanding:



Working of the Quiz

Adding I-frame tag to HTML

Generating the I-frame tag

#### **IV) Slide Layout: using div containers, and their classes**

It was imperative to use a layout that doesn't make the webpage look cluttered and at the same time, all the content must fit in, like the wireframes in Criteria B strand IV. To not be repetitive with the same layout for the content and pictures throughout the website, I used two different layouts for a better experience for the user and visual appeal. I did this by first creating a layout with div containers. From the below pictures we can see that, first I gave a common “*div-class:ball*” (a class can be of any name) to all the three containers. Then, in “*style.css*,” I used various properties like *padding* (*for increasing space between two divs*) , *text-align* (*for centering the text in the div*) , *float* (*for changing the position of the image*) and etc. The below pictures are examples of the CSS3 and HTML5 code I used for making the webpage “ E-waste Drives and Programs” :

```
<div class="ball">
<br>
<h3>Greene Website: India</h3>
<br>
<p>The Greene Website is run by the Indian government and regularly conducts activities like capacity and skill building, that is useful for our community</p>

<div class="ball">
<br>
<h3>Basal Action Network</h3>
<br>
<p> It is a non-profit organization based in Seattle, that tracks and monitors E-waste now regardless of skill and identity! <a href="https://www.ban.org/volunteer">Visit the Link</a></p>

<div class = "ball">
<br>
<h3>EWASA (E-waste Association for South Africa)</h3>
<br>
<p>EWASA is a Pan-African non-profit organization. This organization has E-waste collection centers across South Africa and learn about E-waste hazards and gain technical skills! <a href="https://www.ewasa.org/become-ewasa-member">Visit the Link</a></p>
```

HTML Code for adding div containers



Div containers on Website

```
.ball{
  float:left;
  width: 30%;
  padding: 0 10px;
  font-size: auto;
  margin: 2px;
}

.ball {
  box-shadow: 0 4px 8px 0 #rgba(0, 0, 0, 0.2);
  padding: 25px;
  text-align: center;
  background-color: #b17373;
  text-decoration: black;
}
```

CSS Code for div containers

#### **V) Javascript Pop-up**

Using Javascript and a Javascript library known as “Sweet Alert,” with HTML, I made a simple-pop-up. When the button “Statistics on E-waste” is clicked in the homepage, a visually appealing pop-up displays 2 facts about E-waste. Sweet Alert is basically a library, that can replace simple “alert” functions in Javascript. In my code, first I created a button class, and determined an event to the button class, that I later coded for in javascript. In javascript, I defined a function by giving it name of “popUp.” Then, using a script source code from Sweet Alert, I added it into my HTML page. Whenever the page has to display a pop-up, the webpage takes the script source code and tracks it back to the origin website. Below are the pictures:

```
<script src="https://unpkg.com/sweetalert/dist/sweetalert.min.js"></script>
<script>
  function popUp(){
    swal("Statistics on E-waste",
      "i)More than 80% of the electronic components were thrown away in dumpsites",
      );
  }
</script>
```

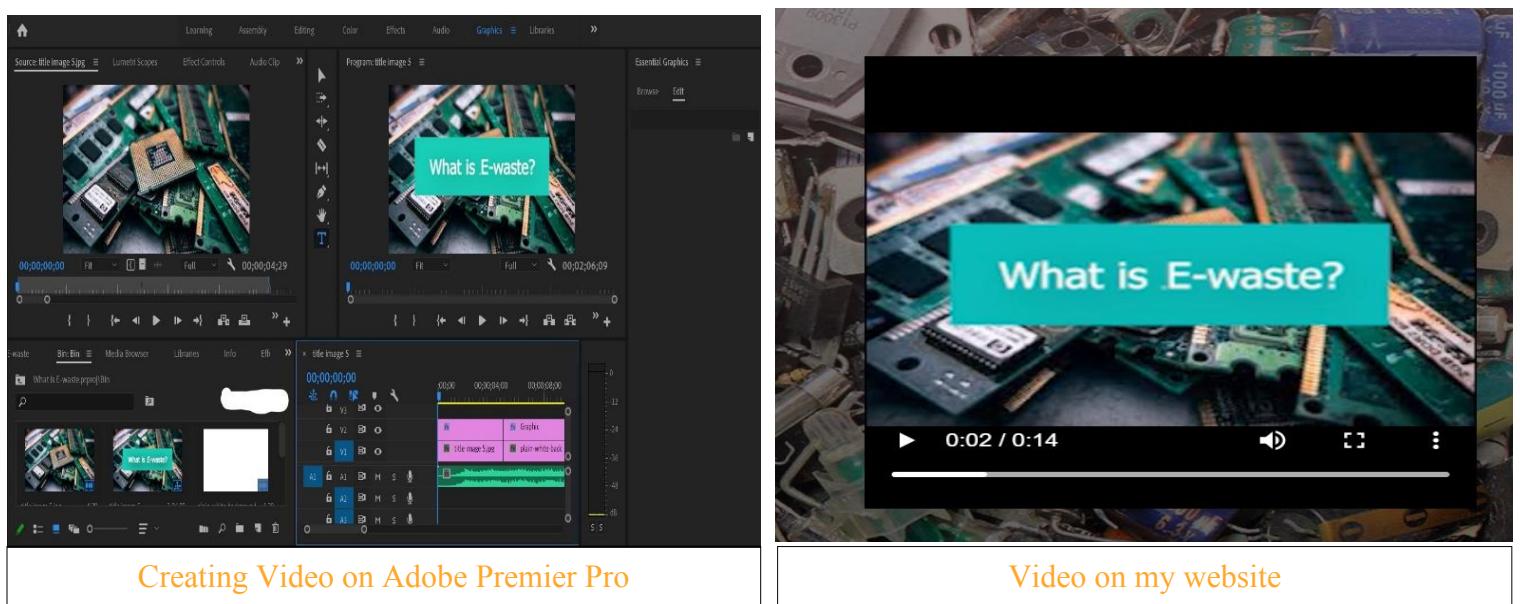
JS code including script source code and alert



Pop-up that shows in my website

## VI) Making the Video

As per the wireframe design of the webpage “what is E-waste,” I developed a video using Adobe Premier Pro that will educate the target audience about E-waste in a brief nutshell, rather than reading the text written on the webpage. Firstly, I gathered various photos from the world-wide-web and collated them in a folder for opening them up on the Adobe software. Then, by adding text and rendering the video, I was able to produce a decent quality video that would aid in the learning process of the user. Below are the pictures of me making a video in Adobe Premier Pro, code and the video on the website.



```
<div class="video", div style= "position: relative; right:40px; top:-380px;">
    <video width="360" height="340" controls>
        <source src="images/title image 5_1.mp4" type="video/mp4">
    </div>
```

