A Publication of
Design For All Institute of India
October, 2019, Vol No. 14 No. 10

Design For All

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Delhi Technological University, Delhi

Content of October 2019 Vol-14 No-10

Other Regular features

Guest Editors

Dr. Ravindra Singh, ***Assistant Professor ,Department of Design***

Delhi Technological University, Delhi. He is passionate about human-centric design; designing a product for a wide variety of users. His major research interest is Universal Design, Innovative Product Design, Sustainability, and Frugal Design. Ravindra Singh has done BTech in Mechanical Engineering from UP Technical University. He received his Master of Design (MDes) and Doctoral degree (Ph.D.) in Design from Indian Institute of Information Technology, Design, and Manufacturing, Jabalpur (IIITDM)

He was the student coordinator of the International Conference on Innovations in Design and Manufacturing (InnDeM) 2012, Design Workshop (DeW) 2010, 2012, 2013, 2014, and 2016, and workshops on IPR, etc. As a designer, he has contributed to national and international projects. To name a few, he assisted as a Visiting researcher at TU Darmstadt, Germany, where he worked on the development of an interactive catalog for multi-touch human-machine interfaces. In 2014 -15, he received the I- Design Award in the Medical Equipment category. He has authored research papers in referred journals and international conferences.

Mr. Partha Pratim Das

Assistant Professor ,Department of Design, Delhi Technological University, Delhi

Partha Pratim Das is working as an Assistant Professor in the Department of Design, Delhi Technological University. His research interest areas are Human-Centered Design, Design for Sustainability, Grassroots Innovation, Design Thinking, Systems Design, Design for Experience. He has a Bachelor's in Civil Engineering, an M.tech in Environmental Science and Engineering, and M.Des in Industrial Design. Currently, he is pursuing a Ph.D. from IIT Delhi.

Editorial from the Guest Editors

Dr. Ravindra Singh and Mr. Partha Pratim Das

Design is finding its importance in today's world. One cannot ignore the significance it has in our daily lives. The key challenge for a designer or a manufacturer is to integrate aesthetic appeal in the form of CMF (Color, material, and finish) in the domain of product design. The current design practice remains more concentrated or directed on specific set users (income groups). Product form and CMF varies based on economic parameters. To cater to such issues a hands-on activity was assigned to the B.Des 1st year students with an objective;

- ***(i) To improvise and redesign the existing form of consumer/white goods, e.g., toaster, hand blender, etc.***
- ***(ii) Re-investigate the changing needs of the customer as far as the product is concerned.***
- ***(iii) To identify the needs and requirements of the users and redesign the product based on revisited needs and requirements.***
- ***(iv) To explore the possibilities with white goods (Home Appliances).***

Fresh out of school, these students were first asked to tinker with existing household products. Where they learned about the "Front End: The parts of the product the user interacts with" and the "Back End: the inner workings which make the product run and is not in contact with the user."

In the Indian scenario, almost every locality has an Electrical Retail cum Repair shop where most of the day to day repairs of different household appliances take place. With the dwindling cost of household appliances and the comparable repair costs of these appliances, they either end up with the "kabadiwallas" or a fortunate curious child in the house gets to tinker with it.

Students were delighted to tinker with brand new appliances given to them. It was interesting to see the excitement of the students when they figured out the workings based on simple principles of science which were taught as a part of the high school syllabus.

In the tinkering task, the students got to deconstruct the white goods and put them back together to a working condition. The learnings from these were documented, and the next task was given to them. Here they picked up some of these existing products to reinvestigate the current needs. Aspects like ergonomics, aesthetics, usability, accessibility, etc., were studied. The need assessment was done with the help of surveys, interviews, and observations which was also a first for many of them. Parallel to this, there were two other activities that were being done by the students. The first was an introduction to the software Autodesk Fusion360, where they worked on 3D modeling. The other was to work on the High-Density Thermocol and PU Foam to make basic forms for their classroom assignments.

The deliverables for the project that they were working on was an integration of their classroom learning as well as the application of various principles, ideas, interventions they had acquired over the

period of a semester. The final outcome of the project work was in the form of Sketches, Computer 3D models, and scaled prototypes made of Thermocol or PU Foam. This issue of 'Design for all Institute of India' focuses on to reinvestigate the needs of the users to examine the current or existing products based on CMF and form of the product. As a result of this design project, the design students had a better understanding of "form follows function and function follows form" along with material knowledge and prototyping skills.

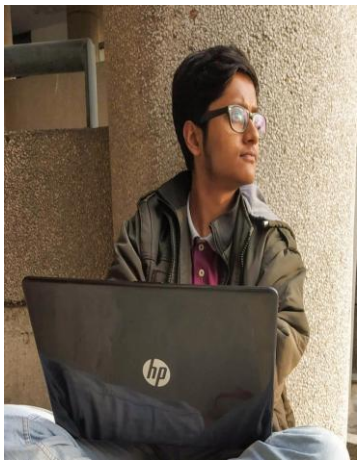
The skills from the assignments that were practiced in class helped them realize the form in their products.

Regards,

Dr. Ravindra Singh

Mr. Partha Pratim Das

AKASH KUMAR SETH



Akash K. Seth is a sophomore pursuing his Bachelors in Design from Department of Design, Delhi Technological University. He's positively enthusiastic about his projects and works. He's persistent in his approach towards learning anything new. Exercising his skills with determination, Akash has constantly been improving in his ways of idea generation and problem-solving abilities. Also, he has started showing keen interest in working physically with hands rather than just learning digital tools.

Akash was a participant at Delhi Design Innovation Boot camp 2018, where he positively worked on enhancing the experience and efficiency of medical lab tests in government clinics through a mobile application- Medic Ninja.

ESPRO

Abstract

The goal of the project is to redesign an electric chopper that is affordable, portable and easy to use for all stages of food preparation in Indian households. This project stems from the Semester Design Project. The objective was to improvise and redesign the existing form (casing/appearance) of consumer goods e.g. toaster, hand blender, etc. The design process in its entirety is detailed throughout this report, including methodology, procedures, analyses, and end results. A detailed description, including finalized CAD models of all components is provided as well. The design has evolved throughout the process and the current design is the result of intense efforts and analysis. This report serves to document the entire process from initial background research to final recommendations for improvement to the final design.

Introduction

The product chosen was an Orpat express chopper (as shown in Figure 1(a)). A cost-effective, durable and efficient chopper running on a 250-watt motor that has an output of 18000 rpm. It comes with two blades for chopping and whisking respectively and a 700 ml BPA free container that doubles up as a storage container with a multipurpose splash guard. The operation is done through a single pulse button providing a range of cutting options like – chopping,

mincing and pureeing. It's provided with a gasket like rubber attachment at the base that prevents slipping. Although being a good enough device for everyday use, it comes with its own set of problems that affects the experience with the device.

The express chopper was tinkered (as shown in Figure 1(b)) and studied in detail through sketches. Market surveys were conducted. A task analysis was conducted as a comparative study between users and first-time users. Online surveys and in-person interview was also conducted. Similar products were also studied. Conceptualization involved a lot of ideas from mechanical chop station to the utilization of fluid at high pressure to chop. However, keeping the brief in focus which required the change in the form/casing keeping the mechanism intact was the key element to the idea of *Espro*. There is a general convention of pushing down on the lid when using similar devices like the chopper i.e. mixer grinder. Even though the newer models come with a locking mechanism, the user has a tendency to put their hand on top during operation. Espro utilizes this conventional behavior to its advantage to operate itself. The container jar is made to rest on a groove in the power base. When the user has put the food in the container and assembled the device and pushes down on the container's top this groove slides in, which in turn presses on the switch starting the motor and thus starting the device.

Objective: The objective of the following project is to improvise and redesign an electric chopper based on user feedback and survey.

Problem Identification

To begin with the phase, the device was used to identify the first-hand problems. Review videos, articles, similar products, and other sources were looked at for primary research. Further, Google forms were circulated online. Offline forms were made which were used to interview both users and non-users to understand different perspectives. Interviews were conducted with homemakers, shopkeeper/salesman who were using similar products/devices. User study/Task analysis was conducted on homemakers and students in the hostels to understand their behavior and actions with the product.

Chopping is a skill mastered over the years. The quality of chopping of the ingredients directly affects the taste, texture, and presentation of the dish. The art of using a knife itself requires practice and precision. Indian households, women utilize this time of chopping in front of the TV using a chopping board and a knife to cut vegetables and other cooking essentials for their next meal preparation. However, these appliances seem to take away the experience of a knife. The 15-20 min. activity gets over within seconds. On analyzing the surveys and interviews, a lot of problems came into light that can be worked upon -The fine gap between the pulse button and power pod risks the entry of water during usage and cleaning. The button's unconventional design often seems to confuse the users to a point where they start opening it thinking it's a lid. Smaller food components get logged in the space between the blade and container and don't get chopped.The detachable blade

design being unconventional causes the user to forget to remove it after use, resulting in the blade getting stuck to the spindle and falling off on emptying the container. Devices of similar operation have the powerhead in the bottom, unlike the chopper. The user found it difficult in associating blades with its usage.

Need Statement

To redesign the electric chopper utilizing the existing convention of a mixer grinder, where the lid is pushed down when in use.

Background Study and Research

The major study of the product was related to understanding user needs and requirements, through Qualitative (18 physical interviews and documentation) and Quantitative (20 Online Google Form) surveys.

There was rigorous effort put into the following phase of the project to get to the root cause of the analysis.

Figure 1 (a) Current/ Existing Design

(b) Components of an existing design (from left to right)

Task Analysis - a user study of the product

A user study was conducted of the Orpat Express Chopper to observe the interaction of the product with people. The participants were of two types - namely, a user (one who has used the product before) and a non-user (one who has never seen the product before). The users were provided with the following materials- A packaged box of Orpat express chopper, knife, onions, a storage container. They were required to chop the onions finely, collect the output in a storage container, clean the components and reassemble the components in the box. The assignment was immediately followed by a feedback session from the candidates. The data were analyzed in a tabular form (as shown in Table 1).

Table 1: Task Analysis

Persona	FIndings	Remarks
Name-Apoorva **Profile-Student** **Age-20** **User**	**The user begins with chopping the onions first and finds himself in a state of discomfort due to the burning sensation in his eyes. The next set of tasks are affected and the subject shows a**	**Overall Satisfaction from Usage** **Ambiguity in the function of the blades.** **The "heavier part" (Power pod) should be placed in the bottom half to get better stability and to have power cord in the base.** **Unappealing pulse button**

	lack of motivation. However, he completes the tasks.	**To accept inputs during the process without removing the setup.** **Ex - Chop bananas and add milk and other ingredients during the same time.**
Name- Hrishikesh Madhav **Profile-Student** **Age-18** **Non User**	**The user finds the physical form of the chopper unappealing. He finds the pulse button to be confusing. Also he claims that the ridges provided in the bowl are not beneficial enough.**	
Name-Athishay Gupta Profile-Student **Age-18** **Non User**	**The user took a sufficiently long amount of time, studying the manual yet failed at many steps throughout the process.**	**The main concern while buying the product would be size and capacity.** **The subject would like to add a speed regulator and a locking mechanism.**

User Journey Mapping: The sequence of the user's interaction with the product is represented through a radial timeline visual. This visual consists of a timeline of all touchpoints between a user and a product. This was further utilized to find alternate approaches and "What if...? "scenarios to the process of the task.(as shown in Figure 3)

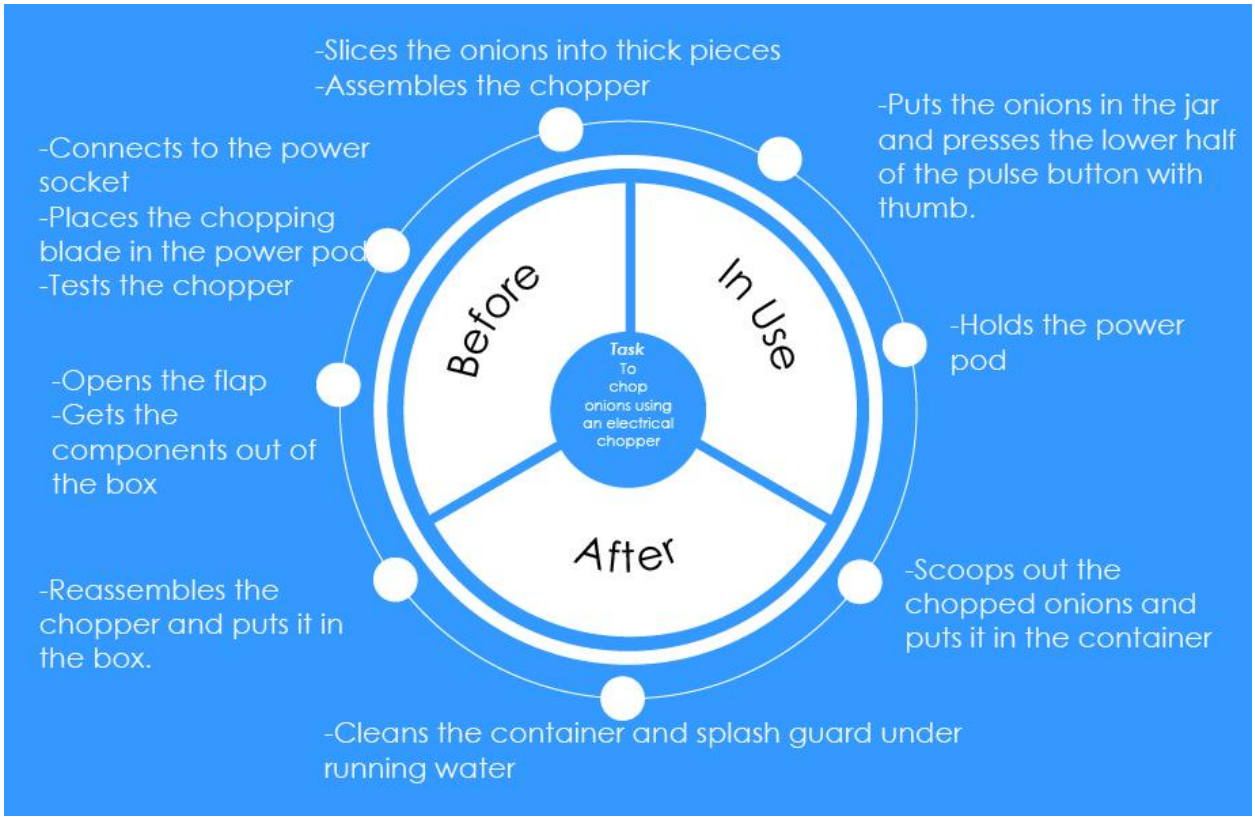


Figure 3 User Journey Map of the chopper in use (Clockwise)

