



**Vibhor Agarwal** is a design student at Delhi Technological university and has keen interest in creating magical and unique experiences, be it a product, service or an application . He firmly Believes that all the design streams are linked with the interconnecting thread of user experience, he also believes storytelling is one of the most important tool for a designer.

Loves to travel and explore the world, connecting dots and collecting stories filled with emotions and experiences

## ZOLA IRON

### Abstract

*This report presents the process of redesigning of an iron while making it more user-centric, ergonomically comfortable and appealing to the eyes. The report starts with considering the background research, which has been further divided into literature study and observational study. A user study was completed with a survey (Questionnaire), Task analysis and deeper interrogations to understand users' needs and requirements. The user study findings were thereafter analyzed and scope of improvements was made which further led to concept generation. Two concepts were compared and then the most suitable concept was chosen focussing on ergonomic handle and modern aesthetics. In short this report talks about enhancing the existing design of clothes iron, understand the current problems faced by users, deep digger and try to find the gap between them and then finally try to solve them.*

### Introduction

This project was done in order to enhance the existing design of clothes iron, understand the current problems faced by users and try to find the gap between them and finally try to solve them. The basic role of ironing a piece of cloth is to remove creases, which are the wrinkles present in the piece of cloth. These wrinkles are cured when the heat by the iron loosens bonds within the fibers of a fabric which were placed incorrectly and after the heat applied the bonds become less strong and they attain the desired position and after the garment cools down it attains the sharp, crisp shape, exactly how people want it. There have been different ways how these creases were removed starting from pressing Linen smoothers on cloths in early age, to box irons, to flat irons to modern-day vertical steam iron. Ironing clothes makes the clothes look more fresh, clean (appearance), also studies have shown that it also saves the cloth from shrinking. Presently there are broadly four categories of iron - The coal iron which uses coal to heat up and is generally used commercially by the vendors, second type is the dry iron, which uses electricity and only heat to remove wrinkles and is generally used where the results need to be quick and fast, third The most common type of iron used these days are steam iron which uses moisture and heat both to remove wrinkles and are very common to normal household, there is one more type of iron - Vertical iron which is a new addition to the steam function where ironing is performed vertically and is mostly used up in fashion industry and stores. This project aims at how ironing is done in households and restrict its user base to personal level than an iron used commercially hence the solution and research has been restricted to steam iron. Most of the current irons are very bulky in shape, which does not match with modern-day looks, also the current handles have been identified with a major issue on ergonomic ground where users have been silently facing the issue and have been used to it. The position of buttons performing different functions are not that convenient to the user and due to this the efficiency also suffers, also there haven't been much changes (significant changes) to the current existing iron to solve this kind of issues, hence this project tries to make the product more user friendly, considering

all the important feedback from the users and also develop the outer look according to the modern-day homes where everything is streamlined, elegant and aesthetically pleasing to our eyes.

## Need Statement

To redesign current iron in terms of ergonomics and making it more aesthetically pleasing for modern-day homes.

## Objective

The objective of the project was to:

1. Understand the Existing product
2. Look for scopes of improvements in current design by analyzing and taking users feedback from their experiences
3. Choosing the most appropriate problems and common issues faced and then drawing solutions and finding the most suitable solution for it.

## RELATED WORK/ BACKGROUND STUDY

Research plays a vital role in understanding what has already happened in the previous time and provides us with a scientific way to improve or develop a new concept,

This project paper consists of two different types of researches

- 1) Literature Study
- 2) Observational Study

The literature study part comprises of the study done through reading articles, websites on internet, trying to figure out how the product has been evolved through ages and how does it actually functions and what are the different types of advancement made till now. The Observational Study comprises of observing how the user has been interacting with the product, the issues they have been facing and later on developing an analysis report for further explorations.

Ironing is done basically to remove creases, the basic elements because of which the ironing functions are Pressure, Heat, and Water.

- a. **Pressure:** The Iron is made of a heavy material so that one can easily give high amount of pressure to the cloth and its easy to iron. Now talking about the shape of the iron its triangular in shape. The best shape that nature has come up with through evolution is the streamlined shape which we all can observe in fishes. Men often try to mimic nature for better results (Fig 1 ) shows a ship similar to the pressing iron shape that is "triangular". Iron requires maximum surface area apart from minimum friction and good

maneuverability, hence it is designed in a streamlined way, narrow in front and wide at



the back.

*Fig 1 A ship showing aerodynamic nature*

- b. **Heat:** The cloths have polymers particles in between them when wrinkles are formed then these particles get locked in all different positions, because of which the wrinkles are there. Heat is required to breakdown these polymers present between the strands of these fibers. After applying heat the polymers gets unlocked and the flat triangular heavy surface of iron frees the wrinkles making it look straight and wrinkle-free (Heating is commonly done to a temperature of 180–220 °Celsius).
- c. **Water:** Now when these particles are been loosened up with the heat, there are lot of complex bonds which can only be breakdown with the help of H<sub>2</sub>O, so water plays a very vital role in ironing. The use of water has the effect of "hydrolyzing" such H bonds present in the fibers And it also enhances thermal conduction to supply energy for the above breaking of bonds. Due to application of heat, these water droplets get changed into steam. As one knows that the steam is much hotter, it provides better removal of creases.

## History of Ironing

One cannot definitely say when did ironing start, but the Chinese used hot metal for ironing. Pans filled with hot coals were pressed over stretched cloth as seen in the drawing to the right (fig2). Around thousand years ago this method was already well-established.