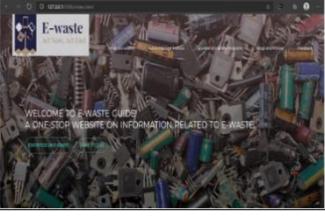
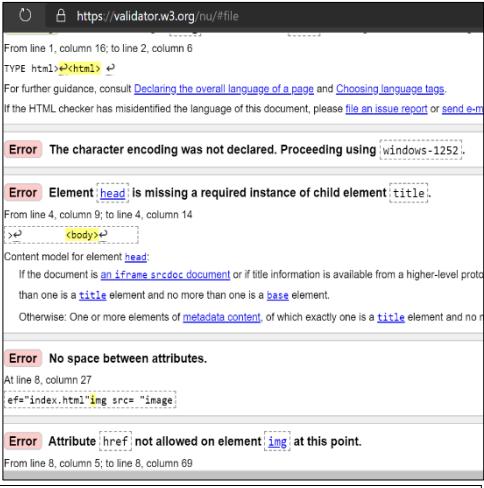
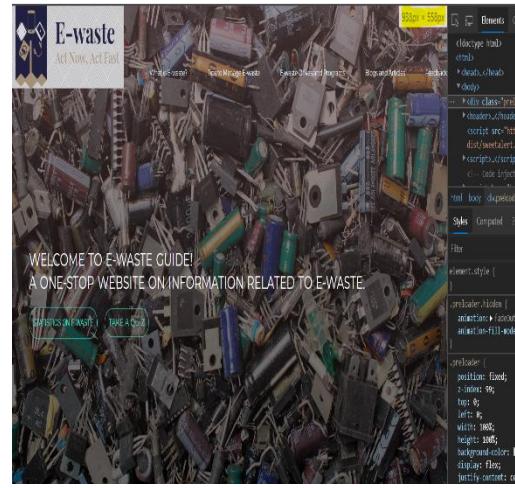
```
.video{
    float:right;
    margin:-15px;
    position:-20%;
    background-color: black;
}
```

HTML and CSS code for Adding the video

## VII) Alpha Testing Phase

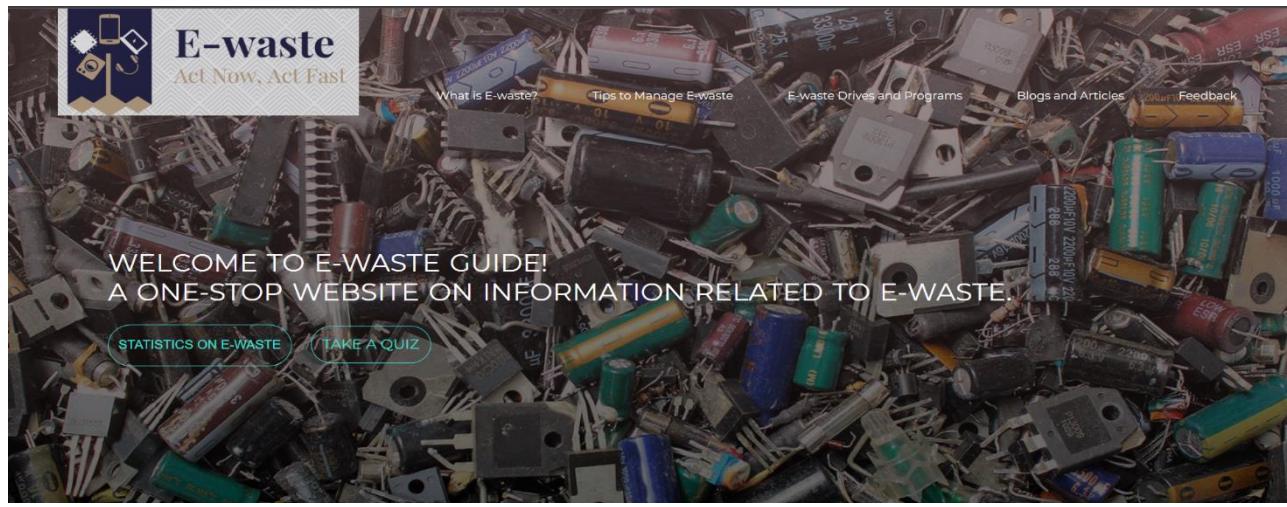
In the GANTT chart under the development phase, “Run Test Phase” was an action to be taken. For conducting the test phase, I have chosen the following testing areas which were **browser**, **screen-change**, **functionality**, **W3C compliance**, and **content testing**. Testing all these elements are essential for ensuring that the target audience will have an enriched experience. In addition to that, the testing phase helps in adhering to the design specifications, that are **simplicity**, **ease of navigation** and **content**. During browser testing, I launched my website onto two web browsers that were

Microsoft Edge and Google Chrome. For screen-change testing, I opened “Inspect Element” on my default web-browser, and changed the screen dimensions (to see how the website will look on smartphones, tablets and etc). To test for functionality, I assessed the button, nav bar, quiz and feedback functionalities. To conduct a W3C compliance testing, I visited the official website and uploaded my HTML, CSS and Javascript files to test the validity of the code. I’ve fixed the errors after performing this test. Then, I performed the content testing by reading and rephrasing sentences that had grammatical errors. Look at the pictures below, for evidence of the tests conducted.

 	<p>Testing on Google Chrome</p> <p>Testing on Microsoft Edge</p>		
<b>Browser Testing</b>		<b>W3C Initial Compliance Test</b>	
		<b>Screen-Changing Test</b>	

### Strand III: Making the Solution

During the creation of the website, I have faced several challenges during the layout phase, for each website. Due to this in several instances, I had to deviate from the design plans. However, in the areas of content, functionality and usability aspects, I believe that I’m successful subsequent to conducting the much-needed testing phase.



Home Page

**What is E-waste?**

Electronic waste, is one of the major issues that adversely affects our environment in the 21st century. E-wastes are basically electronic components, that have been disposed by the owners for various reasons (discussed below). These obsolete pieces of technology contain harmful elements like toxic heavy metals that lead to a negative impact on the environment. All E-waste are categorised into hazardous and non-hazardous (based on the materials that they constitute of).

**What are the causes of E-waste?**

E-waste has multiple causes that cause it to be generated and spread across various landfill or disposal sites. Two reasons below are one of the main reasons of the spreading and generation of E-waste:

- 1) **Technological Advancements:** Technological companies that produce new electronic components and advertise them for creating a demand and, leading to a rise in supply. As sophisticated, updated and flagship models take over the common market, the obsolete technological components are ceased to be utilised by the owner and this causes the generation of E-waste. As there is an increase in the rate of more flagships models of components like smartphones, laptops and tablets are created, there is an increase in the rate of replacements by the user as well.
- 2) **Inefficient Legislations and Policies:** Inefficient government policies and legislations that either have a loose framework or the authorities do not implement the postulates of the policies also cause unsustainable spread of E-wastes into landfill sites. An example of this is India, where the E-Waste (Management) Rules, 2016, have set a framework for the supply chain from the manufacturer to the decomposer, despite this, India's generation of E-waste increases by 25% every year.

**Electronic wastes are basically obsolete electronic items discarded by owners into common dumping-yards. These electronic components are categorised into hazardous and non-hazardous wastes and a majority of them contain heavy-metals that are harmful for the environment.**

## “What is E-waste?” Webpage

**Blog: What Are The Biggest Electronic Waste (E-waste) Problems?**

By: Rubicon Global | January 16, 2018

**What are the Biggest Electronic Waste (E-waste) Problems?**

Over the past few years, electronic waste, or e-waste, has become one of the most rapidly growing sectors of the world's waste stream. The e-waste problem faces us as a global civilization has never been greater.

Nearly a decade ago, smartphones didn't exist – at least not how we think of them today. Now, nearly two-thirds of Americans under 30 own their first phone in the glow of the latest models.

**Almost everything you know about e-waste is wrong**

By: John Lepawsky

This opinion article gives an in-depth perspective on how consumer waste and manufacturing waste from disposing, mining and manufacturing affects the environment. He also discusses about plausible solutions and expects a call-to-action that is highly practical and those that can be done by common people as well. Read the opinion article now!

Link: <https://www.rubiconglobal.com/blog/electronic-waste-problems>

**Article: Almost everything you know about e-waste is wrong**

By: John Lepawsky

This opinion article gives an in-depth perspective on how consumer waste and manufacturing waste from disposing, mining and manufacturing affects the environment. He also discusses about plausible solutions and expects a call-to-action that is highly practical and those that can be done by common people as well. Read the opinion article now!