Experience Mapping: Mapping of the experience from a user's perspective was done to identify strategic opportunities, pain points and generate further ideas. The experience was scaled on the satisfactory level of the user from the product usage. Three stages of the process of usage were taken into account- Before, In use and

After which were further subdivided into crucial steps. (as shown in Figure 4)

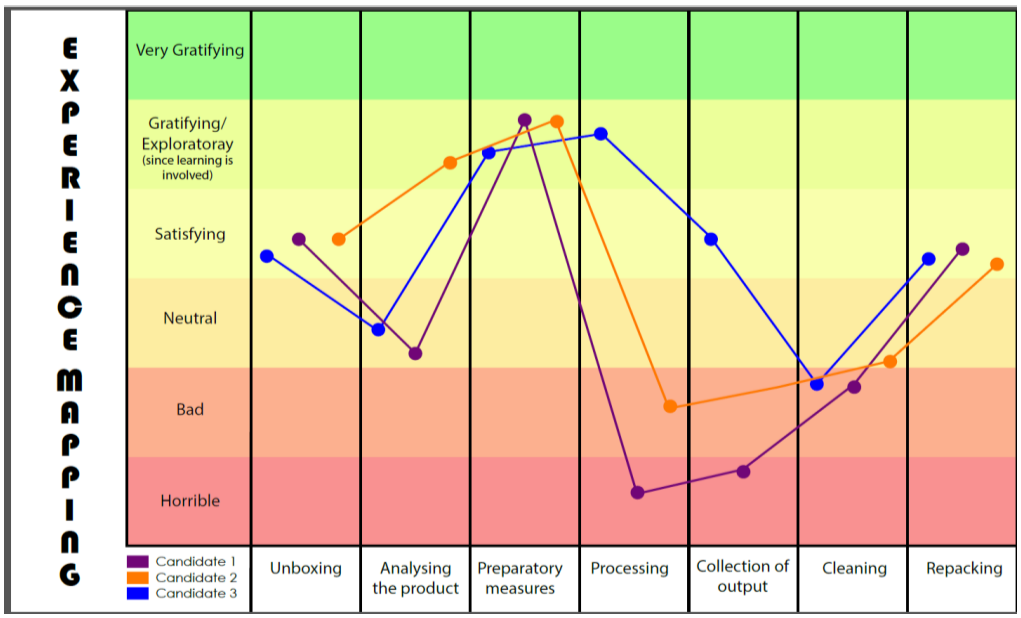


Figure 4 Experience Map of the chopper in use

Empathy Mapping: An empathy map was developed to gain a greater insight into the user's interaction with the chopper. Instances from the interviews, survey and task analysis were included in the different sections of the map namely- Say, Does, Thinks, Feels.(as shown in Figure 5)

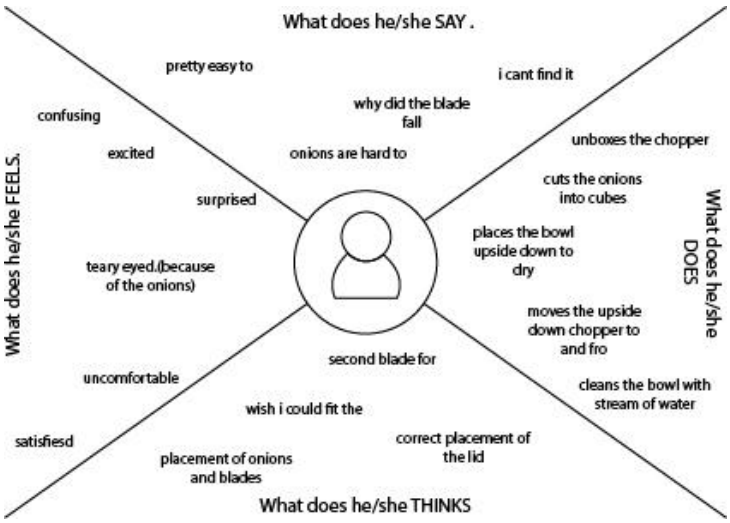
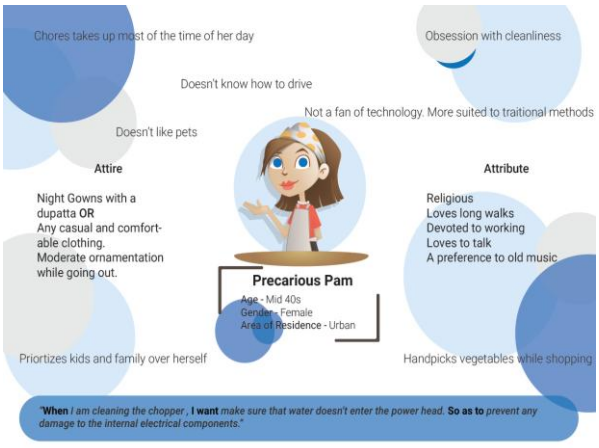


Figure 5 Empathy Map

User Persona: When developing a product, it is essential to define the user base. From the numerous interviews and user interactions, segments of the demographics were selected and quantified into qualitative personas to represent them.

Majorly the segments were divided as working professionals (as shown in Figure 6(a)) and homemakers (as shown in Figure6(b)) - which were the target audience.



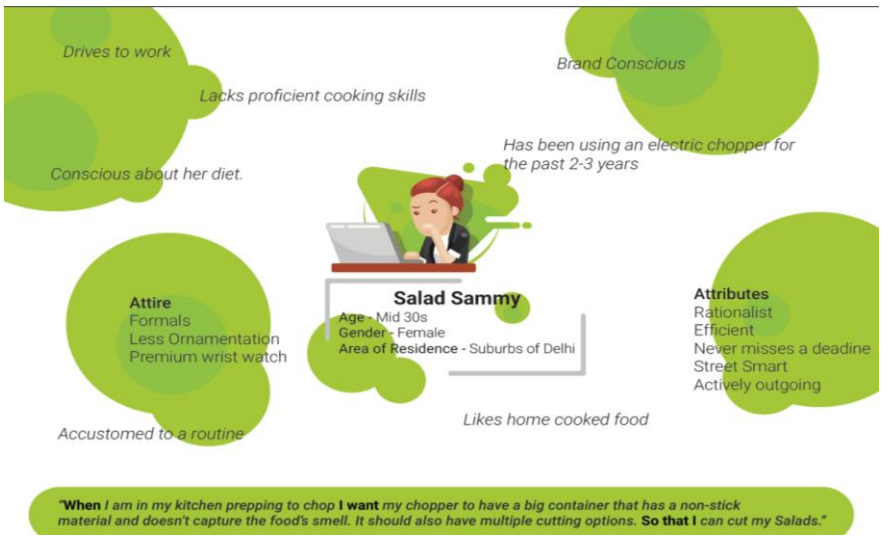


Figure 6 (a) Persona of a homemaker (b) Persona of a working professional

Concept Generation

There were many steps and iterations to the design evolution. Design generation began with a design breakdown/ tinkering of the product to the following functional components : blades, power pod, container, pulse button. For each component designs were generated and iterated based on mentor feedback. Throughout this process several alpha designs were created.

The initial conceptualization involved exploration into component wise design generation which moved into a few mechanical operable designs too. However, mentor feedback and brief requirement brought the conceptualization phase back into focus and the further designs involved change in the form only.(as shown in Figure 7)

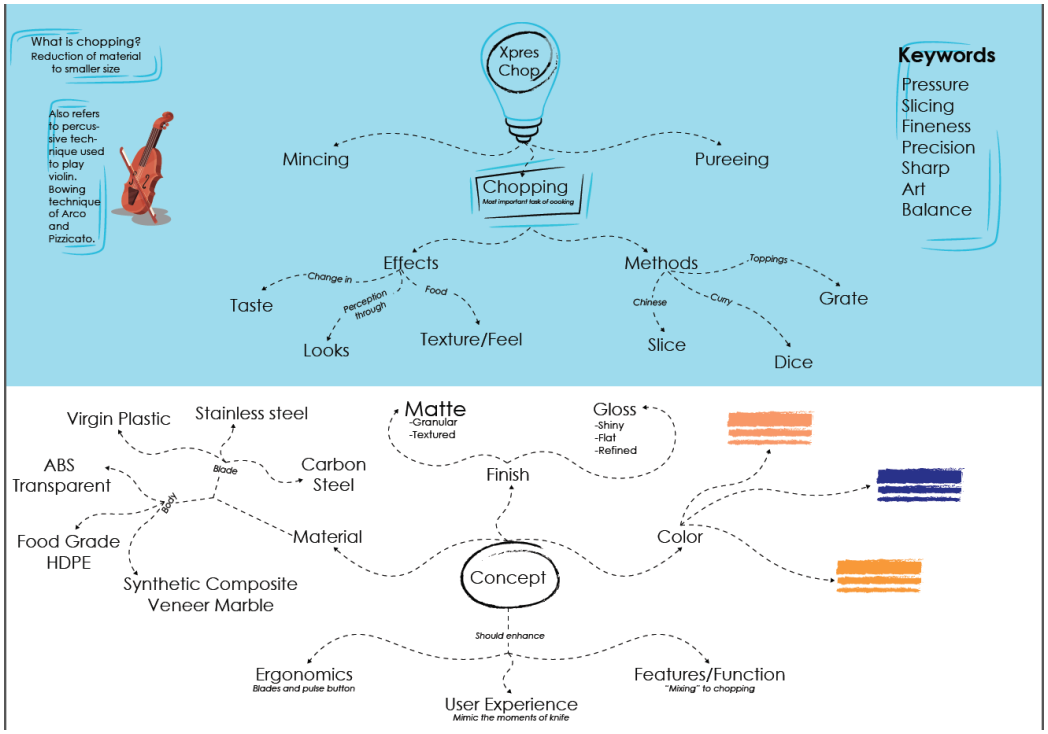


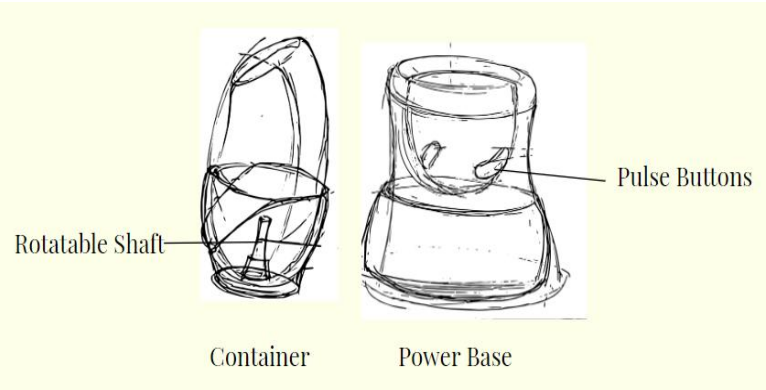
Figure 7 Concept Map

Areas of Study in Ergonomics

The product was further analyzed through an ergonomics study to better understand the shortcomings. The following aspects were studied-

- ***Cognitive aspects of the user machine interface- It is as important to achieving a cognitive fit between user and machine as it is to achieve a physical fit. The problem arising here is the comprehension of parts when is unassembled state. There seems to be an excess of components causing confusion thus leaving the user frustrated.***

- ***Psychological environment- It is necessary to ensure a clear understanding between the expectations and attitudes of a user in their own environment.***



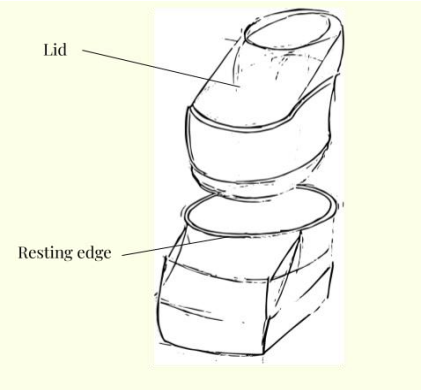
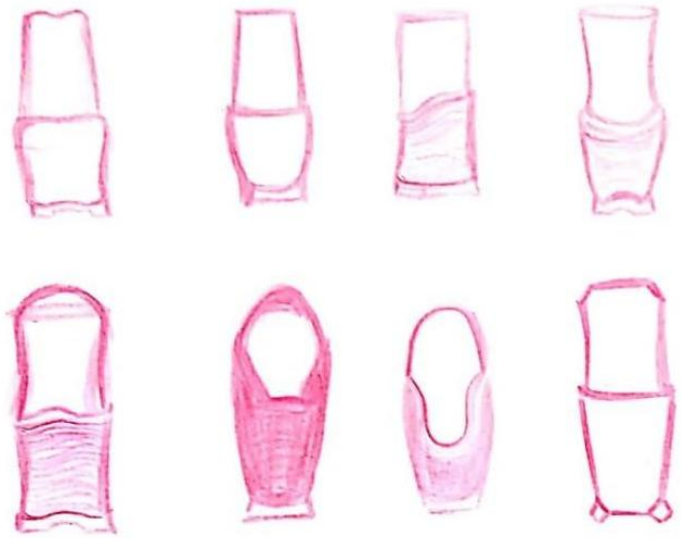


Figure 8(a) A sketch of the initial concept; Figure 8(b) A sketch of the initial concept

The first alpha design (as shown in Figure 8) composed of a rearranged configuration of the components from the initial functional breakdown. The container was shaped like a capsule curved inwards towards the top to have a slant resting lid at an angle of 30 degrees. This capsule-shaped container is made to rest in a socket in the power base. This socket is a cupola to receive the container, having slot(s) from which the button(s) and spindle protrude. The power base is shaped following the form of the motor and the cupola socket in a vertical stack. The container has a rotatable shaft extending into a plate into the bottom sealed with a valve. The container needs to be tough, transparent and be easily molded. Also it needs to be food grade. Hence, Polycarbonate is the optimal plastic. The Powerbase is made of ABS plastic.

As the components are arranged together, it would be in the following configuration starting from the bottom: The spindle will directly connect into the rotatable shaft in the container, which in turn will have blades attached on it. The container will be resting on the button(s) perfectly fitting the socket. When the user pushes down on the head, the button(s) receive the pressure and start the motor, in turn starting the device itself.



Design Evolution leading to Final Design

There have been many iterations of this design throughout the process. Some of the main factors that guided the re-designs were to make the product feel familiar, efficient and one that gives feedback.

Analysis from Alpha to Final design

All concept evolution decisions were based on mentor feedback, predicted material costs, and basic engineering logic.