Meanwhile the people in Northern Europe were using stones, glass, and wood for smoothing. These were in use for "ironing" in some places into the middle -19th century, long after Western blacksmiths started to forge smoothing irons in the late Middle Ages which was a new innovation.



*Fig 2 Chinese people using iron*

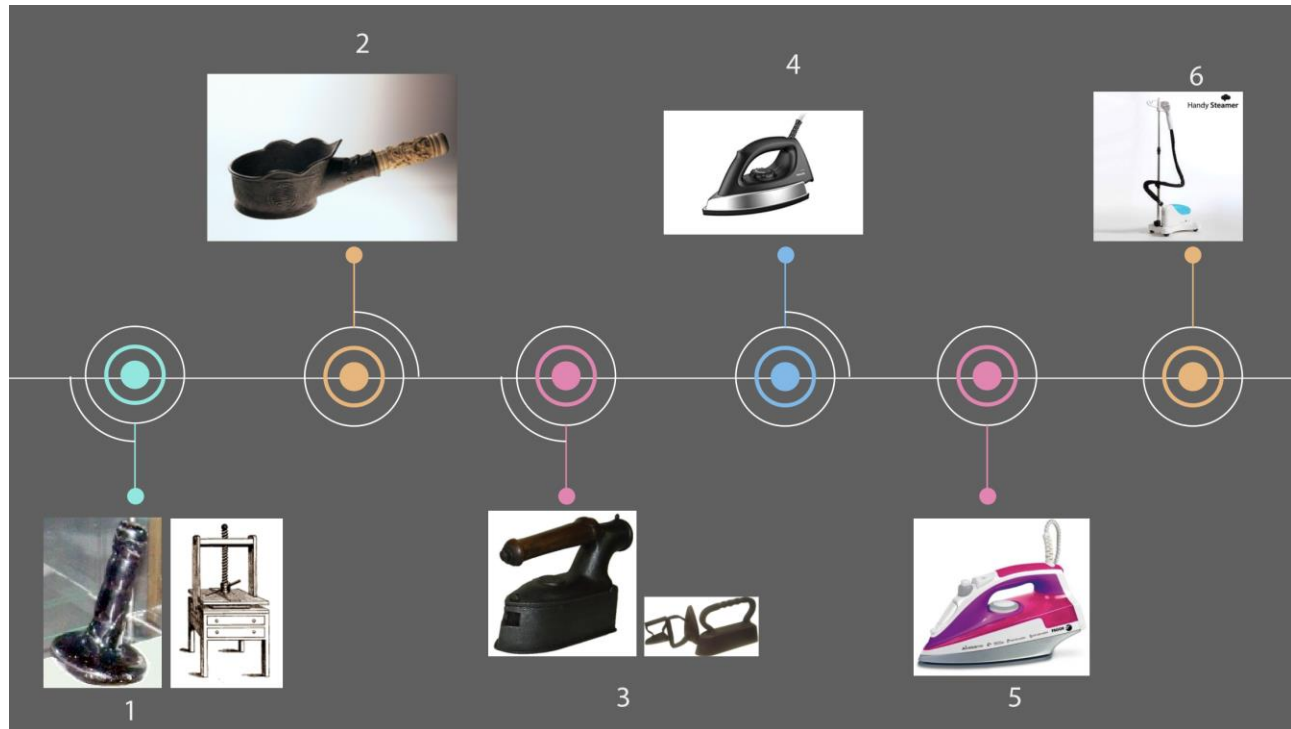


Fig 3 Timeline of ironing

- a. The very Early-Age:** Earlier it all started with flat stones rubbed onto the surface of the cloth. Simple round linen smoothers made of dark glass have been found in many Viking women's graves, and are believed to have been used as something to iron (smoothen the clothes ) with smoothing boards. As per researches, Archaeologists know there were plenty of these across medieval Europe, but they weren't completely sure how they were used. Water may have been used to dampen linen, but it is unlikely the smoothers were heated so one can assume that they were just used as heavy object, to flatten the cloth. More recent glass smoothers often had handles (for easy use), some of these were from Wales or the English. They were also called as slickers, slick stones, sleek stones, or slickenstones. Decorative 18th and 19th-century glass smoothers in "inverted mushroom" shape may turn up at antique auctions, they were given fancy shapes to attract the customers and the design was related to something they could relate/connect with. Occasionally they are made of marble or hardwood. Other methods were only available to the rich. Medieval People were preparing big sheets, tablecloths, etc. for a large household may have used frames to stretch damp cloth smooth, or passed it between "calendars" (rollers). They could also flatten and smooth linen in screw-presses of the kind known in Europe since the Romans had used them for smoothing cloth.