Link: <https://www.eco-business.com/opinion/almost-everything-you-know-about-e-waste-is-wrong/>

## Blogs and Articles Webpage

**Why is Managing E-waste Important?**

Managing E-waste is important for curbing the negative impacts of the ever-growing problem of E-waste and to avoid the adverse repercussions of this issue! In order to do this, there are multiple solutions to manage E-waste, simply put, an average joe like me and you could perform these activities and contribute to saving the environment!

**Solutions to Manage E-waste**

Below are the solutions that are for the consumer and the producer, that are effective in managing the disposal of E-waste:

- 1) **E-waste Disposal Hubs:** E-waste disposal centers can be found in multiple countries, ran by the government or different enterprises. For instance, EcoATM is an ATM where you can sell your obsolete phones, tablets and smart phones instead of disposing them unsustainably. These products are taken to the EcoATM's processing centers, and the products are recycled, hence "closing the loop". Find one E-waste disposal center and commit to a positive cause for saving our environment!
- 2) **Household E-waste collection:** E-waste collection from your household are also a viable solution to manage E-waste from the source of disposal. In China, the Baidu App developed by the Chinese UNDP, also leads the users to directly interact with the E-waste management officials, like disposers and manufacturers. There are other waste collection apps, that collect other types of wastes (including E-waste), like Waste Ventures in India.
- 3) **Extended Producer Responsibility:** EPR programs have been doing rounds across technological companies, where consumers are returning obsolete electronic products, and these products are recycled and refurbished. A classic example, is the exchange programs availed by Apple Inc. The traded in obsolete products reduce the selling price of the flagship models, leading to much more of an incentive for consumers to pursue this option.

**Tips to Manage E-waste Webpage**

### E-waste Drives and Programs Webpage

### Quiz Webpage

### Feedback Webpage

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## Strand IV: Justify Changes Made to the Plan

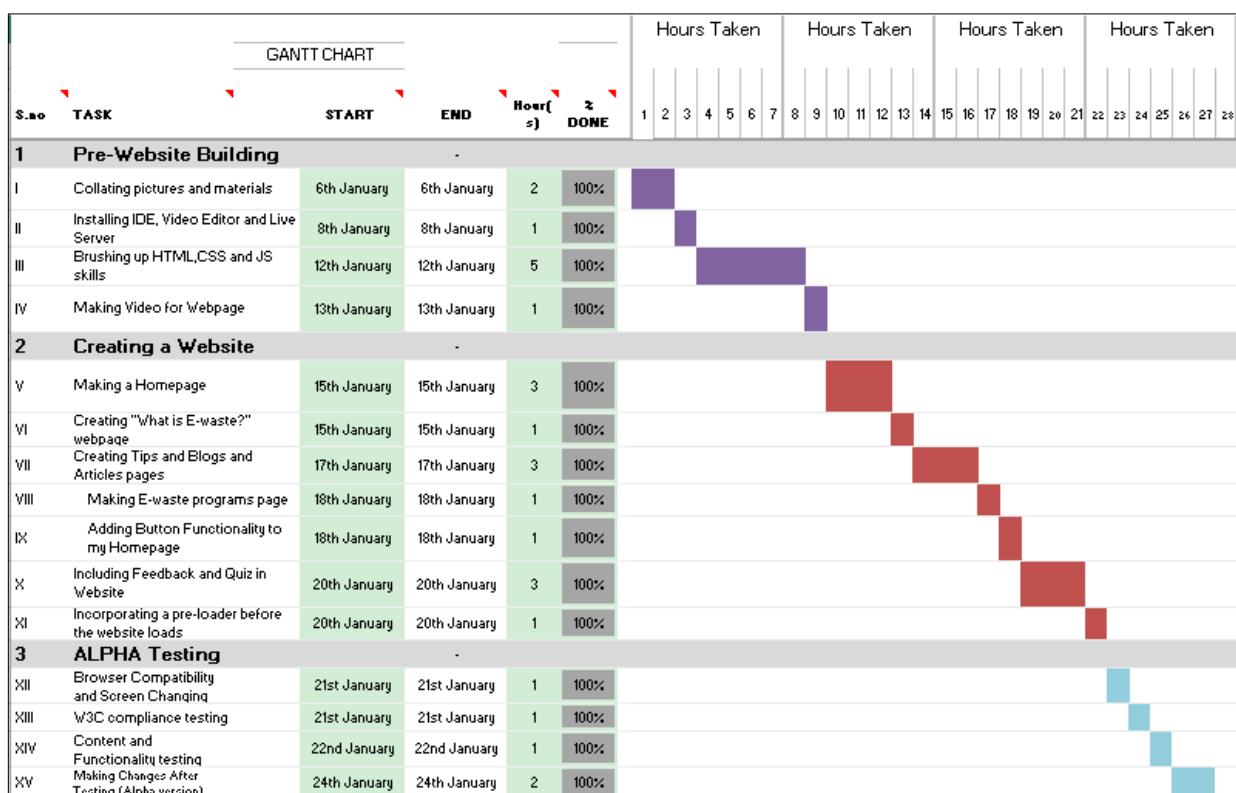
During the process of making the website, I made several changes that I believed would further enhance the UX of my website. Below are the changes that were made to the design plan:

- 1) **Adding a Feedback and Quiz Page:** While I was developing the website, I believed that it was essential to test the user's knowledge that would further add to their learning experience. Since I didn't possess the depth of skill to make a quiz using Javascript, I simply developed a PPT on Google Slides and embedded it into my code using an Iframe tag. Similarly, developing a Feedback form using code would require in-depth knowledge on databases and Javascript to store the information. I added a Google feedback form in order to receive valuable suggestions and ratings from the users for future improvements in the website.
- 2) **Adding a Preloader:** Using HTML and CSS, I was able to add a preloader when my website loads initially. The reason behind adding a preloader is primarily for the website to set a solid first impression on the target user that is vital for the UX of the website. Initially, I added a div class of the name "preloader hidden" and used a gif of a preload animation. Then, in CSS, I used properties like "@keyframes," animation of 4 seconds and the width and height to launch the preloader in a desired manner.
- 3) **Introducing a Pop-up:** During the process of building the website, I believed that reading plain-text is not interactive in any manner, to add a hint of interactiveness with the text, I added a pop-up using javascript and Sweet Alert, that is a javascript library to insert the pop-up button for "Statistics on E-waste" for my home-menu.
- 4) **Linear Gradient:** During the process of developing a final design brief, I was not aware that adding a picture of E-waste stockpiles would be visually unattractive and aesthetically displeasing. To avoid this, I added a CSS property known as "linear gradient" and gave a red-ish hue to the background image.
- 5) **Removal of Picture in "What is E-waste?" webpage:** Aforementioned, in the initial design wireframe for this respective webpage, a picture related to the content of this webpage must've been added as per the final design plan. However, I believed that the video itself would need a larger space than expected to make the content visible and crystal-clear to all the audience. Due to the video taking up additional space than expected, inserting a picture would make the webpage even more cluttered.

### Actual Timeline of the Product

During the entire process depicted in the GANTT chart, I have completed all the set of tasks by January 24th, that is 5 days more than the initial timeline set in Criteria C strand I. This was due to, me taking up longer time during the pre-website building phase to complete all the respective set of tasks. This is the primary reason as to the evident delay in building the product. However, I have

finished alpha testing phase, totally in around 5 hours due to lesser obstacles, errors that have been corrected through a scrutinised manner.