Figure 9 Form Exploration

(a) Line Sketches, (b)Form iterations,(c) Iterations

(From top to bottom)

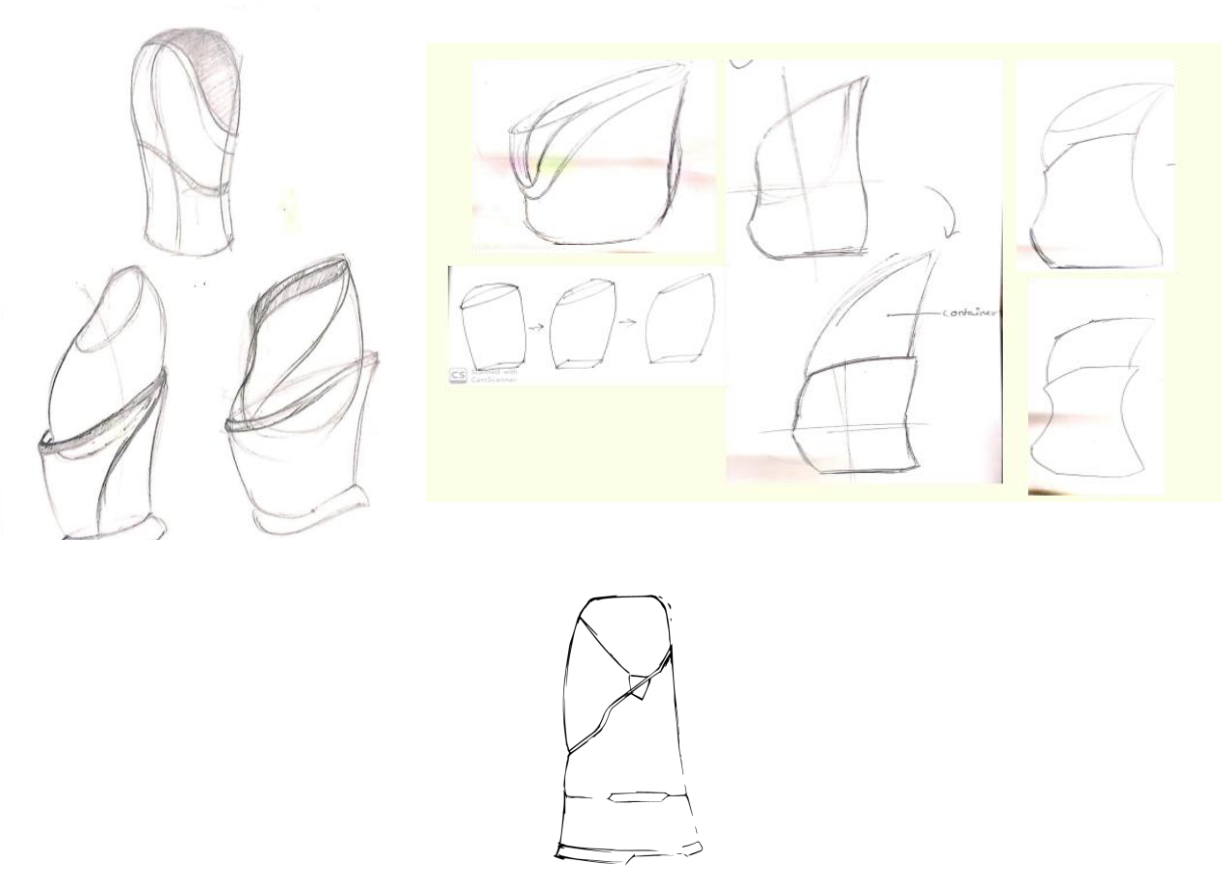


Figure 10 Alpha Design Sketch

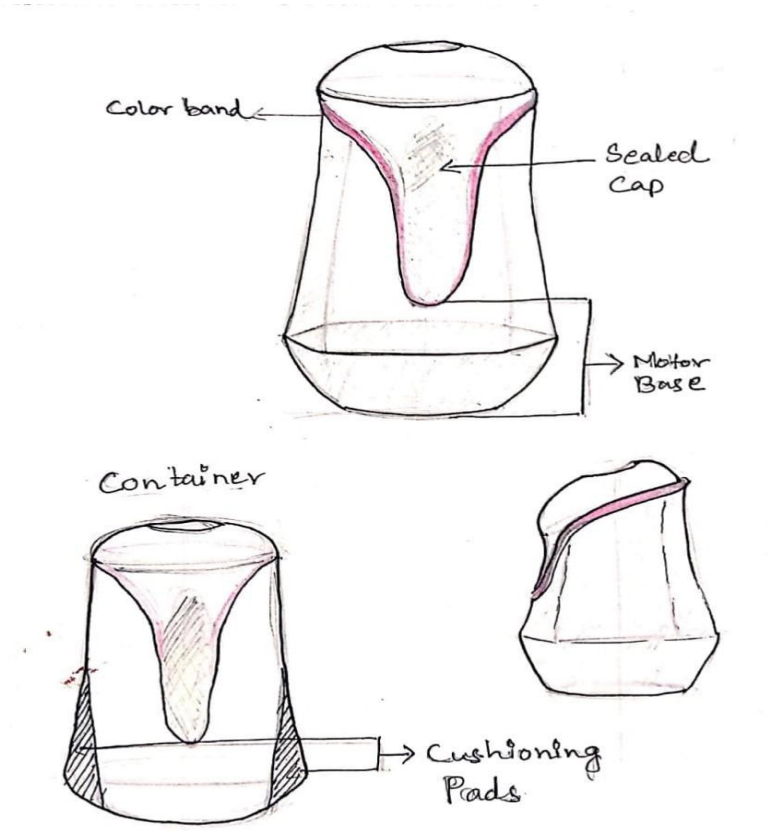


Figure 11 Final Design Sketch

Alpha Design Description

The alpha design concept (as shown in Figure 10) comprises of a container with a protruding circular element near the bottom. The lid's size has been increased keeping in context the problem of cleaning arising from a narrow mouth.

Based on feedbacks from the users, the button(s) have been eliminated from the design. Instead there is a groove in the power

base which has a spring mechanism that behaves similar to a pulse button.

The benefit of having this system is that it blends in with the users preset mindset where only the push from top is applied to start the device. Also as the pressure is increased and the further the container goes down, it increases the speed of the motor too.

Unlike the cylindrical container of the express chopper, Espro has a container with broader and more circular base providing for circulation of food instead of getting smashed in the walls

(as shown in Figure 13) . Inspired from the bottoms up beer draft system(as shown in Figure 12), Espro uses magnetic shaft less blades which fit into a slot in the container. As the container is pushed down upon, the spindle pushes the blade upwards chopping through the food which would earlier have remained lodged in the clearance between blade and container.

The sides of the power base have been added with air vents to facilitate air circulation and prevent heating.

The materials chosen are as follows:

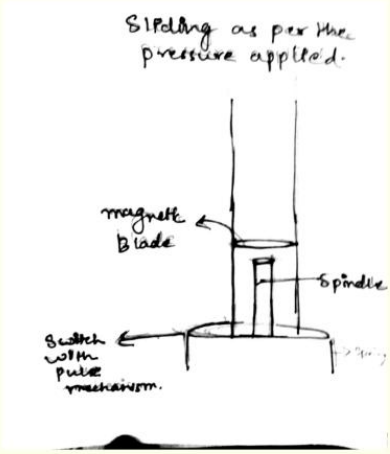
- ***Food Grade Polycarbonate Container and lid***
- ***Stainless steel blades fixed on a circular magnetic plate.***
- ***Spindle made of a certain material having magnetic properties.***
- ***ABS casing for the power base.***
- ***EPDM rubber base.***

Inspiration

As the container is pushed down upon further the height/vertical position of the blade increases and so does the speed.

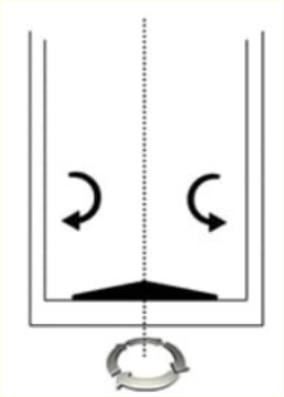
Problem analysis in the existing product

The clearance between blade and container doesn't enable for cutting of smaller food below the blade.

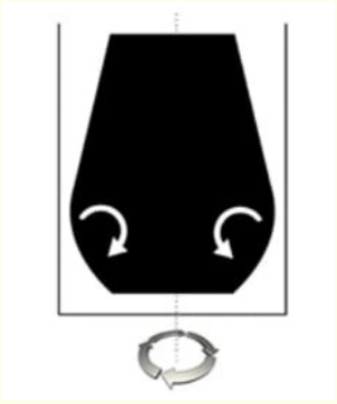


Concept

Figure 12 An idea inspired from the bottom's up technology



Current Agitation Technique



Proposed Agitation Technique

Figure 13 Difference between working and concept Function

Alpha Design Concept CAD Model

Figure 14 Multiple views

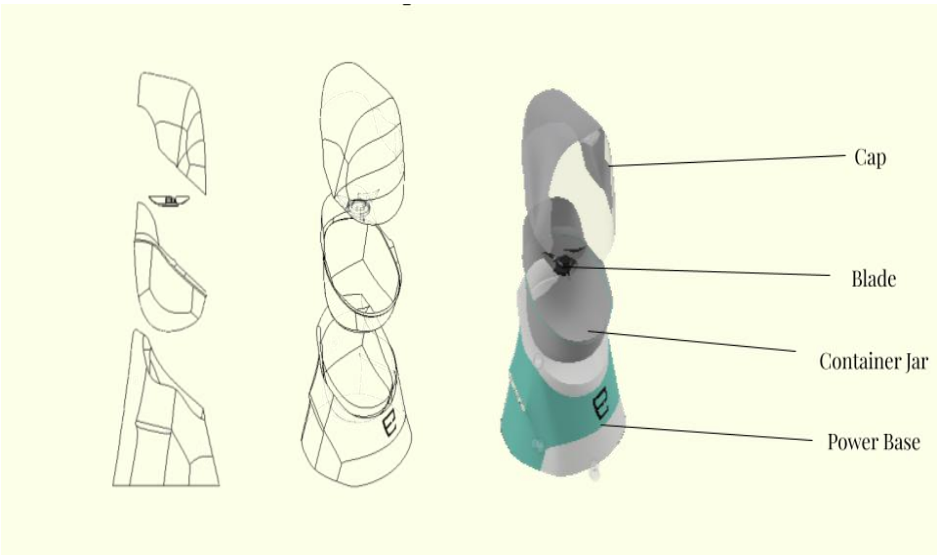


Figure 15 Exploded view and wireframes

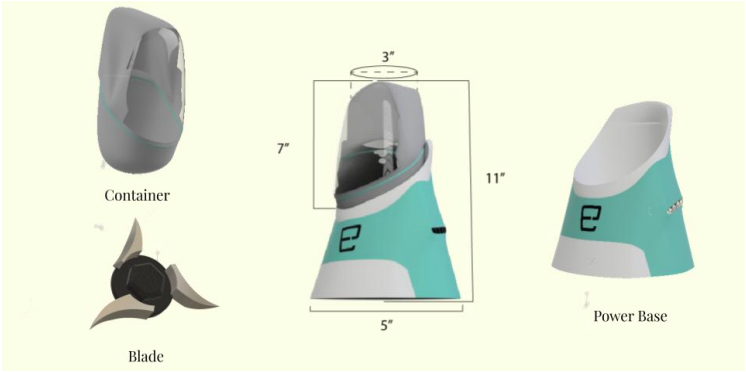


Figure 16 Dimensions of the proposed concept

Prototype

To better understand the form of the product prototyping was done. A 1:1 block model was made with thermocol with grooves depicting the parting edges of the components.(as shown in Figure 17)

Another 1:1 model was made in PU foam to depict the relationship between the container and power base.(as shown in Figure 18)

Figure 17 Thermocol model

Figure 18 PU foam model

Figure 1 PU foam model

Figure 20 Power Base PU Foam Model

Figure 21 Design Board

Potential areas for Design Change

The alpha design for the express chopper had some functions and characteristics that changed in further design evaluation. Adjustments were made gradually as the project approached prototyping stage.

The body as a whole was iterated upon with the use of shapes and visual elements to unify the container and power base, so that they

are a single entity instead of two. The blades were analyzed with the detachable system having a shaft wasn't absolutely necessary. However, eliminating the shaft would reduce handling of such a small component increasing safety concerns. The motive was to keep the detachable system eliminating the shaft. The pulse button(s) needed a better position. The narrow mouth of the container would have caused cleaning issues. This could be solved with work on the lid position and size.

The alpha design was bulky in its aesthetic form. A design intervention was performed to rework the form to make it more sleeker and appealing.

Final Design Concept

Figure 22 Rendered Final concept in two color variations namely (a) Red (b) Pink (From top to bottom)

The final design concept is a more sleeker development over the alpha design. It comprises of more stable base for both the container and the power base. There has been an addition of color bands at the junction of cap and the power base. This has been done

in respect to the cognitive aspect of ergonomics, to reduce any ambiguity and communicate to the user the correct functioning of the assembly without external help.

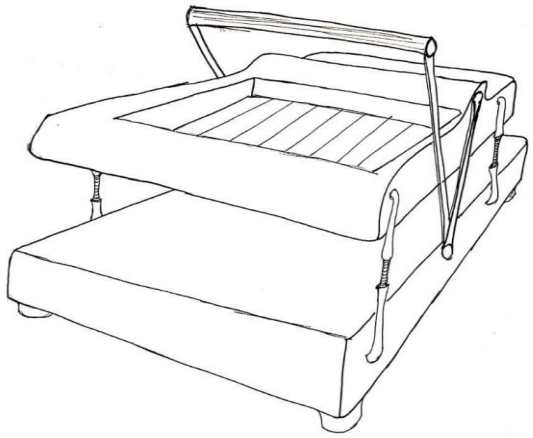
The proposed mechanism remains intact in the following design.

The container is completely transparent enabling the user to look at the food being processed and be provided with simultaneous feedback.

The colors chosen are in high contrast and give a classy appearance to the overall product.

Unused Concept

In the concept generation phase there were lots of ideas which couldn't be taken into further stages and were discarded for a possible future project. Two of the more prominent ones are -



- ***A mechanical chop station(as hown in Figure 23) with two plates balanced parallel with spring. Attached though these plates was a lever to crunch downwards enclosing the gap between the plates.***

Figure 23: Mechanical Chop station

- ***Bladeless chopper- utilising air (as shown in FIgure 24) at high pressures passed through very fine gaps to cut through the food.***

The main reason for discarding these concepts were that they didn't fit in with the design brief and the objective of the project.