- b. *Medieval Advancements:*** Blacksmiths started making simple flat irons in the late Middle Ages. Plain metal irons were heated by a fire or on a stove and it used to become extremely hot. Some were made of stone, like these soapstone irons mostly from Italy. Earthenware and terracotta clay were also used, from the Middle East to France and the Netherlands. Flat irons were also called sad irons or smoothing irons because of their nature. Metal handles had to be gripped in a pad or thick rag because they also used to get hot. Some irons had cool wooden handles and in 1870 a detachable handle was patented in the US which made life a little easier. This stayed cool while the metal bases were heated and the idea was widely imitated. Cool handles stayed cool even in the "asbestos sad irons". The sad in sad iron (or sadiron) is an old word for solid, and in some contexts, this name suggests something bigger and heavier than a flat iron justifying its use. Goose or tailor's goose was another iron name, and this came from the goose-neck curve in some handles which added to the beauty of the product. Irons had to be kept immaculately clean, sand-papered and polished, extreme care was required. They must be kept away from burning fuel, and be regularly but lightly greased to avoid rusting in them
- c. *Modern-day approaches*** If one makes the base of the iron into a container for glowing coals inside it and this keeps the base hot longer than the normal iron with just the base plate heated. The charcoal iron used in India, where ironing is mostly done by the "press wallah" at small stalls mainly near societies. The hinged lid and the air holes to allows the charcoal to keep smoldering by letting in oxygen. These are sometimes called ironing boxes, or charcoal box irons, or commonly known as "Coal Iron". For centuries these charcoal irons have been used in many different countries. They also have a funnel to keep smokey smells away from the cloth otherwise it would be a problem, these are also called as chimney irons. In today's date as electricity has become more accessible, it was observed that the dry electric iron become more and more popular, which was more convenient and also eliminated the use of coal. With introduction of Steam iron, the extra use of water was incorporated inside which added more convenience.

## OBSERVATIONAL STUDY

A number of user research methods was carried out to get deeper into the user-product relationship and empathize better with the users. They've been discussed in detail as under.

### *Task Analysis*

A user study was conducted on Clothes Iron to observe the interaction of the product with the user. The aim was to develop a dynamic interface between the system and the user and to create a persona-based report and try to locate the issues faced on the product

Job description: To iron a piece of cloth using the same type of iron

Product used

Clothes Steam Iron

Brand: Philips

Model: Steam iron (Comfort series)

Condition: New with the box



- There were 4 users who were taken in order to conduct this user study, with age group ranging from 17 to 45 yrs

The task of ironing was reduced to further 7 steps (subtasks), and which breaks down the single task of ironing into the small easier tasks to understand the problematic areas

This helped in observing the users and understanding the problems at each small step and categorizing it whether the subtask is easy or difficult and also any specific comments during performing those steps

The subtasks are as follows:

- Unboxing (The users were required to unbox iron from the new box. This was done to observe how easily people can figure out and understand)
- Looking for manuals (How easily the users were able to understand manual and correlate it with the product)
- Preparation (Setting up the place where ironing will happen, the preparation for that)
- The functioning of iron (How the product gets started and the basic functions, like changing the dials and waiting for the iron to get hot)
- Style of the ironing (How does the user irons, how it is operated.)
- Time taken ( The total time consumed for 1 cloth)
- Storage (After the process of how the users kept the product)

## User 1

Age: 45 yrs

Gender: Male

Usage: Not very frequent



Task Required	Task Performed	Ease/ Difficulty	Satisfaction level	Comments
Unboxing	<ul style="list-style-type: none"> <li>❖ Opens the box</li> <li>❖ Remove the product</li> </ul>	Quite easy	Not Concern	Doesn't look about the box looks or the form shape of product
Looking for manuals	<ul style="list-style-type: none"> <li>❖ Looks at the box for some information</li> </ul>	Moderate	Nothing concern	Wasn't interested for looking how to use product
Preparation	<ul style="list-style-type: none"> <li>❖ Setting up the press table</li> </ul>	Easy	Easy	Had his fixed pre defined areas and type of table cover for easy work
Functioning	<ul style="list-style-type: none"> <li>❖ Switch on the product</li> <li>❖ Waiting time for Iron getting hot</li> </ul>	Easy	Little anxiety	Wants iron to get hot fast
Style of ironing	<ul style="list-style-type: none"> <li>❖ Side by side ironing</li> </ul>	Moderate	Monotonous	The pattern was side by side , very professional
Time Taken	<ul style="list-style-type: none"> <li>❖ Average 2 min for one cloth</li> </ul>	-	Want to do more fast	The details were given more emphasis , there was more perfection to each and different part of cloth
Storage	<ul style="list-style-type: none"> <li>❖ The iron was kept vertical and next cloth was ready</li> </ul>	Easy	Not Concern	After iron clothes were folded and kept in bundle and for next set iron wasn't switched off



**User 2****Age : 17 yrs****Gender: Female****Usage : Occasional User**

Task Required	Task Performed	Ease/ Difficulty	Satisfaction level	Comments
Unboxing	<ul style="list-style-type: none"> <li>❖ Opens the box</li> <li>❖ Remove the product</li> </ul>	Quite easy	Little curious	Does give some importance to box and little excited for product
Looking for manuals	<ul style="list-style-type: none"> <li>❖ Doesn't look at box for instructions</li> </ul>	Easy	Curious for new product	New generation is much more aware about different products so they don't care much about manuals
Preparation	<ul style="list-style-type: none"> <li>❖ Setting up the press table</li> </ul>	Moderate	Not satisfied	Press table is also avoided as bed is taken as substitute because of less time
Functioning	<ul style="list-style-type: none"> <li>❖ Switch on the product</li> <li>❖ Waiting time for Iron getting hot</li> </ul>	Easy	Anxiety can be seen	There is a restlessness where she gets concern how long will it take
Style of ironing	<ul style="list-style-type: none"> <li>❖ Side by side ironing plus random also</li> </ul>	Moderate	Little confused	The pattern was side by side with mixture of random strokes
Time Taken	<ul style="list-style-type: none"> <li>❖ Average 3 min for one cloth</li> </ul>	-	Okay with it but want to do it more fast	The time was given more emphasis Than perfectionism
Storage	<ul style="list-style-type: none"> <li>❖ The iron was kept vertical to let it cool</li> </ul>	Easy	Not Concern	<ul style="list-style-type: none"> <li>❖ After iron clothes were folded and iron there on bed side table</li> </ul>