Color Representation	
<span style="background-color: #6A5ACD2; display: inline-block; width: 15px; height: 10px;"></span>	: Pre-Build Phase
<span style="background-color: #DC143C; display: inline-block; width: 15px; height: 10px;"></span>	: Creating a Website
<span style="background-color: #00FFFF; display: inline-block; width: 15px; height: 10px;"></span>	: Alpha Testing

## Criteria D: Evaluation

### Strand I: Beta Testing and Testing Methods

Subsequent to finishing the project, where I have conducted the alpha testing as mentioned above for any bugs, glitches and technical instability. Now, the product was ready for beta testing, where community organizations are my target audiences. I made the content relevant where webpages like “Tips to Manage E-waste” to a larger extent give resident welfare association bodies in a community to tackle these problems in an efficient and sustainable manner. To increase the amount of feedback I can receive, I added a Google Forms survey in my website as well.

### Expert Evaluation: Client's Perspective On The Product

I have conducted an interview with Mr.Prashant who is the president of my community's resident welfare association and completed masters in Computer Science, that includes web development. By connecting via WhatsApp, I was able to request for a convenient time to evaluate my product. The table below represents the proceedings of the interview and Mr.Prashant's views on the website.

### Transcript Table of the Interview

**Q1) Is the information on E-waste, its implications and management strategies sufficient?**

Ans. Yes, the information, facts and statistics were sufficient enough for common people who have a surface-level understanding on E-waste.

**Q2) What is the rating that you would award for the quality of information in the website, on a scale of 1-5, with 5 being the highest?**

Ans. I would rate the quality of information on your website a 5/5, considering that you have included different drives and programs; blogs and articles that are pretty unique.

**Q3) How content were you with the design, aesthetics and visual appeal of the product? Please rate the visual appeal and aesthetics on the aforementioned scale.**

Ans. The website is really elegant and in-fact the initial loading animation made it feel like a professional website. The background image, the buttons have greatly contributed to the visual appeal and the aesthetics of your website. Kudos to your creativity! Personally I would rate the design a 5/5.

**Q4) How did the video help in aiding your learning process? Please rate the video's quality of information and resolution.**

Ans. The video was good enough in helping me understand about what is E-waste. I actually clicked on the video first rather than reading the information, maybe because it's a human tendency to learn visually in a video rather than reading the information, however I went through the information too! I would rate the video a 4/5, as it acted as a TL:DR (Too Long; Didn't Read) and helped me grasp the information in a quick manner

**Q5) Did the Blogs and Articles page help in widening your perspective on E-waste? Please rate this webpage.**

Ans. Definitely! The mentioned blogs and articles have greatly inspired and built upon my knowledge on E-waste and its impact. Also I'm an avid newspaper reader and especially love to read the daily editorials and Op-eds, and this section of the website also intrigued me. I would give this a rating of 5/5.

**Q6) According to your opinion, Is this website a viable solution to spread awareness on E-waste?**

Ans. Yes, as I said before, the website has adequate information, good aesthetics and diverse information that are key elements in effectively spreading awareness.

**Q7) How will this website impact our community residents' welfare organization, and what key points will you take from this website and implement them?**

Ans. The website has good information on tips to manage E-waste, considering that most of the residents in our community are tech-savvy and are part of the IT industry, small obsolete electronic products such as earphones, broken electronics are found in our garbage dumps. With this website, we will try to implement specific measures such as the E-waste collection drive for maybe once a month by certified recyclers. Also, we will inform our cleaning staff to not pick up trash that includes any electronic components in them.

**Q8) What rating would you give for the content in the webpage "E-waste drives and programs?"**

Ans. On a scale of 1-5, I would give it a 3 as I believe it could have had a bit more information on what each drive and program was. Also, you could have added the time and place where these programs are taking place.

**Q9) What are your suggestions for ameliorating this website in any aspect?**

Ans. Firstly, add information as discussed in the previous question in the drives and programs page. Next, I think you could work on improving the resolution of the video, as I found it a bit standard and a high resolution video could attract the users more. Lastly, distribute your text by using the property of "Justify" that allows your text in the website to be more aligned and evenly spaced between two margins.

**Q10) Does the website achieve the overall purpose and goal as talked about before the interview?**

Ans. Yes! This website is really a great idea to spread awareness on E-waste, and apart from few suggestions and improvements that can be made, your users will learn about E-waste without any problem. Also, community organizations like ours will be delighted to implement such good measures and changes in our effort to tackling E-waste.

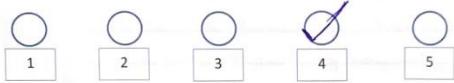
**Q11) Would you refer this website to your colleagues in our community residents' welfare organization?**

Ans. Yes, I will definitely refer your website so that my colleagues and I can have a final consensus and a common platform of solutions to address this problem in our community.

To conclude from the interview, Mr. Prashant was definitely pleased with the majority of the content, aesthetics, style and other such specifications of the website. However, he suggested a few changes in the alignment of the text in the website to give it a polished finish and also add additional information in the boxes in the drives and programs page to inform the user as to which place and time the event is taking place. Indirectly, he implied and displayed general user's tendency and behaviour of absorbing information easily and effortlessly, and to know about the basic information about the drives and programs. In addition to that, he also reminded me about the high population of tech-savvy and employees in the IT sector that reside in the community and dispose obsolete E-wastes. Due to this, I believe that the website will really help the community organization to implement a cost-effective and pragmatic solution that would benefit the environment and our community .

### **Target Audience Evaluation: Evaluation by 5 Different Community Organization Members**

As a part of beta testing, now I interviewed 6 members from different community residents welfare organizations where I asked them initially to go about my website. The following feedback form are examples of the feedback I've received (Refer to **Appendix F** for pictures of 5 other feedback forms).

Design Response Form	
<p>Name: <u>Sunil Virina</u></p> <p>Community Organization: <u>LAWCO HILLS RESIDENT'S WELFARE ASSOCIATION</u></p> <p>Please rate the overall product on the scale below (1-lowest, 5-highest):</p>  <p>How content were you with the aesthetics and the visual appeal of the website?</p> <p><u>I think that the website has a really good visual appeal and I really liked the colours used and the clarity of and hue of the background image.</u></p> <p>Was the information posted on the website useful for your line of occupation?</p> <p><u>Yes, as Lance Hills is one of the biggest communities in Hyd. So, managing our e-waste output is really essential for my association for contributing to environmental protection.</u></p> <p>What solutions will you implement from the "Tips to Manage E-waste" in your community?</p>	<p>Design Response Form</p> <p><u>Most probably, I will follow the Household Collection centers &amp; EPP's as they are efficient solutions according to me.</u></p> <p>How would you rate your current understanding on E-waste and its implications compared to before reading the website?</p> <p><u>After reading the website, I mean have gained knowledge about the urgency of managing e-waste. Also, I've read the blogs &amp; articles which further helped in understanding.</u></p> <p>Will you share this website to your colleagues as well?</p> <p><u>Yes, I will share this website to manage our community's E-waste output.</u></p> <p>Any improvements to be added to the website? Please write them down below</p> <p><u>I think you can add more information and links to directly access collection centers and EPP's for a better approach.</u></p>

To conclude, from the interviews I conducted, I have received positive feedback regarding the functioning and the content present in the website. However, I have also been asked to make improvements such as adding case studies of E-waste management and more statistics to present the reader about the practicality of the solutions.

## Strand II: Product Evaluation Against Design Specifications

After conducting beta testing and collecting feedback from the primary target audience, I believe now it is essential to evaluate my product based on the initial design specifications I have set in Criteria B strand I. This activity will give me an opportunity to be reflective, that is an IB learner profile. Below is the evaluation table with the score range of 1-10, and justification as to why I have rated my product the respective score.