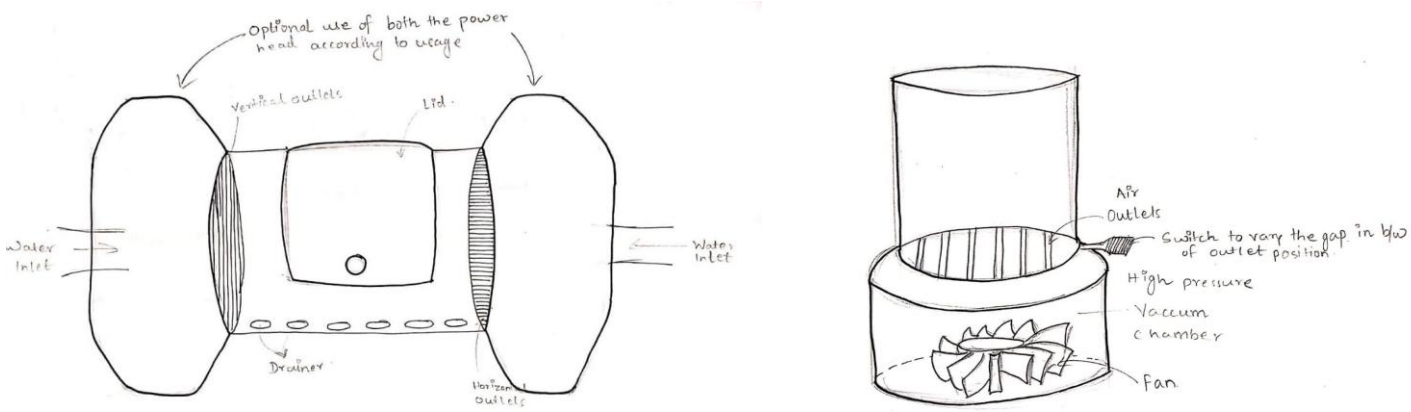


Figure 24 Air Chopping Concept (a) Utilising Fluid Technology (b) Using bladeless Technology

Conclusion

The goal of this project was to develop a design and a prototype for an electric chopper that combines the functionalities of a mixer grinder and a chopper. The chopper is designed for everyday use by

housewives who are skeptical about such devices and are more proficient with traditional methods of chopping.

Espro is more efficient than an electric chopper because it relies on the user's preset mind to operate itself. Also it eliminates the shaft in detachable blade system ensuring easy cleaning.

The final design specifications were based on users' feedback. The prototype was used to validate the specifications of the design to a certain extent. Physical testing was done to determine that the ergonomic specification of the design were satisfied. All the specification for the design were met except: the thermocol block model was preferred over PU foam model in the context of appearance.

As one of the undergraduates to tackle this problem, I believe I have made sufficient progress towards developing a final solution. However, I intend to further study the possibilities of using controlled fluid pressure to chop, which would replace the blades.

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  -Living

  -Doing

  -Working

  -Enjoying
- ***Design of the 20th century Charlotte & Peter fiell***
- ***Applied Ergonomics Handbook Second edition edited by Ian Galer Butterworths Publications***
- ***https://deepblue.lib.umich.edu/bitstream/handle/2027.42/62449/me450?sequence=1***

VIBHOR AGARWAL

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 of the 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 fuction 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 though 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 a 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 H2O, 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

Fig 2 Chinese people using iron

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.

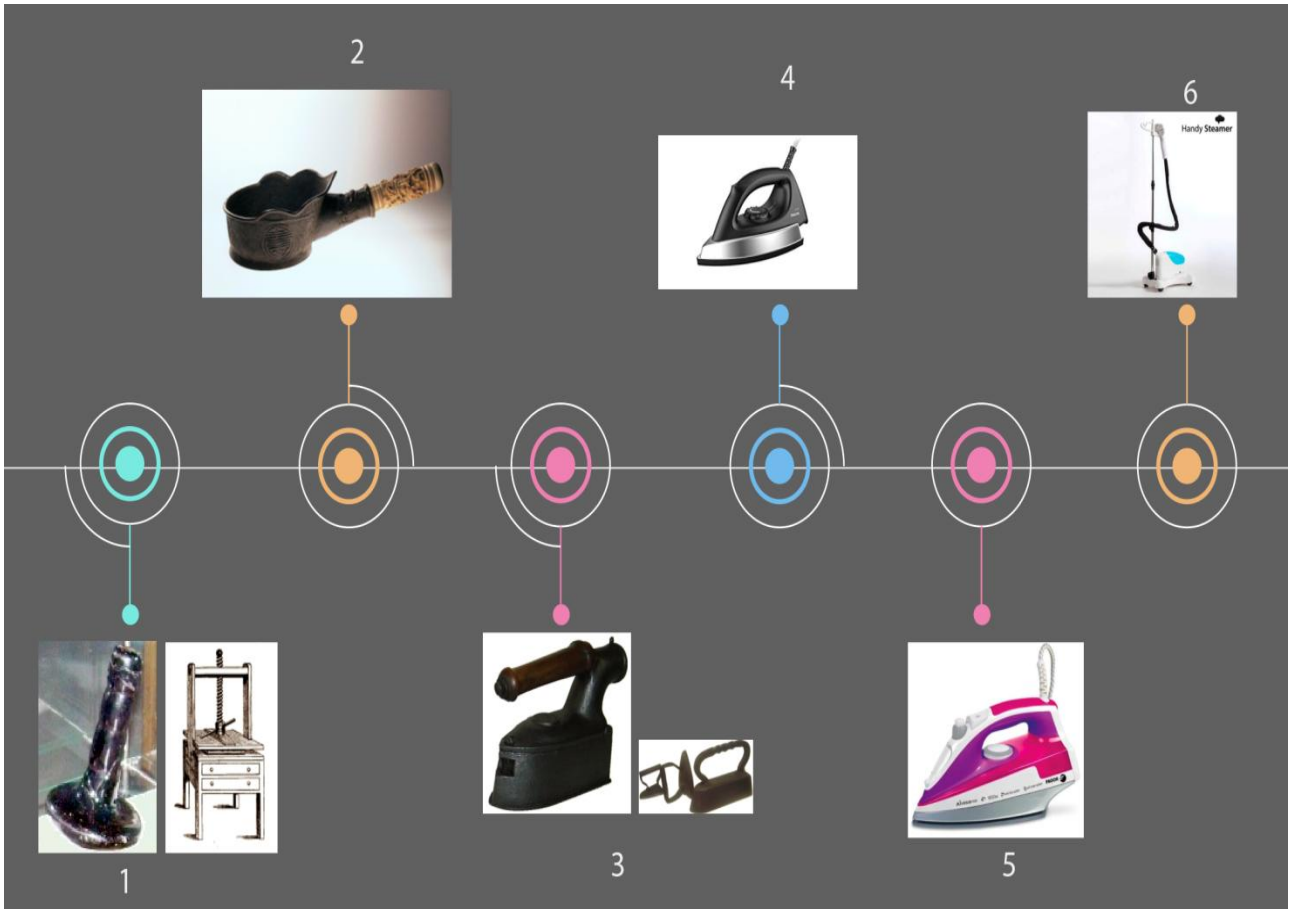


Fig 3 Timeline of ironing

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	❖ Opens the box ❖ Remove the product	Quite easy	Not Concern	Doesn't look about the box looks or the form shape of product
Looking for manuals	❖ Looks at the box for some information	Moderate	Nothing concern	Wasn't interested for looking how to use product
Prepration	❖ Setting up the press table	Easy	Easy	Had his fixed pre defined areas and type of table cover for easy work
Functioning	❖ Switch on the product ❖ Waiting time for Iron getting hot	Easy	Little anxiety	Wants iron to get hot fast
Style of ironing	❖ Side by side ironing	Moderate	Monotonous	The pattern was side by side , very professional
Time Taken	❖ Average 2 min for one cloth	-	Want to do more fast	The details were given more emphasis , there was more perfection to each and different part of cloth
Storage	❖ The iron was kept vertical and next cloth was ready	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	❖ Opens the box ❖ Remove the product	Quite easy	Little curious	Does give some importance to box and little excited for product
Looking for manuals	❖ Doesn't look at box for instructions	Easy	Curious for new product	New generation is mauch more aware about different products so they don't care much about manuals
Prepration	❖ Setting up the press table	Moderate	Not satisfied	Press table is also avoided as bed is taken as substitute because of less time
Functioning	❖ Switch on the product ❖ Waiting time for Iron getting hot	Easy	Anxiety can be seen	There is a restlessness where she gets concern how long will it take
Style of ironing	❖ Side by side ironing plus random also	Moderate	Little confused	The pattern was side by side with mixture of random strokes
Time Taken	❖ Average 3 min for one cloth	-	Okay with it but want to do it more fast	The time was given more emphasis Than perfectionism
Storage	❖ The iron was kept vertical to let it cool	Easy	Not Concern	❖ After iron clothes were folded and iron there on bed side table

User 3

Age: 10 yrs

Gender: Female

Usage: once in while

Task Required	Task Performed	Ease/ Difficulty	Satisfaction level	Comments
Unboxing	❖ Opens the box ❖ Remove the product	Quite easy	Little curious	Does give some importance to box and little excited for product
Looking for manuals	❖ Doesn't look at box for instructions	Easy	Curious for new product	New generation is mauch more aware about different products so they don't care much about manuals
Prepration	❖ Setting up the press table	Moderate	Not satisfied	Press table is also avoided as bed is taken as substitute because of less time
Functioning	❖ Switch on the product ❖ Waiting time for Iron getting hot	Easy	Anxiety can be seen	There is a restlessness where she gets concern how long will it take
Style of ironing	❖ Side by side ironing plus random also	Moderate	Little confused	The pattern was side by side with mixture of random strokes
Time Taken	❖ Average 3 min for one cloth	-	Okay with it but want to do it more fast	The time was given more emphasis Than perfectionism
Storage	❖ The iron was kept vertical to let it cool	Easy	Not Concern	❖ After iron clothes were folded and iron there on bed side table

User 4

Age: 40 yrs

Gender: Male

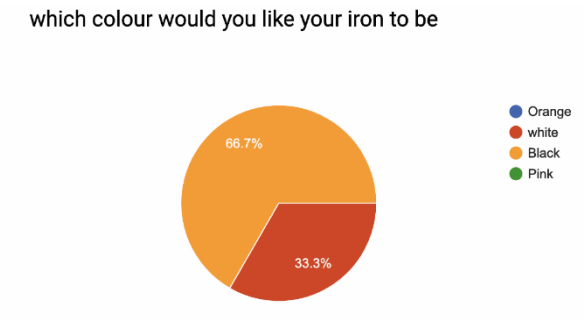
Usage: Daily level;

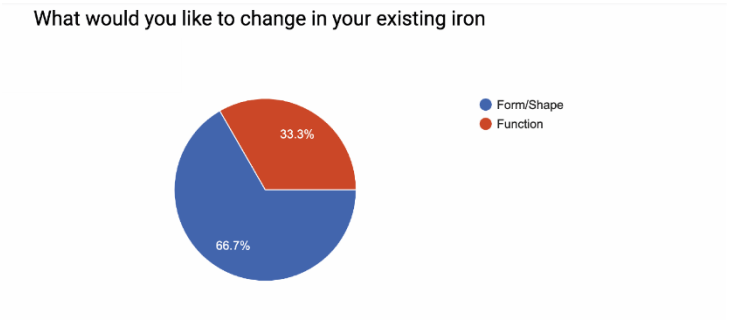
Task Required	Task Performed	Ease/ Difficulty	Satisfaction level	Comments
Unboxing	❖ Opens the box ❖ Remove the product	Quite easy	Not Concern	Doesn't look about the box looks
Looking for manuals	❖ Looks at the box for some information	Moderate	Curious for new product	He might be using a product for quite long time, and when a new product was give, the user was interested about knowing the product before using
Prepration	❖ 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

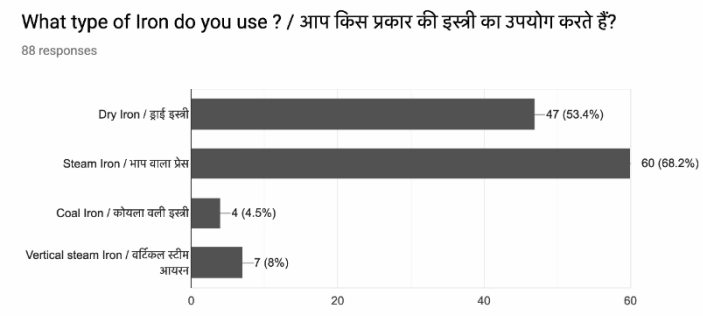
Some key findings

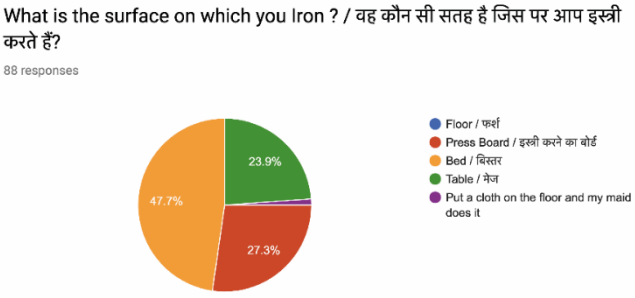
A survey was conducted where users were asked about their preferences

Some of the questions with the key findings were as follows







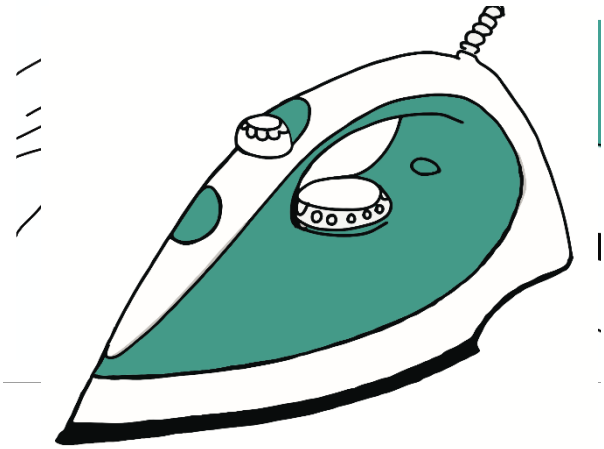


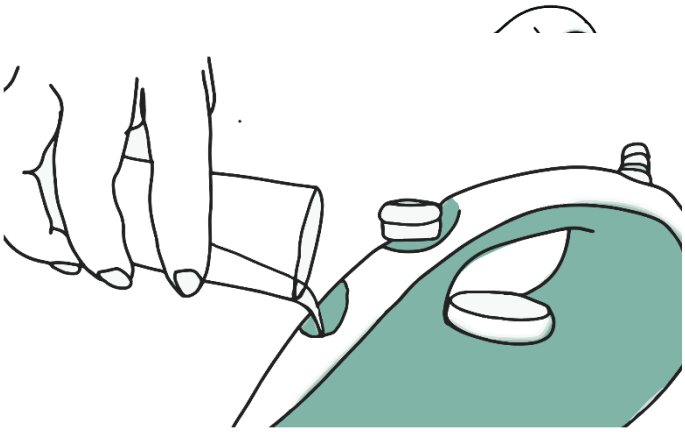
This indicated

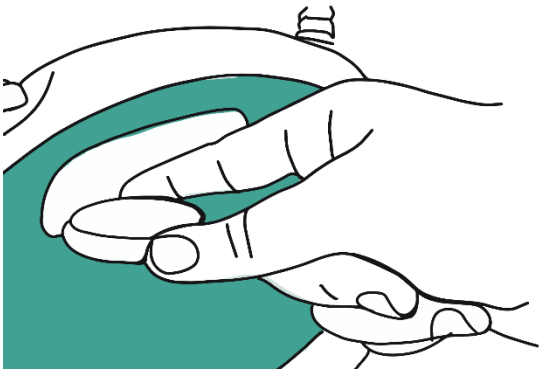
- ***People mostly use steam iron (68.2 percent) out of dry iron, coal and vertical iron***
- ***People were happy about what iron functions although 66.7 percent of people were not happy about the look and aesthetic appeal of the product***
- ***47.7 Percent used bed as the surface for ironing***