**User 3**

Age: 10 yrs

Gender: Female

Usage: Once in a While

Task Required	Task Performed	Ease/ Difficulty	Satisfaction level	Comments
Unboxing	<ul style="list-style-type: none"> <li>❖ Opens the box</li> <li>❖ Remove the product</li> </ul>	Quite easy	Very excited to see	Does care about graphics on box and very excited about product look and form shape, colour
Looking for manuals	<ul style="list-style-type: none"> <li>❖ Looks at the box for some information</li> </ul>	Moderate	Curious for new product	Doesn't read but do looks for graphical information provided
Preparation	<ul style="list-style-type: none"> <li>❖ Put bedsheets on bed to iron</li> </ul>	Difficult	Confused	There is small problem for putting cloth evenly on bed
Functioning	<ul style="list-style-type: none"> <li>❖ Switch on the product</li> <li>❖ Waiting time for Iron getting hot</li> </ul>	Easy	Lot of anxiety for when will it get iron	A problem was that the wire troubled the areas where iron was already done on the clothes
Style of ironing	<ul style="list-style-type: none"> <li>❖ Random ironing with some side by side</li> </ul>	Little difficult	Confusion	The pattern was sort of random
Time Taken	<ul style="list-style-type: none"> <li>❖ Average 4 min for one cloth</li> </ul>	-	Not bothered	They somehow enjoyed ironing their clothes
Storage	<ul style="list-style-type: none"> <li>❖ The iron was kept vertical</li> </ul>	Easy	Not Concern	❖ Storage of clothes was not that great

User 4

Age: 40 yrs

Gender: Male

Usage: Daily level;

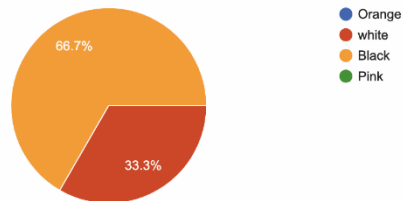


Task Required	Task Performed	Ease/ Difficulty	Satisfaction level	Comments
Unboxing	❖ Opens the box ❖ Remove the product	Quite easy	Not Concern	Doesn't look about the box looks
Looking for manuals	❖ Looks at the box for some information	Moderate	Curious for new product	He might be using a product for quite long time, and when a new product was give, the user was interested about knowing the product before using
Preparation	❖ Setting up the press table	Difficult	Hectic	The legs of the press table were not so easily adjustable according to the height of the person
Functioning	❖ Switch on the product ❖ Waiting time for Iron getting hot	Easy	No Anxiety	The location of the iron switch took few seconds There was no restlessness while the iron was getting hot
Style of ironing	❖ Side by side ironing	Moderate	Monotonous	The pattern was side by side ,
Time Taken	❖ Average 5min for one cloth	-	Okay with it	The details were given more emphasis , there was more perfection to each cloth
Storage	❖ The iron was kept vertical to let it cool	Easy	Not Concern	❖ After iron clothes were folded

## Some key findings

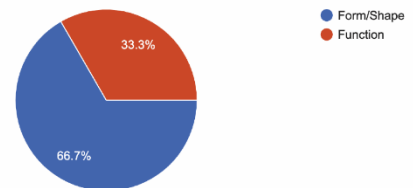
A survey was conducted where users were asked about their preferences  
Some of the questions with the key findings were as follows

which colour would you like your iron to be



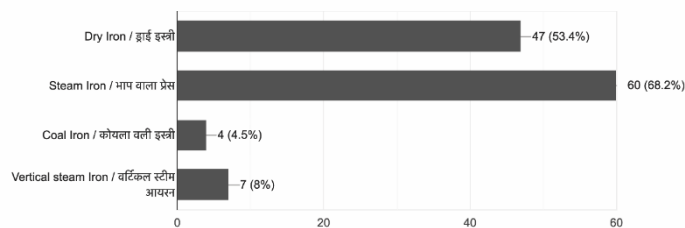
What would you like to change in your existing iron

6 responses



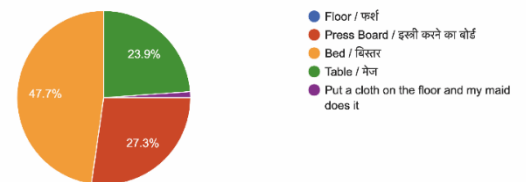
What type of Iron do you use ? / आप किस प्रकार की इस्त्री का उपयोग करते हैं?

88 responses



What is the surface on which you Iron ? / वह कौन सी सतह है जिस पर आप इस्त्री करते हैं?