<b>Specification</b>	<b>Score (1-10)</b>	<b>Explaining the Specification</b>	<b>Justification for Score</b>
<b>Customer</b>	8	The target audience of this website will be the community residents' welfare organizations who have a difficult time in coping with the disposal of E-waste in an unsustainable manner.	I believe that 8/10 is the score to award this specification. This is because of the improvements to the website suggested by the expert and the 6 members of the different community organizations which could have increased the score given.
<b>Visual Appeal</b>	8	The background image that will be used throughout the website must have a resolution of 1500 x 100 resolution for having a greater visual appeal to the user. All the pictures must be clearly visible and non-blurred.	The target audience, especially Mr.Prashant was really content with the visual appeal of the website, and has given me a good rating , which can be seen above in strand 1 of Criteria D. However, the quiz and the feedback pages need formatting to fill the surroundings of the quiz and feedback with the background image
<b>Aesthetics</b>	10	The product should be a dynamic website, with an attractive colour scheme, where the colours are complimentary to each other. Also, for the visual appeal, appropriate languages like CSS will be used to improve the visual appeal of the website.	Evidently, the product is a dynamic website and by adding a linear gradient to the background image, made the website aesthetically pleasing in addition with using turquoise as a hover colour.
<b>Content</b>	9	The website must give a breadth of information to the target user to obtain decent knowledge on this growing problem. For this, the website will include- Basic information on E-waste and its causes; Tips to manage E-waste for the general public;	The content as mentioned in the interviews was sufficient for giving a decent understanding about the growing problem of E-waste. It includes all the webpages as mentioned in the specification. However, as per Mr.Prashant in the blogs and articles page could have been a

		Blogs and Articles on E-waste to provide multiple perspectives; information on drives and programs for the user to participate and receive first hand information.	bit more polished using the Justify property. Also, the drives and programs should have been added with date and place to give the basic information about these events.
<b>Availability</b>	10	The intended audience are the people in demographics of 10-75, as mentioned before. However, this website will be available to everyone as it won't be location-specific and can be accessible from all around the world.	Subsequent to hosting the website, it will be available around the world and will help spread awareness to a wider range of audience apart from my intended audience.
<b>Simplicity</b>	10	The website should have a simple UI (User Interface) to provide a better User Experience (UX). The dynamic website should include easy-to-access tabs for accessing various sorts of information.	The website has a simple User Interface, which is the main advantage of a top bar menu layout. The website's tabs are visible and has a standard position across all the webpages. Also, the buttons are easy to press and change colour when hovered and pressed upon.
<b>Ease of Navigation</b>	10	The website should be easy to use, this should be done by using credible and latest iterations of the coding languages as they are less prone to glitching/hanging that can affect the UX of the website.	The website is navigation-friendly and is intuitive to use and this can be seen in the interview feedbacks as well. With non-cluttered information and has a standard position of the nav bars across all the webpages.
<b>Load Time</b>	10	The load time must take less than 4 seconds for initially loading the website. However, for intra-website navigation, it must take less than 2 seconds to load respective web-pages. This must be the expected result when a user has a decent internet speed to load these web-pages quickly.	The website loads in 3 seconds initially, with a preloading screen and each webpage loads in max 2 seconds when pressed upon the respective webpage in the nav bar. This adds to enhanced user experience.
<b>Browser Capabilities</b>	10	The website must run smoothly in Google Chrome and the new Microsoft Edge, considering both these web engines are built on the same Chromium platform.	The website performs and opens up on both Microsoft Edge and Google Chrome.
<b>Hosting and Publishing Cost</b>	10	The cost can vary from Rs.500 to Rs.1000 as it requires money to upload the website onto the website host.	I will be choosing Microsoft Azure, that will allow for free web hosting and reduce the Cost of the project once I upload the website.

### Strand III: Improving my Product

Expert, self and target user evaluation has given me the minor and major weaknesses that I must work on. I've made a list of major and minor improvements that I could add that will improve my product and effectively help my target audience to learn about and manage E-waste in a sustainable manner. In the given table below, I have divided my improvisations into the following classes that are- major and minor improvements. I've done this to prioritise my improvisations and highlight the most important ones and colour-coded major weaknesses with blue and minor weaknesses with green.

S.no	Source of Suggestion	Limitation	Improvisations to be Made
I	Self	Re-arranging Images in Drives and Programs for greater visual appeal.	Re-arranging the respective div classes using CSS3 and HTML for arranging them side-by side
II	Self	Reformat Quiz and Feedback Pages to make them look visually appealing.	Using CSS3, I will reformat the I-frame tags in such a way that they are surrounded by the background image to give it a uniform look just like the other webpages, rather than a white background that doesn't contribute to visual appeal.
III	Target User	Improve quality of video.	Currently, the video is of standard resolution, that may impede user experience. I will render the video to 1080p resolution in Adobe Premier Pro.
IV	Target User	Use different background images for each webpage.	As per a feedback from response forms, the target user felt that adding a different background image per webpage makes each page unique.
V	Target User	Add more Blogs and Articles for the user to further read and understand about different perspectives.	I will add 2-3 more articles and blogs to the respective web page to give more information
VI	Self	Add return to homepage for each webpage.	Adding a return to homepage button for each webpage will take the user back to the home menu. This will make intra-

			navigation in the website easier.
VII	Self	Including a webpage that contains information on E-waste laws and regulations.	I will use HTML5 and CSS3, I will add a webpage for giving additional information to target audience on

## Strand IV: Impact of Solution on Target User

### **Impact of spreading awareness on Target User**

My website has impacted the target users tremendously as seen above in the response forms personally filled by them in Criteria D strand I. With community residents' welfare organizations are responsible for maintaining their respective communities and are a governing body, I believe that spreading awareness on managing E-waste to the officials of these organizations is much more efficient, as they have the authority and jurisdiction to make sustainable changes. This is in context to the global context, as effective management locally will mediate global experiences that will bring about sustainability through interconnectedness.

From the expert evaluation interview, we can see as to how Mr.Prashant has a better understanding on how to tackle the growing problem of E-waste in our community. Acting upon knowledge gained from the website, he mentioned that he will conduct E-waste household pick up drives to reduce E-waste and its effects on the community and to the environment. In addition to that, we can imply from this measure that IT company employees that are in huge numbers in my community are heavily dependent on technological products. By mending our ways in E-waste disposal, that spread across various surrounding communities (as mentioned in target audience response forms), and using any sustainable method mentioned in the website, we can reduce the amount of E-waste generated per capita.

Therefore, the target user that are the community organizations can be a viable target user that can bring about local positive changes.

### **Negative impacts on the target user by the product**

As far as I'm concerned, the website was intended to deliver positive results and make communities environmentally friendly by spreading awareness on E-waste. However, conducting E-waste drive collection by privately certified recyclers can cost a sum considering on the amount of E-waste to dispose and the size of the community.

### **Have the design specifications been satisfied?**

I believe apart from several improvisations that must be added to the website, as mentioned above in Criteria D strand III, the website has successfully fulfilled the design specifications. With good load

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times, visual appeal, aesthetics, content, ease of navigation and etc, I was able to adhere to the specification table showcasing my self-management skills.

### **Extension: widening my website's influence on target users**

As a part of an extension to this project, to the best of my ability share my website with the MyGate app. The MyGate app is a widespread app used by many residential communities across India for community management and security purposes. However, by sharing my website into the MyGate app, the website can have a wide-spread impact on different communities across India allowing for local processes to spread across the sub-continent. This will immensely spread awareness of effective E-waste management.

### **Measuring Success Against Global Context**

Globalisation and sustainability is the global context that this project is affiliated with. Aforementioned, the product instigates local and surrounding communities to take a stringent action against unsustainable E-waste disposal, thus instigating local initiatives can mediate global ones which is determined by the successfulness of this solution/product. In addition to that, the strand "*impact of decision making on humankind and the environment*" can also be addressed as the awareness spread to the community residents' welfare organizations officials can alter their whole approach to waste management or in particular E-waste management, that is heavily dependent upon the efficacy of the product.