- ***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***

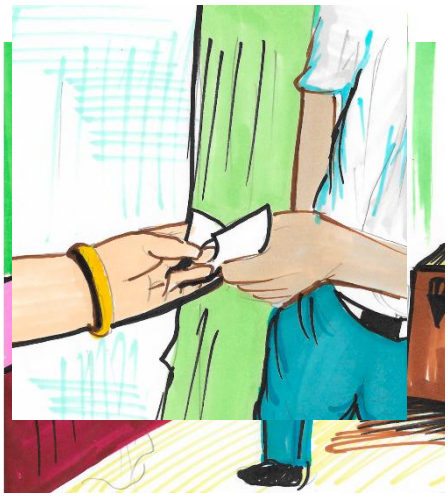
Existing Product Analysis





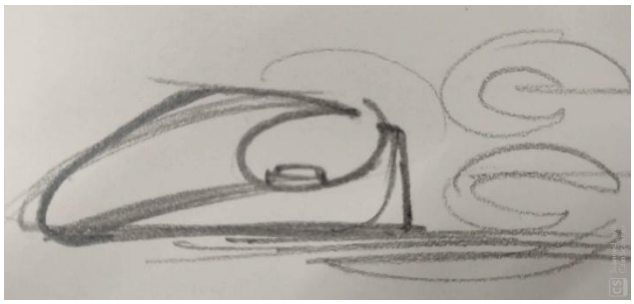
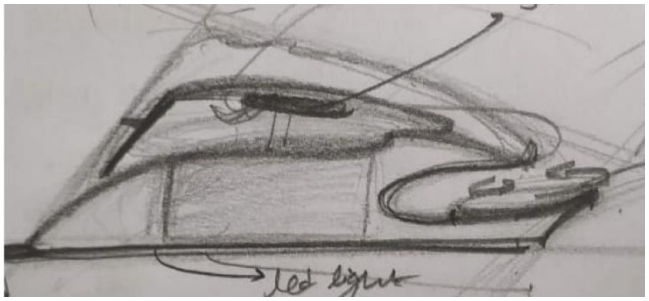


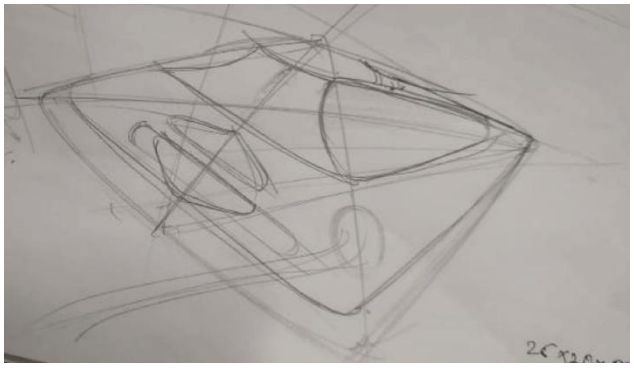
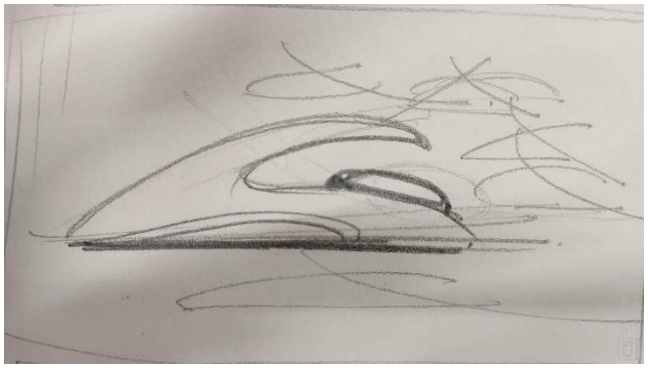
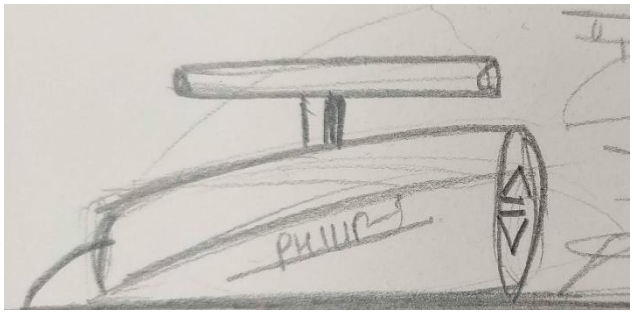
SCENARIO UNDERSTANDING THROUGH SKETCHES

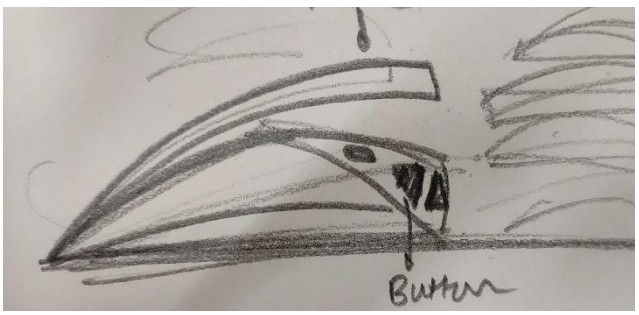




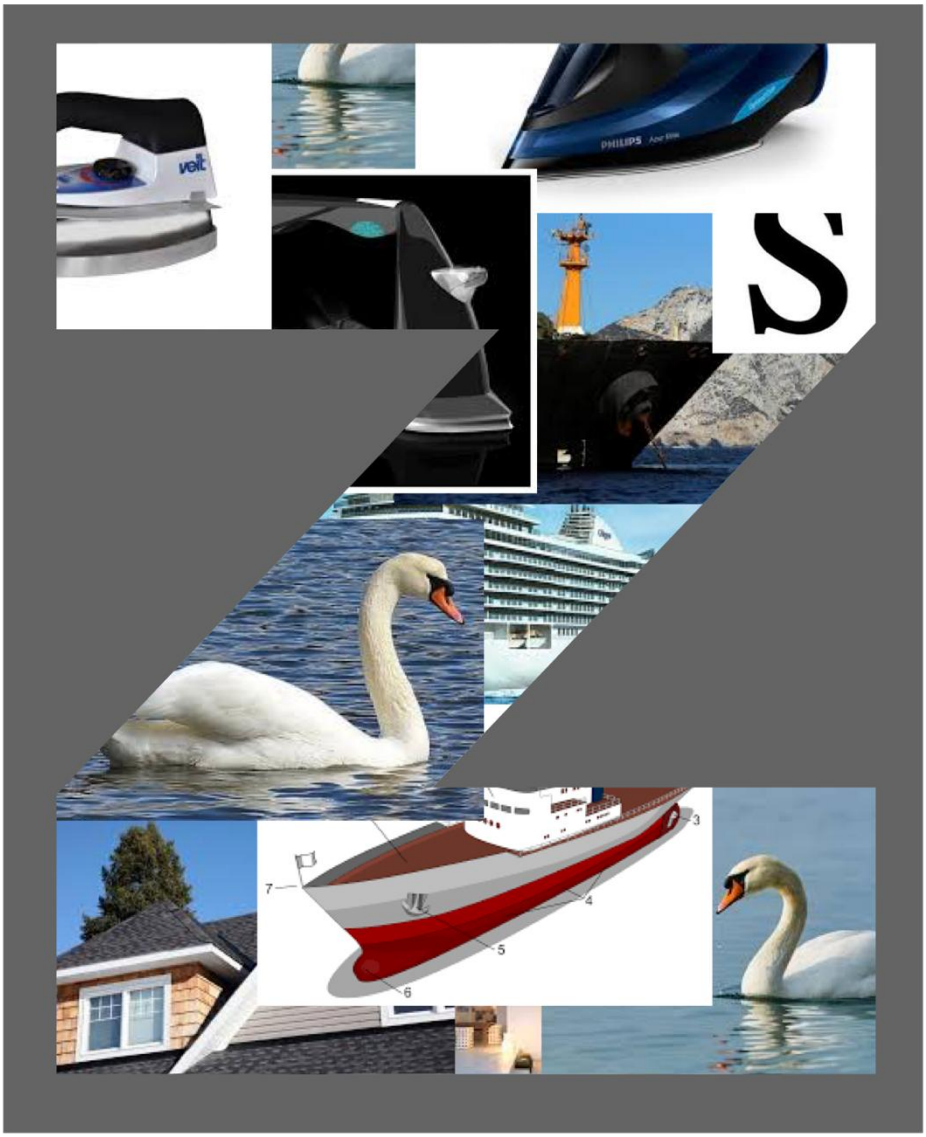
CONCEPT GENERATION



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

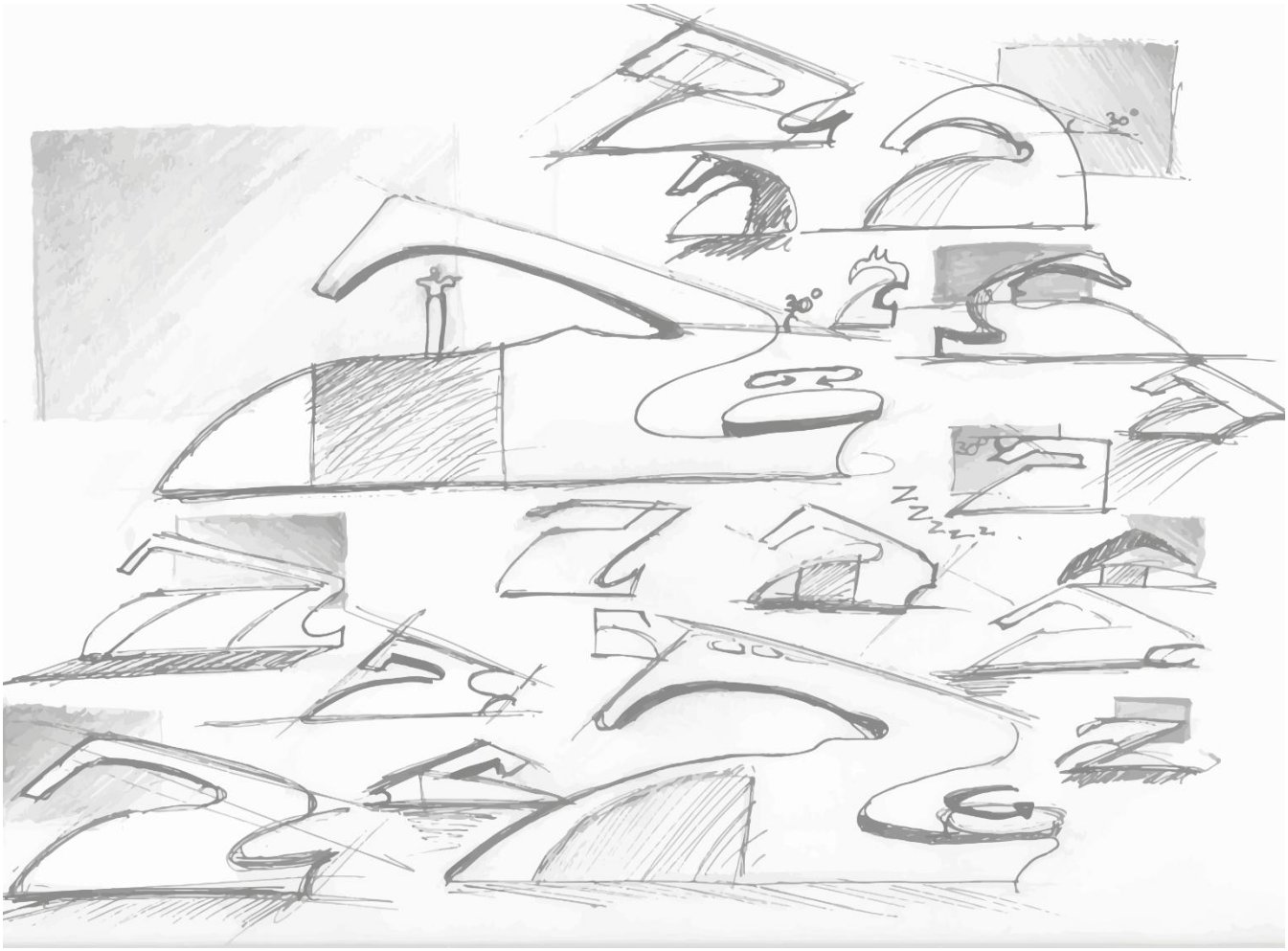
-The ship majesty and the overall shape

-Modern-day homes, their color pallets which helped in understanding how the product will match in the surrounding

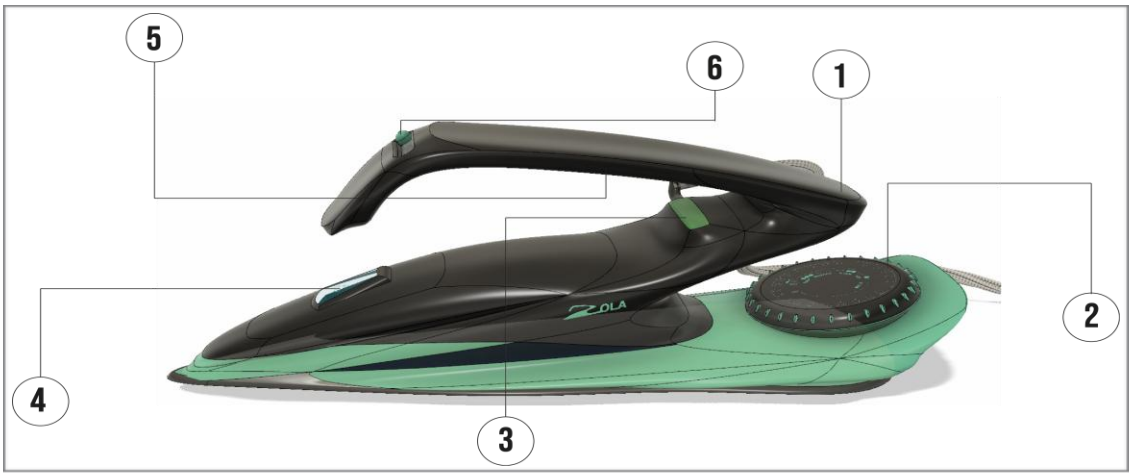
-Letter S also played a role in showing how continuous things appeal

-Some present iron with good shape and colors.