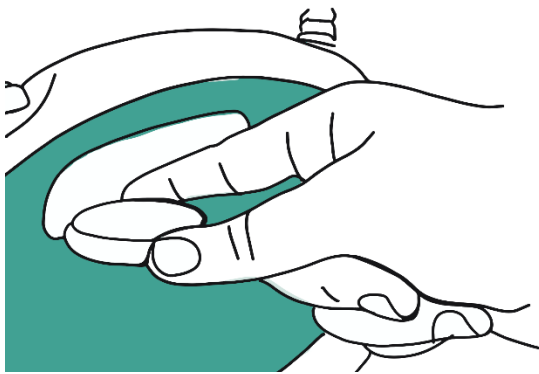
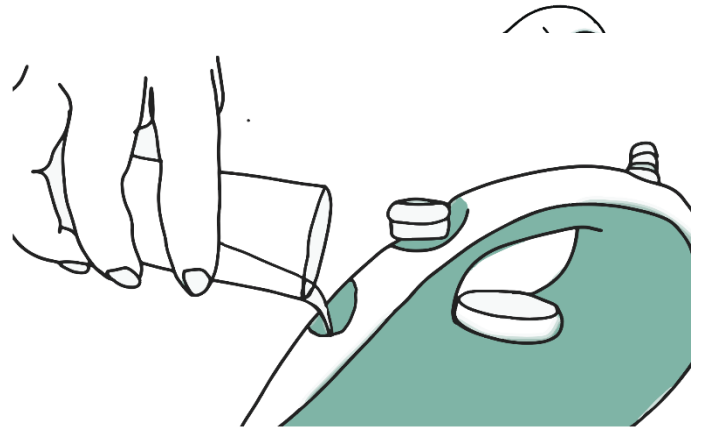
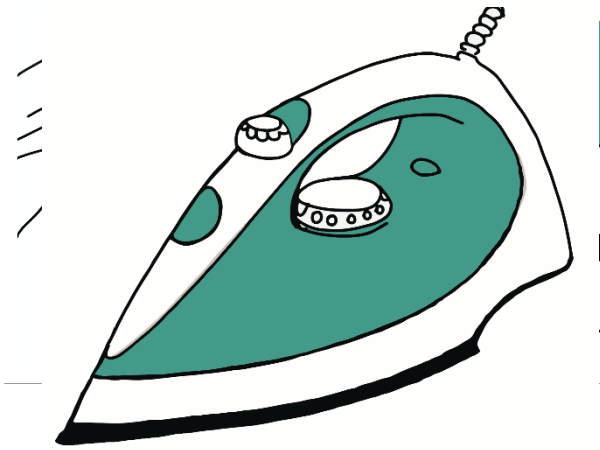
88 responses



This indicated

- People mostly use steam iron (68.2 percent) out of dry iron, coal and vertical iron
- People were happy about what iron functions although 66.7 percent of people were not happy about the look and aesthetic appeal of the product
- 47.7 Percent used bed as the surface for ironing
- 66.7 percent of people preferred black as the most suitable color for their homes
- People had issues with handling iron for a longer period of the time
- Most of the people refrained using it and gave it to local laundry service