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## Appendices

### Appendix A: Bibliography

#### Sources Used in E-portfolio

- n.d. Accessed November 20, 2019. <https://ebookcentral-proquest-com.library.britishcouncil.org.in:4443/lib/britishcouncilonline-ebooks/reader.action?docID=981726&ppg=22>.
- n.d. Accessed November 26, 2019. <https://wireframe.cc/>.
- n.d. Accessed December 5, 2019. <https://www.lucidchart.com/pages/>.
- Baldé, C.P., Forti V., Gray, V., Kuehr, R., Stegmann,P. 2017. *The Global E-waste Monitor 2017.* Statistics Report, United Nations University, International Telecommunication Union, International Solid Waste Association , Global E-waste Statistics Partnership. Accessed November 23, 2019. [https://collections.unu.edu/eserv/UNU:6341/Global-E-waste\\_Monitor\\_2017\\_\\_electronic\\_single\\_pages\\_.pdf](https://collections.unu.edu/eserv/UNU:6341/Global-E-waste_Monitor_2017__electronic_single_pages_.pdf).
- n.d. *Chekhov*. Accessed November 25, 2019. <https://chekhov.withgoogle.com/alive>.
- n.d. *Google Forms*. Accessed November 27, 2019. <https://docs.google.com/forms>.
- Greene. n.d. "EWM Rules 2016." *Greene*. Accessed November 23, 2019. <http://greene.gov.in/wp-content/uploads/2018/01/EWM-Rules-2016-english-23.03.2016.pdf>.
- MCallister, Lucy. 2013. *The Human and Environmental Effects of E-Waste*. April 4. Accessed November 11, 2019. <https://www.prb.org/e-waste/>.
- McCarthy, Niall. 2019. "The World's Worst Electronic Waste Offenders." *Statista*. February 28. Accessed November 24, 2019. <https://www.statista.com/chart/17175/e-waste-generated-per-inhabitant-in-selected-countries/>.
- Morton, Andrew. 2019. *Trashing Electronics: The Effects of E-Waste on Environment*. April 22. Accessed November 11, 2019. <https://cleanlites.com/trashing-electronics-the-effects-of-e-waste-on-environment>.
- Prasad, Mallikarjuna. Effects of E-waste on Health. In person. Dr. Prasad's Home, 2019.
- Vaishnavi, Sri. Effects of E-waste by IT employees and workplaces. E-mail, 2019.
- Venngage. n.d. *GANTT Chart Templates*. Accessed December 6, 2019. <https://infograph.venngage.com/templates/charts/gantt>.
- . n.d. *Wireframe Templates*. Accessed November 23, 2019. <https://infograph.venngage.com/templates/diagrams/wireframe>.

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Weihua Zhang, Hua, Wu Ying-Xin, Marie-Odile Simonnot. n.d. "Soil Contamination due to E-Waste Disposal and Recycling Activities: A Review with Special Focus on China \*1." Accessed November 2019, 21. doi:10.1016/S1002-0160(12)60030-7.

## Sources Used in Project

- n.d. Accessed December 23, 2019. <https://sweetalert.js.org/>.
- n.d. Accessed December 24, 2019. <https://www.ecoatm.com/pages/how-it-works>.
- n.d. *Awareness Activity*. Accessed January 25, 2020. <http://greene.gov.in/awareness-activity/>.
- n.d. *Become A Member*. Accessed January 25, 2020. <https://www.ewasa.org/become-ewasa-member/>.
- Coyer, Chris. 2016. *Keyframe Animation Syntax*. September 19. Accessed December 16, 2019. <https://css-tricks.com/snippets/css/keyframe-animation-syntax/>.
- "CSS Layout - Horizontal & Vertical Align". *W3 Schools*. Accessed 18 December 2019. [https://www.w3schools.com/css/css\\_align.asp](https://www.w3schools.com/css/css_align.asp).
- Global, Rubicon. "What Are The Biggest Electronic Waste (E-Waste) Problems?". Blog. *Rubicon*, 2018. <https://www.rubiconglobal.com/blog/electronic-waste-problem/>.
- Hamedani, Mosh. *JavaScript Tutorial for Beginners: Learn JavaScript In 1 Hour [2019]*. Video, 2018. <https://www.youtube.com/watch?v=W6NZfCO5SIk>.
- ITU News. *Image on E-Waste*. Image, 2018. <https://news.itu.int/ewaste-growing-challenge/>.
- Lepawsky, John. 2018. *Almost everything you know about e-waste is wrong*. May 21. Accessed December 30, 2019. <https://www.eco-business.com/opinion/almost-everything-you-know-about-e-waste-is-wrong/>.
- TNN. *An Image That Shows Household Waste Collection*. Image, 2017. <https://timesofindia.indiatimes.com/city/surat/no-segregation-at-source-no-garbage-collection-from-houses/articleshow/62028407.cms>.
- "Understanding Extended Producer Responsibility". Blog. *Danube Goes Circular*, 2018. [https://danube-goes-circular.eu/?q=Blog\\_2](https://danube-goes-circular.eu/?q=Blog_2).
- n.d. *Volunteer with Us*. Accessed January 14, 2020. <https://www.ban.org/volunteer>.

## Appendix B: Displaying ATL Skills

<div style="text-align: center;">  <h3>Thinking</h3> <ul style="list-style-type: none"> <li><b>Creative thinking:</b> During the course of building the product, I have used creative thinking to add various functionalities, color schemes to adhere to my design specification.</li> <li><b>Critical Thinking:</b> I've been a critical thinker while choosing the appropriate design solution, keeping in mind the advantages and disadvantages of different layouts, texts and etc.</li> <li><b>Transfer:</b> I have shown transfer skills by using different concepts such as toxicity of heavy metals (chemistry), HTML and CSS (Design IT) and waste management (Biology)</li> </ul> </div>	<div style="text-align: center;">  <h3>Self Management</h3> <ul style="list-style-type: none"> <li><b>Organizational Skills:</b> By creating GANTT, flowchart and design specifications, I was able to adhere to the timeline, navigation process and aspects of the website respectively. I have constantly maintained the sources I've used throughout the project in one particular folder as well.</li> <li><b>Affective Skills:</b> I was able to showcase these skills when I consistently failed to desirably align my Div classes onto the website, and after failing every trial, I have persistently tried and finally succeeded to align the div containers to stick to the design plans.</li> </ul> </div>
<div style="text-align: center;">  <h3>Social Skills</h3> <ul style="list-style-type: none"> <li><b>Collaboration:</b> While collecting feedback from my target users, I have gained inputs and suggestions from them. This helped me collaborate and know the necessities of my target users by being open-minded and social.</li> </ul> </div>	<div style="text-align: center;">  <h3>Research</h3> <ul style="list-style-type: none"> <li><b>Information Literacy:</b> I have collected data and collated information collected from primary sources and secondary sources such as survey, E-book awareness website and etc.</li> <li><b>Media Literacy:</b> I have collected a variety of secondary sources such as E-books, awareness websites, online statistics, intergovernmental reports using the digital media.</li> </ul> <p>I respected other's works that I have used as secondary and primary sources to maintain academic honesty. I have practiced this by duly citing each source I used.</p> </div>
<div style="text-align: center;">  <h3>Communication</h3> <ul style="list-style-type: none"> <li>I have developed communication skills by interviewing my primary sources that are Ms. Vaishnavi and Dr. Prasad. In addition to that, by collecting feedback from experts and 6 of my target audience, I was able to approach and communicate with each individual in an appropriate manner.</li> </ul> </div>	

## Appendix C: Other Results from the survey.

Here is the extra information that I've gathered from the survey:

How, according to you, is E-waste affecting the lifestyles of humans?