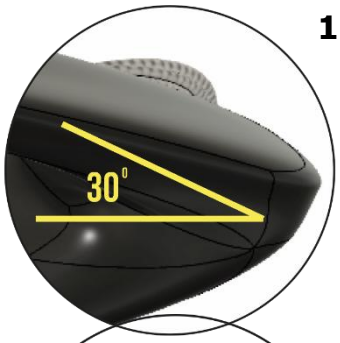
Form Exploration



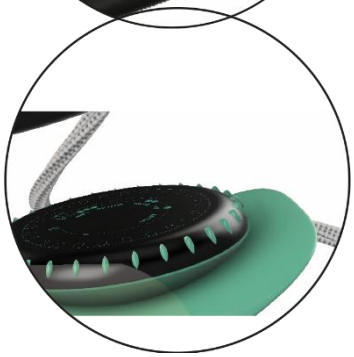
FINAL CONCEPT



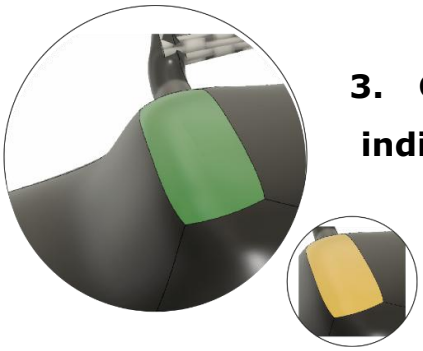
Zola iron (the final concept) was made addressing the issues currently faced by users.



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

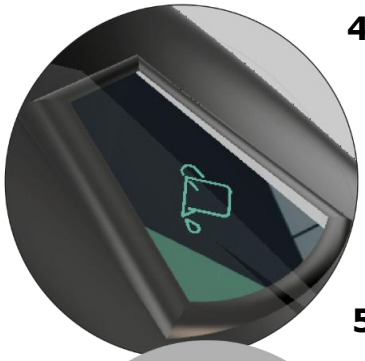


2. The dial was placed at back instead on center so that users can easily spot or change the mode and also crosscheck easily while ironing, also making it more easily accessible



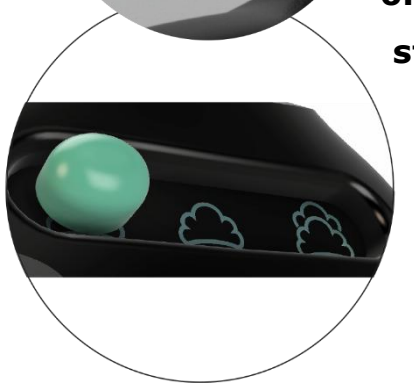
3. Generally the irons have a small light for indication which is not that visible

So a larger LED light was in corprated 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

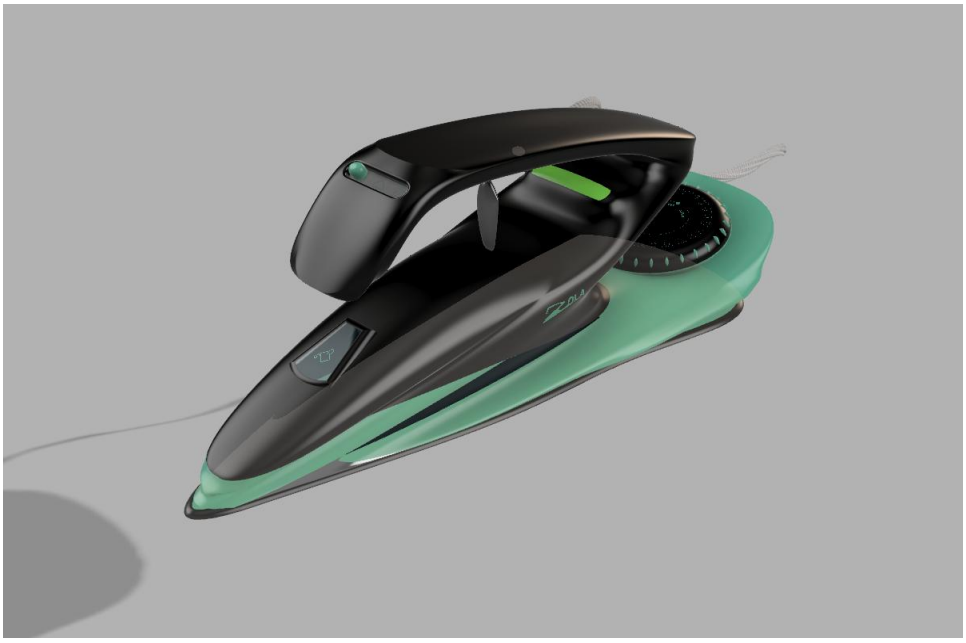
5. The switch (Steam Switch) Is placed such that it can easily pressed making more comfortable



6. Generally, the iron has 3 modes (Steam, No steam, and double steam) or (half steam, steam, and no steam)

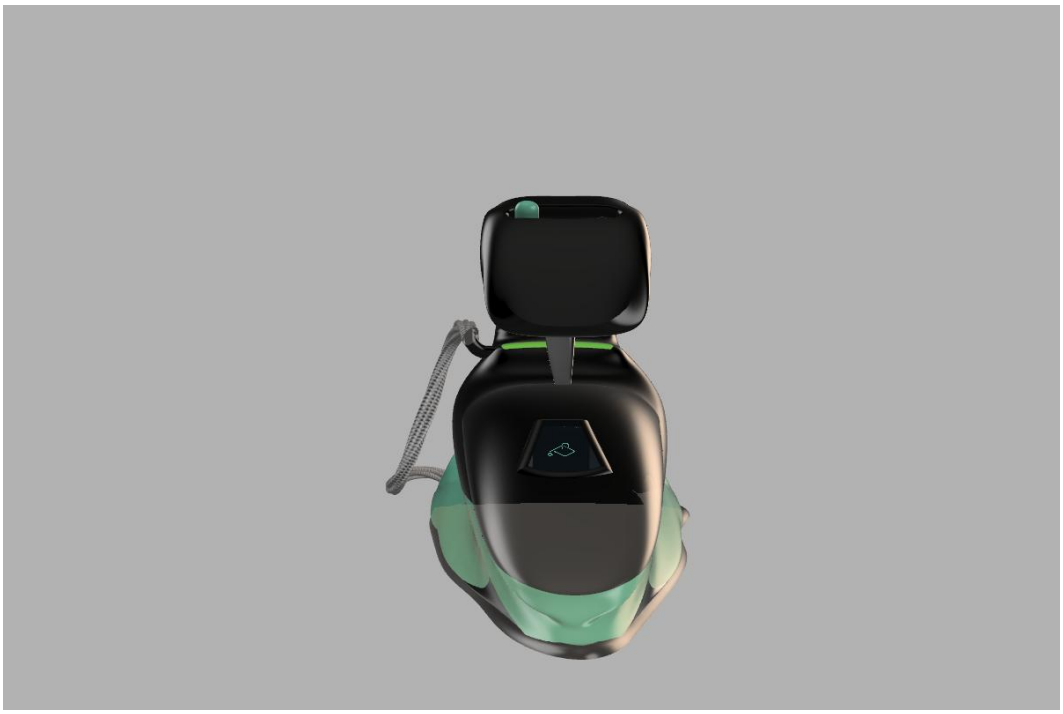
The switches which are generally toggled with a push are replaced with a slider giving more ease to the user.

Different views of the concept

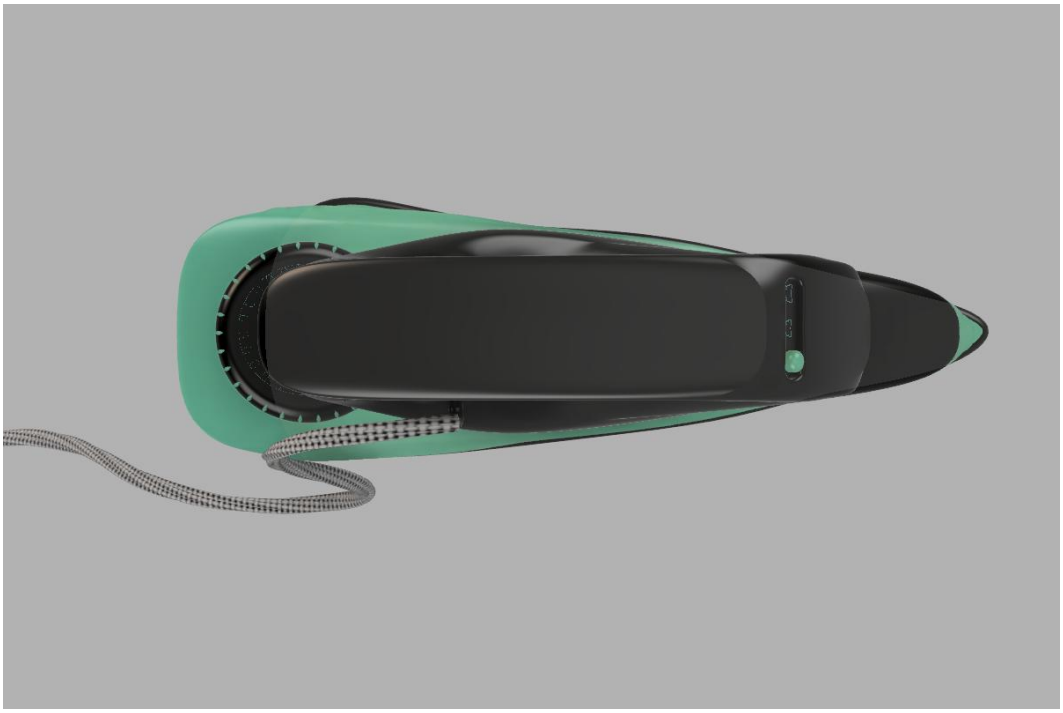


3D VIEW

LEFT VIEW



FRONT VIEW



TOP VIEW

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HIMANG SHAKKARWAL

Himang Shakkarwal, design student of Delhi technological university, interested in field of product design, himang is more into finding innovative solutions to existing products and ecosystem, His primary research interests are Universal Design and Innovative Product Design And has performed well in various design projects.

Vegetable peeler

Abstract

The main goal of this project is to redesign a peeler and make it usable for all stages of peeling for food preparation. This project is a part of semester design project where the objective was to redesign and improvise the existing form of a vegetable peeler. Vegetable peelers are widely being used in almost every sector of cooking for the removal of the outer skin of the vegetable making it suitable for cooking. The whole design process is explained through this report which includes design methodology, procedure followed, final cad models of the product, background research and conclusion.The whole framework leads to the product design that eliminates the problems encountered and improves the functionality of the product.

INTRODUCTION

A peeler is a kitchen tool that mainly consists of a slotted metal blade which is attached to a handle. It is used for removing the outer layer which is called "skin" of certain vegetables often carrot roots, potatoes, cucumber and sometimes fruits such as apples, pears, etc.

Figure 1 and 2 Different types of peelers

Today there are numerous designs available of peelers. Most of these handheld peelers are either straight or Y-type; some design may vary depending on the personal preferences of the users. For the problem identification, a set of 60 users of peeler were chosen of age group ranging from 25-40 years. Ethnographic field study and contextual inquiry were done on above-said users. The various issues were identified related to the functionality and usability of the product, i.e., handle of the peeler being too thick or thin, peeler not being able to perform well on curved surfaces, handle being slippery, etc.

Figure 3 Man using Y- type peeler

Figure 4 Man using a mechanical peeler

Figure 5 Man using potato peeler

Figure 6 Peeler in a rusted state

Objective

The primary aim of this project is to redesigning of a peeler and cater issues related to functionality and usability.

Importance of Ergonomics

In order to enhance the existing design or develop a new design solution designer needs to integrate ergonomics to maintain the balance between functionality and usability. The process of designing or arranging workplaces, products, and systems so that they fit the people who use them is called ergonomics. Ergonomics holds 8 fundamental principles these are: -

1. ***Maintain a neutral posture***
2. ***Work in the comfort zone***
3. ***Allow movement and stretching***
4. ***Reduce excessive force***
5. ***Minimize contact strength***
6. ***Keep everything in easy reach***
7. ***Work at proper heights***
8. ***Minimize pressure points***
9. ***Provide clearance***

Wrist Posture in daily life activities

One performs fine manipulative work (speed and precision, e.g., holding a pen) with wrist flexion and radial deviation for day to day activities. Activities may involve slower and stronger movements and may require wrist extension and ulnar deviation like tightening

the screw with a manual screwdriver under the dashboard of the car, etc. The maximum voluntary range of motion in different postures is exhibited in figure 7. The resting position of the wrist is considered in 12° wrist extension. An extreme flexion can cause muscle insufficiency, as the flexed wrist cannot grasp the tool firmly and an extended wrist affects finger movement. If one considers the grips used in daily life, it is of three types: power, hook, and oblique. In

power grip, the position of the thumb is directly oblique and opposes the fingers, thumb, and fingers are wrapped around the object. The hook grip consists of a flat and curled finger, whereas thumb is not used in this position to grasp the object. In oblique, the thumb is extended to stabilize the grasping position. However, in pinch grasp, we require less strength as compared to a grip. The various types of grips are exhibited in figure 8.