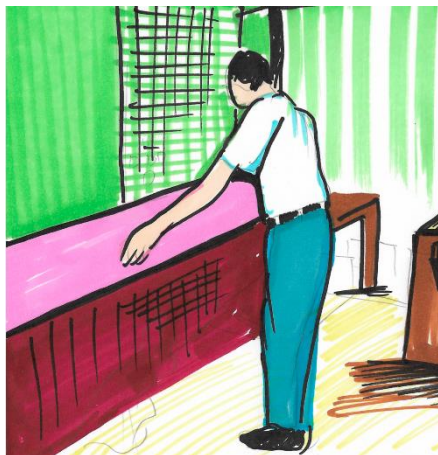
## Existing Product Analysis





## SCENARIO UNDERSTANDING THROUGH SKETCHES

### *A Journey....* Through Sketches

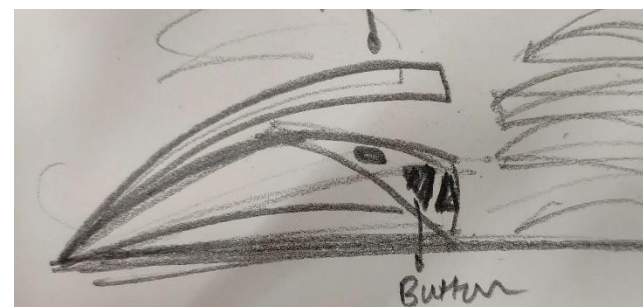
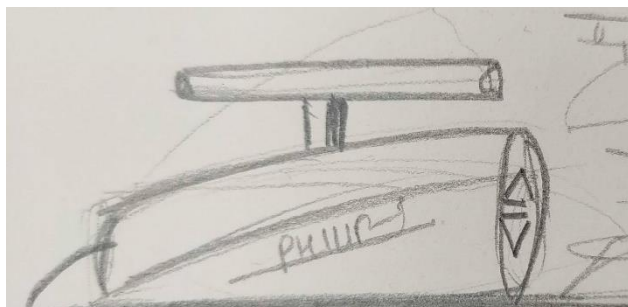
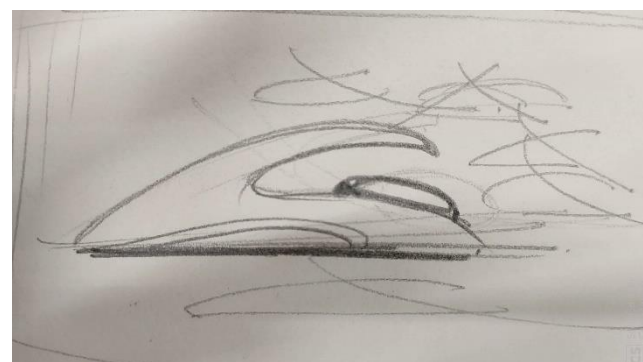
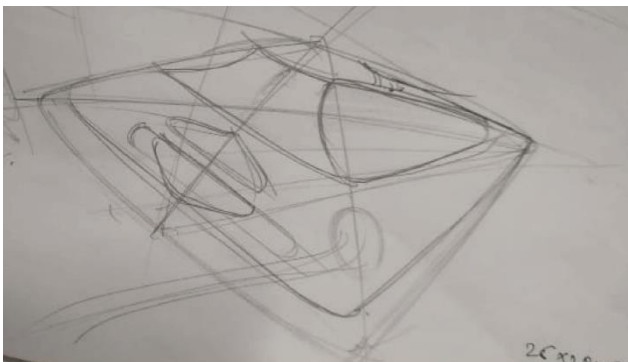
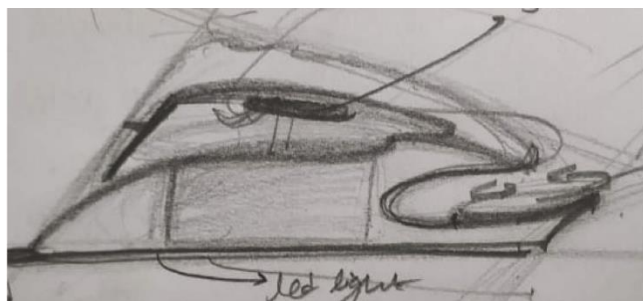
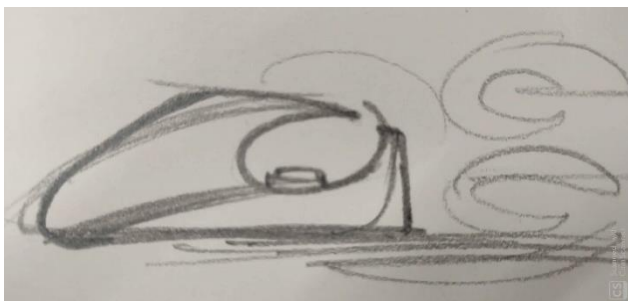