17 responses

Slow poison

causes pollution and wastage of resources

e waste is affecting humans nervous system

Unknowingly, we are going to face health hazards in the eye and the spine and nervous system . Planners should take this seriously and work on this.

More plastic ,when disposed leads to more production and more e waste

i think it is causing a lot of problems to dispose the material and it could often be very problematic for the environment.

Creating a lot of global warming

Dump yard space increases day by day and burning e-waste is polluting the air quality.

What, according to you are the causes of the generation of E-waste?

17 responses

Want to have latest gadgets

people not willing to use their resources well in turn leading to wastage

the causes can be many but few prominent ones are people upgrading their electronic appliances / smart ones very frequently , fast changes in technology is also adding on to generation of e waste

due to the increase in population , technology and increase in products

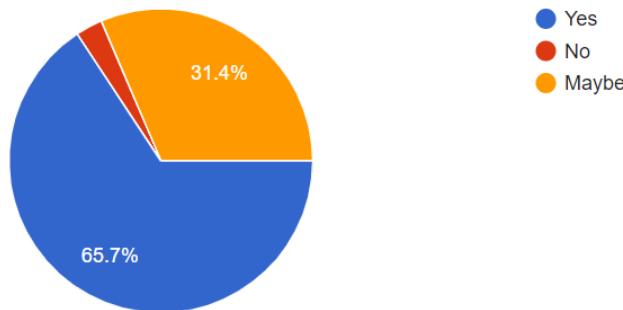
Going for new generation. Electronic products

People being attracted to toward gadgets more than necessary

disposing phones very often and the poor construction of the phone. for example the dscos show caused by Samsung phones.

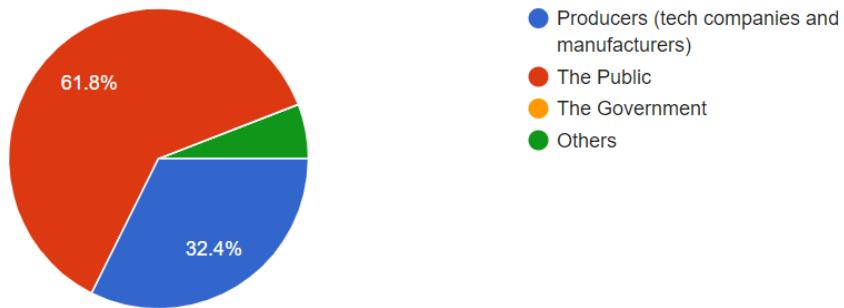
Are you willing to participate in environmental campaigns related to E-waste?

35 responses



Who do you think are responsible for the generation of E-waste?

34 responses



Do you think existing campaigns have effectively curbed the effects of E-waste on the public?  
Explain how?

17 responses

No

no as the public still believes that this isn't a major issue to human kind which is not true

they havent effectively curbed the effects on e waste

Very little. Thought has been given on this

Yes ,it's spreads a lot of awareness of the harmful effects of e waste

I have never heard of any E-waste campaigns

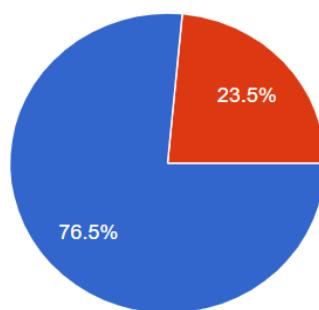
Yes

spreading awareness through social media and broadcast media.

No I don't think so

Do you think exchange programs offered by producers are a great way to halt the generation of E-waste?

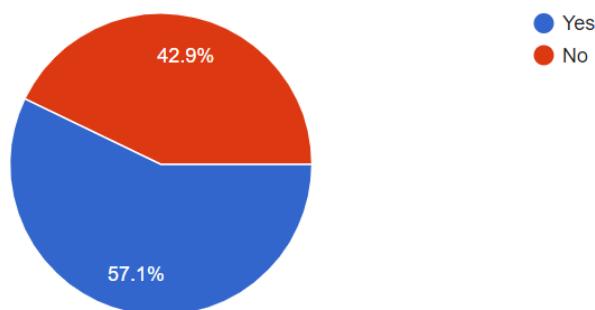
34 responses



- Yes, as more amounts of obsolete technological products can be returned
- No, as they reuse and reintroduce it as new electronic components back into the market.

Have you ever encountered E-waste disposed of in common areas like roads, parks, and malls?

35 responses



What are your suggestions for creating solutions to counter the growing problems of E-waste?

13 responses

pass on the electronic items  
recycle reduce and reuse

the first thing we can do is create awareness regarding the fast generation of e waste and how it is harming the environment.

later we can introduce factories or plants which can convert the e waste into something productive and healthy for the environment.

inform people about it and participate in the campaigns

,make people aware encourage people working in this field

Proper disposal of e-waste , segregated on the bases of reuse or refuse

## Appendix D: Transcript of Dr.Prasad's Interview

### **Q1) Have you ever witnessed cases during your career on heavy metals affecting your patients?**

Ans. Yes, I have worked as a doctor near coal-mining areas in Telangana. I have seen 3-4 cases back in the early 2000s I believe where patients were unwell and in a very deteriorated health condition. Through medical tests, we have found out traces of heavy metals in their bloodstream that was the ultimate cause of their deteriorated health.

### **Q2) Can you explain about how heavy metals such as cadmium, arsenic and etc have an impact on human life?**

Ans. Heavy metals are very harmful to the different systems in your body. Heavy metal ingestion through respiration and intake via mouth can cause negative effects. Also, while the specialists were treating the patients, it caused degeneration of nerve and muscular cells, diminishing cognitive abilities of the patient. Unfortunately, we were not able to save these patients due to the limited resources in rural areas, that too near coal-mining areas during my period of service.

### **Q3) How do you know that heavy metal presence were harmful to patients?**

Ans. Well we were introduced to effects of heavy metals and didn't have much information about it during my specialisation and MBBS. However since I was the hospital superintendent of my area, I went over each patient's file personally and came across such adverse effects of heavy metals on the patients affected by it.

### **Q4) Do you have any information on current treatment methods to tackle the negative effects of heavy metals on human bodies?**

Ans. It has been over 7 years since I have retired. So I am not up to date with treatment methods of heavy metal presence by present practitioners.

### **Q5) Do these metals have an impact on a cellular level in context to their size?**

Ans. Yes, these heavy metals cause interruptions in cell proliferation, protein synthesis. Especially, it can have significant negative impacts on nephrons that are present in our kidneys as their main purpose is to filter out unwanted substances from our body. I've also heard that from my present junior practitioners that heavy metal presence can lead to Parkinson's disease which is a brain related disease.

## **Q6) What is your opinion on modern technological products using toxic heavy metals in their products?**

**Ans.** Are you telling me that the devices I use contain these harmful metals? Well then, if what you're saying is true, I am completely against such unethical companies who deliberately include heavy metals in our daily electronics which can as mentioned has the ability to deteriorate our health.

## **Q7) Will the effects of heavy metals on humans increase if such electronic wastes are incinerated?**

Ans. It is highly possible. These heavy metals are dense too so once they are released into the air, ingestion into our respiratory system takes no time.

## **Q8) Do you have any suggestions to reduce heavy metals effects on humans?**

Ans. A famous quote we hear all the time is "prevention is better than cure." So, we can prevent the spread of heavy metals in any area by implementing stringent actions. Considering that these heavy metals are used in technological products, we must ban them from being used altogether.

## **Appendix E: Answers from Ms. Vaishnavi**

The answers for my questions were sent in a word document.