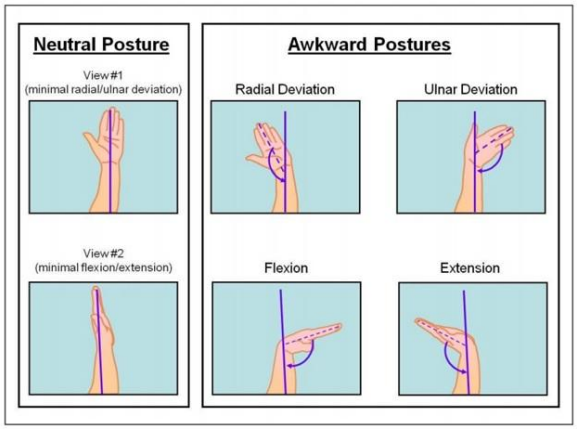


Figure 7 Neutral and awkward wrist postures

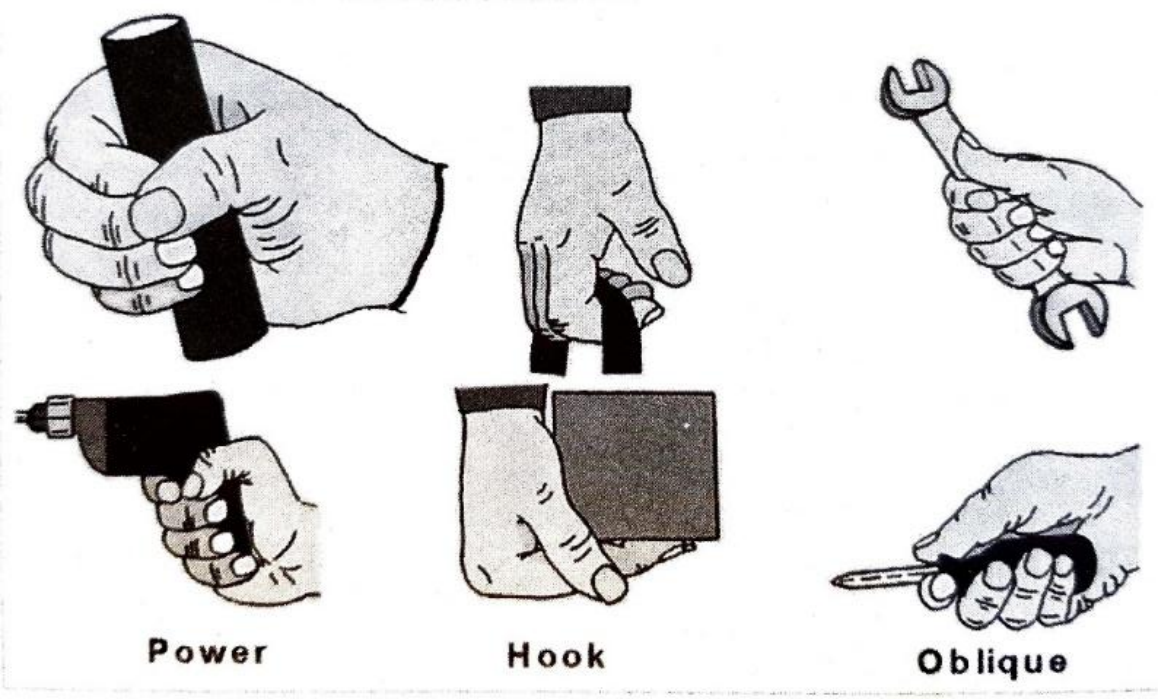


Figure 8 Various types of grips

The grip strength holds gender variation; the females have relatively lower grip strength as compared to males counterparts. A power grip is five times stronger than a pinch grasp. The grip strength of male and female is compared in table table1.

User study

Why is User Research needed?

1. To create designs that are genuinely relevant to users.

2. To create designs that are easy and user-friendly -

"If the user is having a problem, it's our problem."

—Steve Jobs, co-founder of Apple Computers

3. To understand the return on investment.

Table 1 Male and female grip strength

Grip Type	Grip Strength (lbs)	
	Males	Females
Two point pinch	17	11
Three point pinch	23	16
Lateral pinch	24	16
Oblique grip	65	38
Power grip	100	59
Hook	100	59
** Power grip ≈ 5 times pinch grip		

Research Methods

Objective - Research Methods - Conduct & Organize – Analyze

There are many types of user research methods like persona building, card slotting, ethnographic field study, contextual inquiry, A/B testing, etc.

Here, in this case, ethnographic field study and the contextual inquiry was done on a group of 60 people of age group ranging from (25-40).

Ethnographic field study allowed to observe the user in their natural environment. During observations, it was precisely measured that what participants/users are doing and Understand why they are doing.

Figure 9 and 10 showing ethnographic field study

In contextual inquiry, the users were given a particular set of questions regarding the whole process of peeling vegetables, and their responses were recorded accordingly.

Figure 11 and 12 showing ethnographic field study'

Analysis of user study

By both of the user research methods resulted in the same set of problems listed below.

1. ***The handle of the peeler is very bulky***
2. ***The handle of the peeler is thin***
3. ***Improper padding against certain joints***
4. ***Blades not able to move properly on the curved surface***
5. ***Handle becoming slippery***
6. ***No raised area to act as a safety guide***

Concept generation

Need: -Handle should be designed in such a way that it should fit in the user's hand properly.

Concept generation: -Plasticine clay was used in generating impressions of palm. Here the clay was held in such a manner that it

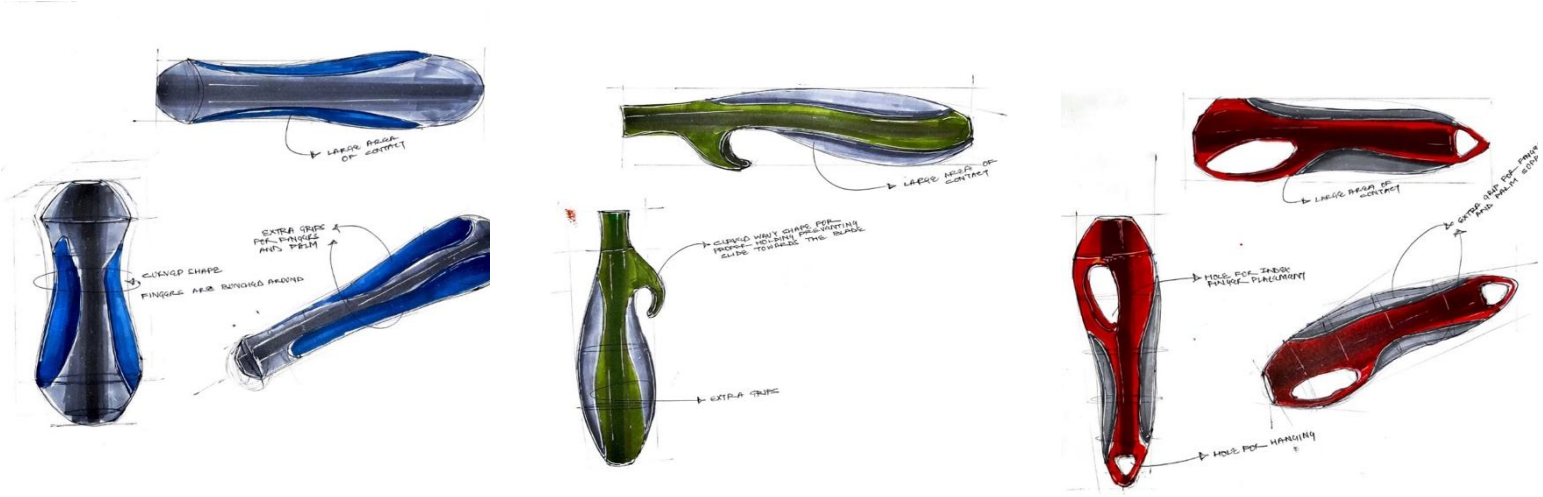
was imitating the same grasp when it comes to hold a peeler. this whole process resulted in giving a rough idea of how the shape and size of the handle should be.

Figure 13

Figure 14

Figure 15

Figure 13,14 and 15 showing holding of plasticine clay

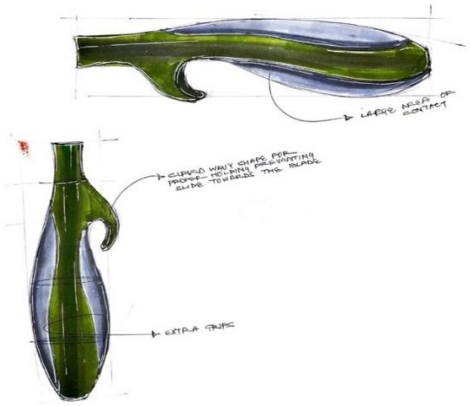


Final concept

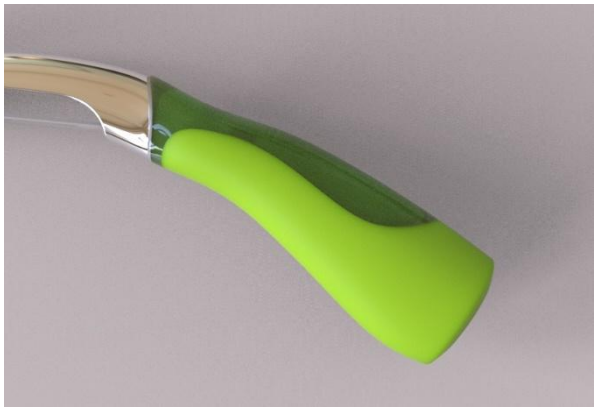
The final concept is an ergonomic solution to the problem.

Highlights of the concept

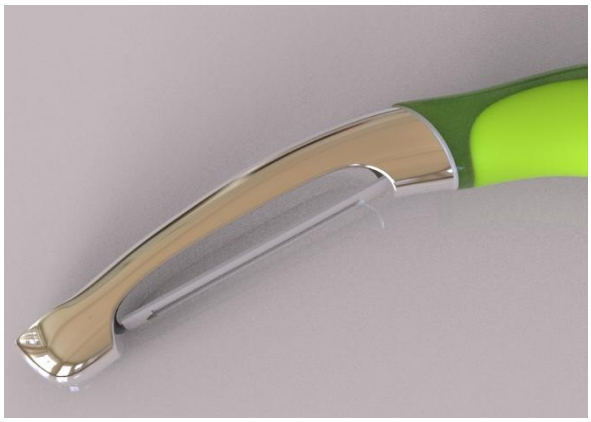
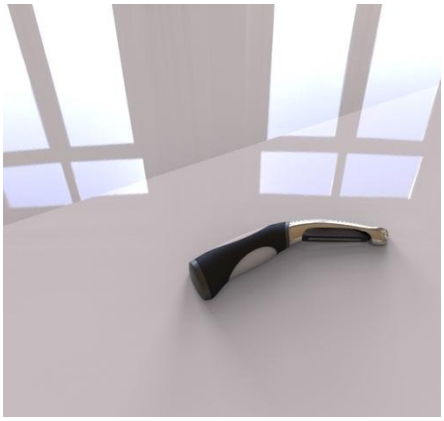
1. **Bent spline which avoids awkward posture of hand**



2. **Ergonomic handle with minimum pressure points**



Rotatable blades to work on curved surfaces


Conclusion

The final product designed is an ergonomically designed product that eliminates the functionality problems.

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HARSH SOKAL

Hi, I am Harsh Sokal, 2nd year student of Bachelor of Design, Delhi Technological University, Delhi and a quick learner. I am a responsible person with a positive attitude. I try my best to finish any work within the time limit. I like making new friends to improve my socialising skills. Model making, product sketching, listening to music and songs creation. I am also food lover and try making new dishes whenever I am at my home.

A Redesigned form of Electric Iron

Abstract

The main aim of the project is to improve the method of ironing the cloth to reduce creases.-Iron can reduce the creases by adding heat, pressure, and moisture to flatten it. Steam and dry iron are the most common irons used around the world. Other than these, streamers and ironing boards are also there. For tonnes of cloths, big ironing machines are there for faster production. Despite the fast and smart technology change and development, method of ironing remains the same as that of first iron. Smaller configurations have been made since the first steam function introduced in the 1920s. Since then only the angle of handle changed and with the more refined streamlined shape made up of plastic. Therefore, there is a scope of improvement in the way of ironing.

Introduction

As we know, clothing is part of life. As every human need care, clothes need to be taken care of as well. Before the discovery of cloth iron, its principle was discovered by the Chinese.–They ironed their silk cloths with coals placed in a pan. This principle continued until the discovery of electric iron in 1882. Technology changed over time, from the use of external water to the steam station, hence improving results over time. Some of the benefits of ironing clothes as follows:

1. ***Removes the smell of detergent from cloth.***
2. ***Ironing makes clothes look better and fresher.***
3. ***Kill germs and remove creases from the fabric.***

In order to find problems in present cloth iron, a student was while ironing their clothes.

The observation started from plugging the iron to storing it after cooling down

Difficulty in ironing between the buttons as button stuck between the soleplate and body.

1. ***Many a times the tank overflowed as there was no indication of water level.***
2. ***Change in hand posture according to handle which is not comfortable. May strain the hand while using it.***
3. ***Cord holder has oscillatory motion in up and down direction. Ironing in random movement-causes problems as strain may be observed in the wire. This may be the reason for wear and tear of insulation at the junction of the cord holder.***

Solutions need to be found in order to address the following issues: To tackle the button issue, the gap may be increased between the soleplate and the body so that it will not be stuck.

1. ***For water tank, instead of the small gap to fill water, a transparent water tank may help the user can get the idea of water level.***

2. ***For the handle, Inspiration was taken from an existing product used by a carpenter to cut the wood. The handle looks more comfortable than the existing one.***
3. ***For the cord holder, Inspiration was taken from the cord holder of hair products like straighteners with 360° rotating base which will help the user while ironing in any pattern.***

Need Statement

The need for this project is to design an ergonomic steam iron that will enhance the user experience.

Objective

Main objectives of this project are:

1. **To generate a solution to solve the challenges of ironing.**
2. **The solutions are generated through user research and evaluation of present ironing methods and tests.**
3. **The designs are done keeping in mind the ergonomics and aesthetics.**

RELATED WORK/ BACKGROUND STUDY

Heat: Heat energy is transferred in fabric bond so that bonds can transform themselves from wrinkle state to the original state. If the wrong temperature is chosen, the fabric can shrink, degrade, or can lose its color. That's why heat controller is marked with dots on it representing the type of fabric along with it.

Moisture: Moisture is needed so to get better ironing results. Intermolecular bonds weaken when the fabric absorbs the water. Users with dry iron use external spray for moisture source while today's steam iron contains both moisture and spray functions which ease the method of ironing.

Press: Together with heat, moisture, and pressure, one gets the desired results of Pressing clothes. In the Earlier irons, the handle was at the back of the iron body. So the effect of the press could only be done by the end part of iron, i.e. center of gravity is at the end of the iron. But today's iron has handled in the middle. So the center of gravity is in the middle, and better results are observed.

ERGONOMICS

Ergonomics means the completion of any task by avoiding risk to the user's health. Factors such as posture and other aspects are needed to be taken care of while designing the handle of any product. Hands, upper arms and shoulders should be given extra attention while designing the handle for an iron. The plane created while the hand moves towards little finger are known as deviation plane. More the angle between the wrist and little finger, more will be the strain on the user's hand.

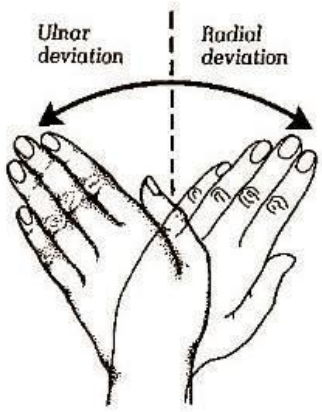

Figure 1. Deviation Plane

DESIGN HISTORY OF IRON

The main change after the discovery of first electric iron in the 1880s is the change in the design of iron and not the functions.