## CONCEPT GENERATION





## INSPIRATION BOARD

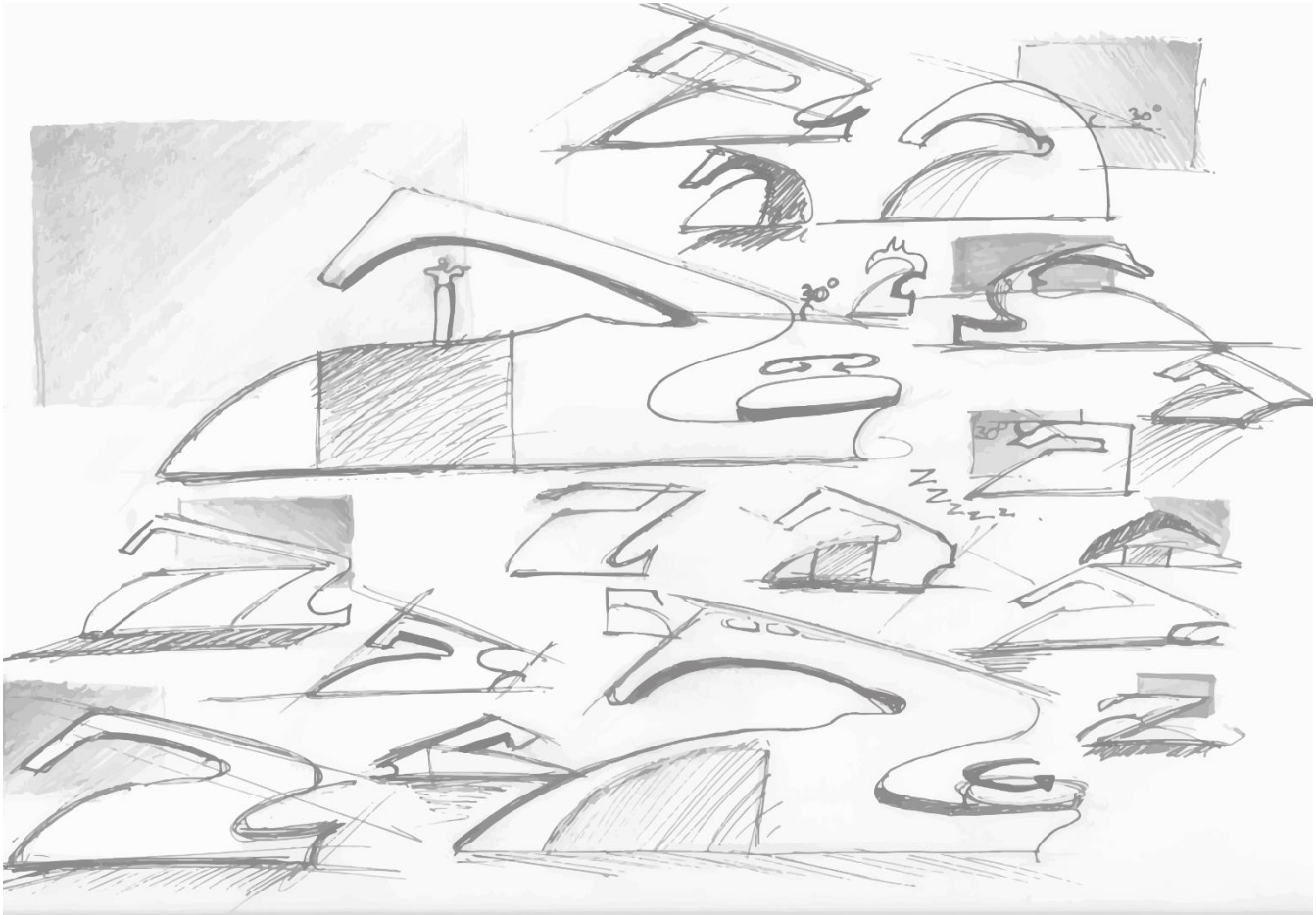


Dominantly the letter Z was taken as inspiration while developing the final concept

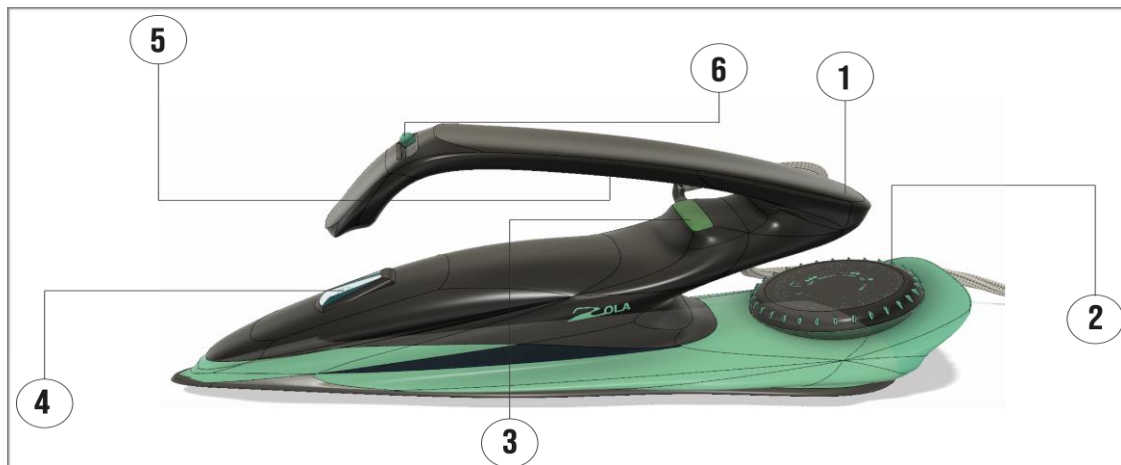
Other inspirations were

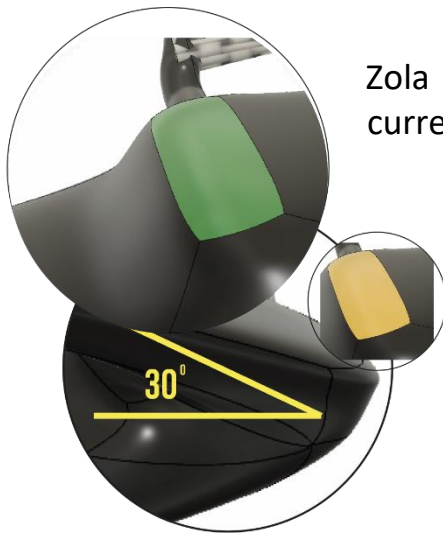
- The flexible and smooth curvature of the swan body, its overall appeal
- The ship majesty and the overall shape
- Modern-day homes, their color pallets which helped in understanding how the product will match in the surrounding
- Letter S also played a role in showing how continuous things appeal
- Some present iron with good shape and colors.

## Form Exploration



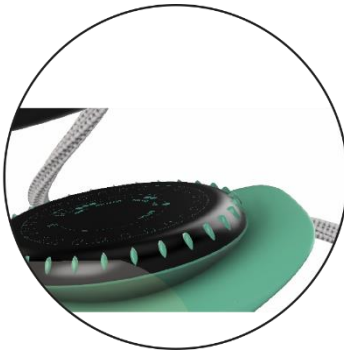
## FINAL CONCEPT





Zola iron (the final concept) was made addressing the issues currently faced by users.

**1.** As mentioned earlier the handle had a **30-degree** inclination which made it more ergonomically beneficial for the user

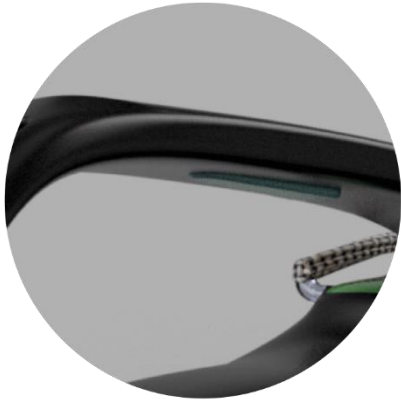


**2.** The **dial was placed at back** instead on center so that users can easily spot or change the mode and also crosscheck easily while ironing, also making it more easily accessible

**3.** Generally the irons have a small light for indication which is not that visible So a larger LED light was incorporated which has two modes of yellow and green. Yellow for heating and green when it gets heated.