Q1)

Any electronic product nearing the end of its "useful life" is considered an e-waste. When I say "useful life", I mean when you can no longer use it for its specified purpose or when the product itself becomes redundant. This is where the mantra of "Reduce, reuse and recycle" should be applied. Every generation must 'Reduce' e-waste generation smartly. A still functioning electronic equipment can be 'Reused' by donating or selling it to someone. And finally, the products that cannot be used should be 'Recycled'.

Q2)

The main cause or rather reason for the increasing e waste is the increased number of products, because of which disposal problems are caused as excess of anything is not appreciated.

Development : As of now, It is estimated that there are over a billion personal computers in the world.

Technology : In this modern era technology is growing at lightning fast speed. This technology results in the coming of newer products and appliances.

Population : With the increasing population all these have been triggered even more. It's simple to understand by one of the most simple theories of unitary method.

Q3)

MNCs now a days are so powerful that they can influence the whole market system of a country in no time. It is these MNCs that provide better technology. They have money more than the budget of some countries as well. . In the United States alone there are over 300 million obsolete computers combining all IT companies. Most of the MNCs are wary of some compliance risks. E-waste and IT recycling for business should be done such that the followings needs are met :

Your IT assets and e-waste are processed in an environmentally responsible manner

Your reputation is protected

Your compliance risks are eliminated

Q4)

I have never discarded any electronic product as of yet and I'm not planning on just discarding it away. I would probably donate if I find any product to be obsolete in my life.

Q5)I don't replace my very often unless it is absolutely necessary. I want a device that gets the job done.

Q6)The government agency where I work in uses many obsolete products. But the urge to upgrade to newer products is evident every day. You simply cannot keep up with all the latest technologics with old systems.

Q7)

A use of a product depends on the user itself. For, example I own an older version phone and a new, latest model is doing the job I need to complete in a much faster way I would definitely be tempted to cast away my old phone. Innovation brings about changes and consequences as well. But those consequences must be dealt with in a proper manner.

Q8)

Phones, laptops and televisions.

Q9)

Virtusa, the company I had worked in earlier launched Virtusa's Code Green initiative and is run in collaboration with the Central Environmental Authority. Its aim is to encourage Virtusans to manage the disposal of e-waste in a responsible manner.

Q10)

It's very commendable that you are building a web site on E-waste awareness. Most people aren't even aware of the concept of E-waste. And since everyone is pretty much tech savvy, this is a good medium to let them understand the depth and magnitude of problems e-waste can cause to our environment.

## Appendix F: Target Audience 4 Response Forms (Response 1 in page. 35)

### Response 2: Mrs.Priyanshi Saxena from Trendset Apartment Resident's Association

<p><b>Design Response Form</b></p> <p>Name: <u>Priyanshi Saxena</u></p> <p>Community Organization: <u>Trendset residents' Association</u></p> <p>Please rate the overall product on the scale below (1-lowest, 5-highest):</p> <div style="text-align: center;"> <input type="radio"/> 1    <input type="radio"/> 2    <input type="radio"/> 3    <input type="radio"/> 4    <input checked="" type="radio"/> 5     </div> <p>How content were you with the aesthetics and the visual appeal of the website?</p> <p><u>The website is really good. I admired at the overall looks of the website. However you can work on changing the shade of the image in the background.</u></p> <p>Was the information posted on the website useful for your line of occupation?</p> <p><u>Definitely, I have learnt a lot about E-waste. As a secretary, I will pitch in managing ideas to my colleagues in the association I work for.</u></p> <p>What solutions will you implement from the "Tips to Manage E-waste" in your community?</p>	<p><b>Design Response Form</b></p> <p>I personally prefer having a E waste collection point. Then the collected E waste will be given to credible recyclers, once in a while.</p> <p>How would you rate your current understanding on E-waste and its implications compared to before reading the website?</p> <p><u>I learnt a lot from the website on E-waste.</u></p> <p>Will you share this website to your colleagues as well?</p> <p><u>I will share it with my kids and acquaintances and colleagues.</u></p> <p>Any improvements to be added to the website? Please write them down below</p> <p><u>I believe you should add information about the effects of e-waste.</u></p>
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### Response 3: Mr. Vishnu Khunteta, SMR Vinay Apartments Resident's Welfare Association

<p><b>Design Response Form</b></p> <p>Name: <u>Vishnu Khunteta</u></p> <p>Community Organization: <u>SMR Vinay Residents Welfare Association</u></p> <p>Please rate the overall product on the scale below (1-lowest, 5-highest):</p> <div style="text-align: center;"> <input type="radio"/> 1    <input type="radio"/> 2    <input type="radio"/> 3    <input type="radio"/> 4    <input checked="" type="radio"/> 5     </div> <p>How content were you with the aesthetics and the visual appeal of the website?</p> <p><u>The visual appeal of the website is very excellent. It looks like a professional website.</u></p> <p>Was the information posted on the website useful for your line of occupation?</p> <p><u>I am a treasurer in my office. This will help us treat E-waste in a better manner.</u></p> <p>What solutions will you implement from the "Tips to Manage E-waste" in your community?</p>	<p><b>Design Response Form</b></p> <p>Obviously I will implement cost-effective solutions such as recycling the EPR's as mentioned.</p> <p>How would you rate your current understanding on E-waste and its implications compared to before reading the website?</p> <p><u>My knowledge on e-waste has grown a lot after reading your website.</u></p> <p>Will you share this website to your colleagues as well?</p> <p><u>I will share this website with my fellow association members.</u></p> <p>Any improvements to be added to the website? Please write them down below</p> <p><u>Add more tables, graphs and more articles in the "blogs and article" webpage.</u></p>
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## Response 4: Mr. Abhijeet Reddy from Rainbow Tree Park Community Association

Design Response Form

Name: Abhijeet Reddy

Community Organization: Rainbow tree park community association

Please rate the overall product on the scale below (1-lowest, 5-highest):

1     2     3     4     5

How content were you with the aesthetics and the visual appeal of the website?

You should work on using different images on your background in different web pages other than that its splendid.

Was the information posted on the website useful for your line of occupation?

The information is useful for awareness up my community

What solutions will you implement from the "Tips to Manage E-waste" in your community?

Design Response Form

I will use two solutions that encourage collection drives and inform my community members to increase exchange rates.

How would you rate your current understanding on E-waste and its implications compared to before reading the website?

I came across new information in your website such as tips and articles. So I developed my knowledge.

Will you share this website to your colleagues as well?

As I suggest you to make some changes to the website then I will share it with my friends and colleagues.

Any improvements to be added to the website? Please write them down below

As said use different images for background and change the visual appeal of the feedback form page.

## Response 5: Mr. Kiran Rao, Estella Apartments Residents Organization

Design Response Form

Name: Kiran Rao

Community Organization: Estella Apartment S, Resident organization

Please rate the overall product on the scale below (1-lowest, 5-highest):

1     2     3     4     5

How content were you with the aesthetics and the visual appeal of the website?

Website had a really nice appeal to it and was very informative.

Was the information posted on the website useful for your line of occupation?

The information was very useful as it will help my community deal with E-waste.

What solutions will you implement from the "Tips to Manage E-waste" in your community?

Design Response Form

As VP, I will make sure all the disposed e-waste will go to recyclers by initiating regular e-waste collection drives.

How would you rate your current understanding on E-waste and its implications compared to before reading the website?

My understanding on e-waste has significantly improved after referring to your website.

Will you share this website to your colleagues as well?

Yes, I will share the details to my colleagues and my neighbours how to help clear out e-waste.

Any improvements to be added to the website? Please write them down below

Your website can include more videos and displays so that user can easily understand the intent of the website.