**4.** Generally, water tank openings are too small which spills up the water, and so this concept has a large and prominent opening so that water isn't wasted and it's convenient for the user



**5.** The switch (Steam Switch) Is placed such that it can easily pressed making more comfortable



**6.** Generally, the iron has 3 modes (Steam, No steam, and double steam) or (half steam, steam, and no steam)  
The switches which are generally toggled with a push are replaced with a slider giving more ease to the user.

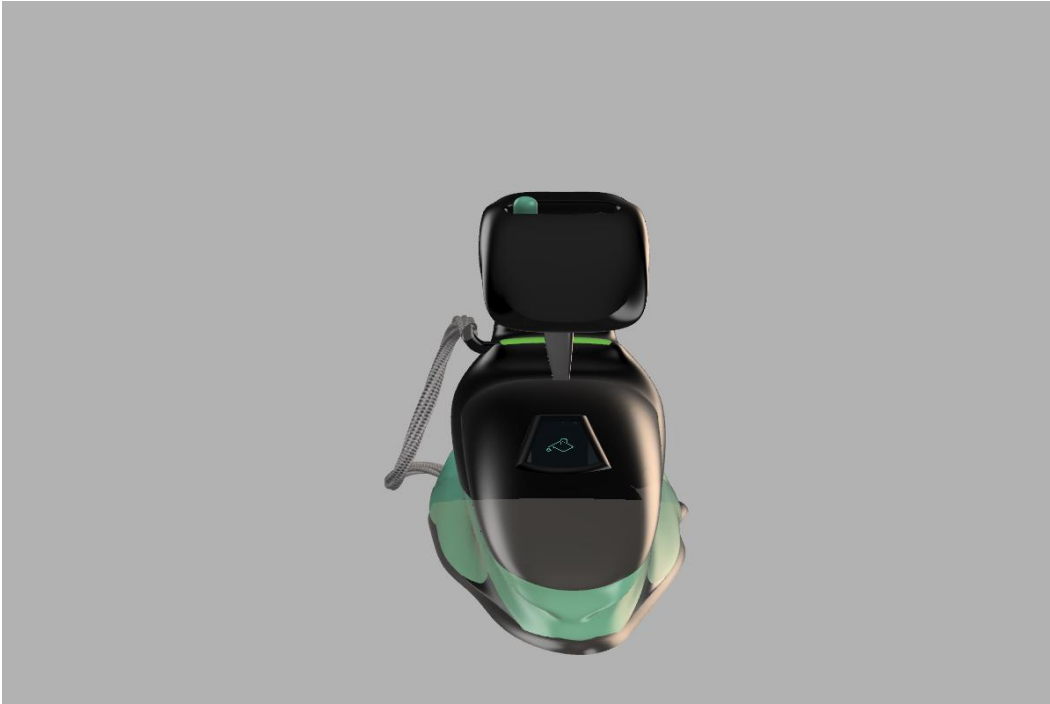
## Different views of the concept



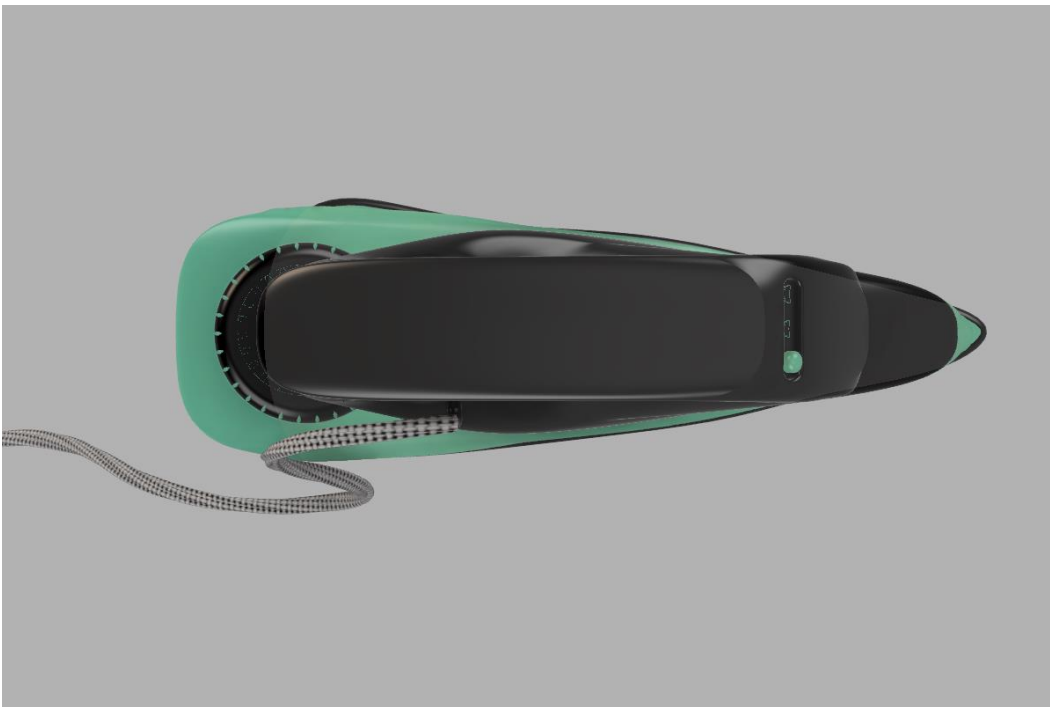
3D VIEW



LEFT VIEW



FRONT VIEW



TOP VIEW

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