Figure 2. One of the first steam irons

The principle remains the same but handles and materials have changed over the period of time. One can observe that the early Irons looked bulky and their handles were also extended as heels. With time the rest of the body became curvier, and the handle became more comfortable which in turn increased the speed of ironing.

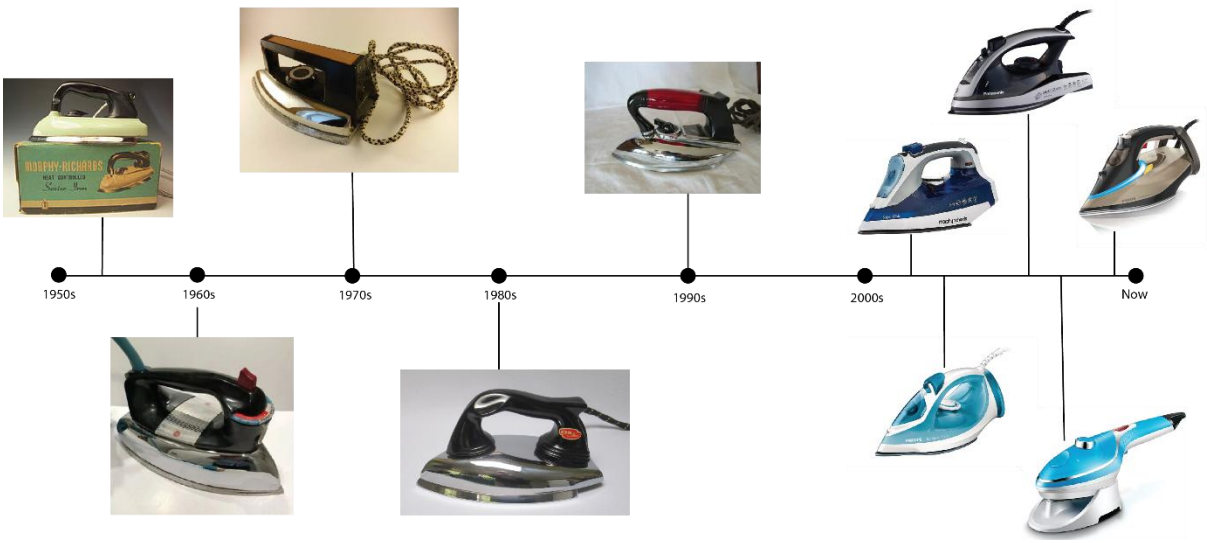

Figure 3. Design development of iron since the 1950s till now

MARKET STUDY

The leading brands in the market are Phillips, Morphy Richards, Bajaj, Havells, and USHA, etc. All these brands offer some solutions such as dry irons and steam irons. But Phillips has done innovative work by introducing OptiTemp function thing which automatically sets the temperature by detecting the type of fabric.

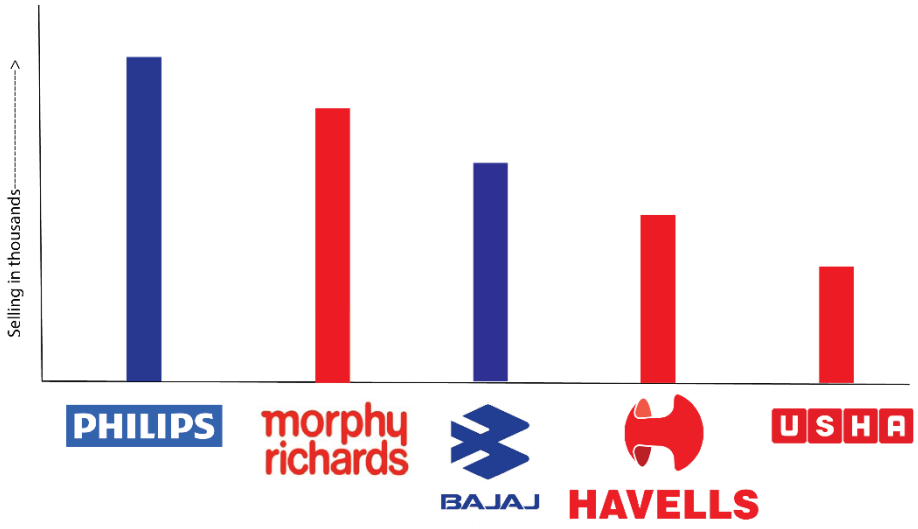

Figure 4. Sales of different iron companies in 2019

USER STUDY

SURVEY

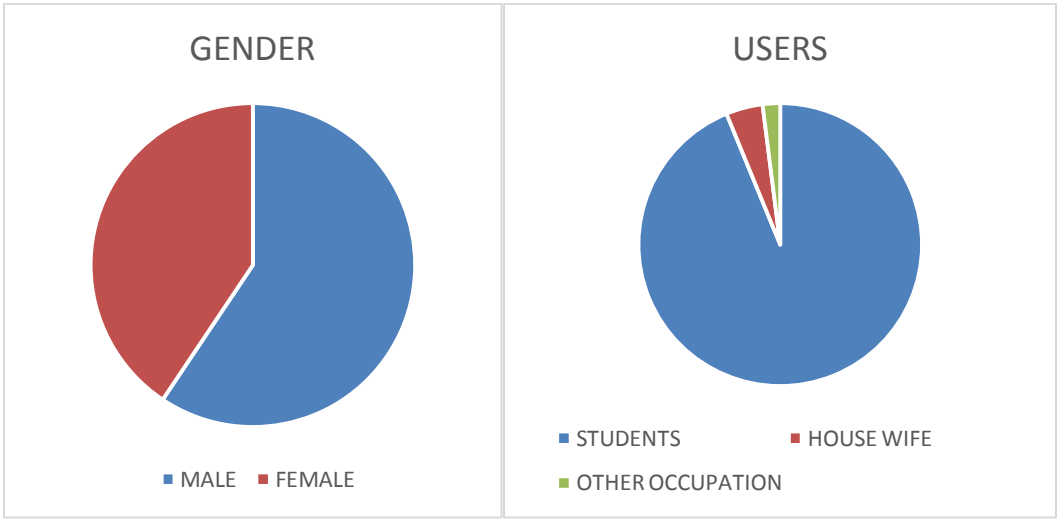

Figure 5. Left from right- Gender distribution and Occupation distribution

Survey Analysis

A survey was done amongst 50 participants within the age group 15-30 years.

An equal distribution of females and males members were there.

90% of the participants were students and the rest of them housewives and other professionals.

60% of users iron their own cloth.

60% of users use dry iron or not steam iron.

60% of users use iron in side by side pattern and the rest of them in circular loops and random patterns.

Appearance and safety are the aspects that are users want in their next buy.

Survey main findings

Most of the users think ironing is a time-consuming task, whereas some find it relaxing.

Users don't want to try steam iron as there is more functionality in steam iron than in dry iron which needs caring and services.

Most of them want more ergonomic iron, want better results, and wanted something for the cord problem.

TASK ANALYSIS WITH OBSERVATION

Main findings of task analysis

- ***User completes ironing while sitting all the time. So they bend while ironing and wrist are at the stomach level.***
- ***User held the iron in a way that might strain their hand.***
- ***Most of the users lifts the iron so that they can get better precision while spraying.***
- ***While filling the reservoir, some users find it difficult as there is no idea of water level in the tank due to the translucent body. They stopped only when water-filled till the brim.***
- ***There is no proper display for steam control. That's why some users only use spray and regulator for this task.***
- ***There is a strain in the wire while ironing in a circular pattern as the cord holder is limited to back and forth direction.***

1. PERSONA

Paul Wilson

Figure 6. Paul Wilson (Shutter stock)

- ***Paul Wilson is a 1st-year student B.Sc. nautical science of navy. He needs to wash his navy uniform daily and iron it daily. He tries to keep his uniform neat and clean. Usually, he wears T-shirts which he irons once in a week. He recently bought Bluetooth headphones with neon color to look different from others, and he controls his headphone with his phone. He tries to buy electronics which are cordless.***
- ***Quote: "I don't want the crease to spoil my personality."***

2. INTERVIEW

Main findings of the interview

- ***Refilling of the water tank and using spray is an issue.***
- ***An iron which will use less energy and should give good result in less time.***
- ***Heel rest should be stable enough as most of the Indian users iron their cloth on bed.***
- ***The part which gets damaged the earliest is the cord holder as it gets twisted and the insulation gets removed over time.***

AREA OF IMPROVEMENTS

- ***Handle/ergonomics***
- ***Light***
- ***Cord holder***
- ***Buttons***
- ***Design***

- ***Water reservoir***

1. **DESIGN BRIEF**

   A neat and clean product with attractive appearance and offer the user a more ergonomics and comfortable way to remove crease from the cloth without giving strain on the user's wrist.

2. **INSPIRATION FROM OTHER EXISTING PRODUCT**

   This machine is used by a carpenter to cut wood. Its handle looks more ergonomics when seen from the point of ironing clothes. It is also used in the same manner as that of cloth iron.

Figure 7. Bosch GST 150 BCE jigsaw

3. **INSPIRATION BOARD**

Figure 8. Mood board of design

Concept Generation

Handle Development

The handle should be developed in a way that it would be comfortable in the user's hand and easy for the user to place the iron in standing position.

Types of handles

1. **Horizontal handle: This handle is positioned over the iron body just like in trolley bags and pushed in the same manner. This handle is used in early irons.**
2. **Joystick handle: The handle consists of engravings on it which had a potential of adding comfort while using it.**

3. **Pistol grip handle: this handle has a natural tendency for moving back and forth movement with hand. Also, with this, it is easy to stand the iron.**

Figure 9. Types of the handle that can probably use as a handle in iron.

Rejecting horizontal handle and joystick handle as it is hard to stand iron with horizontal handle and joystick handle and also not close to the natural posture of the hand.

The pistol grip handle was chosen with palm rest.

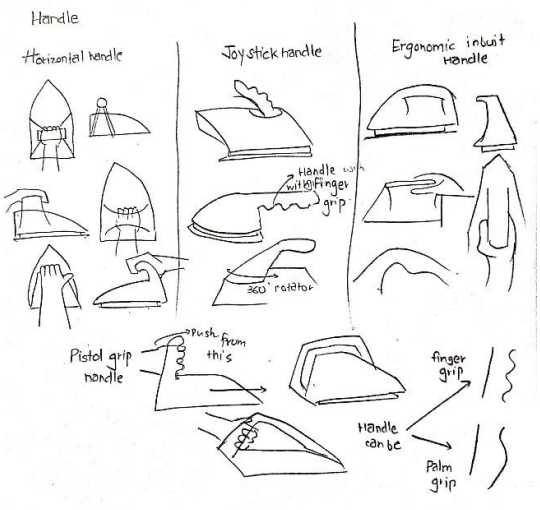

Figure 10. Sketches are showing the reason for selection of pistol grip handle.

After choosing the pistol grip handle, different ways through which the pistol grip handle could be used were studied.

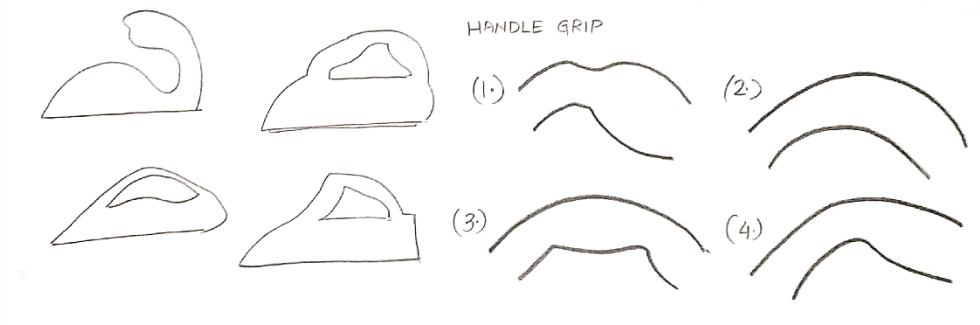

Figure 11. Possible ways of adding pistol grip handle in iron.

Choosing no. 4 handles as there is a place for index finger and position for a sprinkler button. Also handle looked more comfortable and ergonomic in user's hands than the present one. Also, the angle between the iron body and handle should be 30º which is the natural posture of the hand.

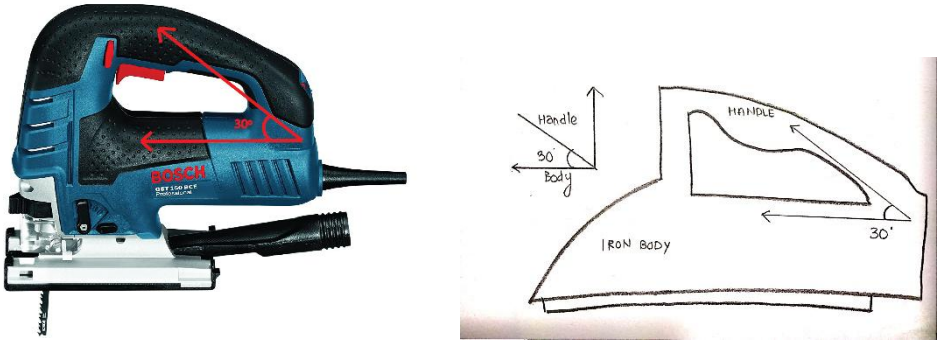

Figure 12. Left to Right- inspiration from existing product and implementing it in our product.

Body concepts

This helped in developing the design of iron through sketches and proceed for model making.

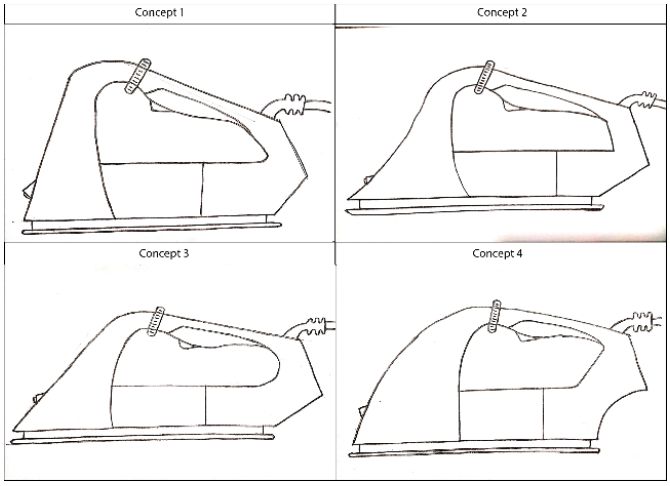

Figure 13. Some of the interesting concepts

Each concept is explained and further, on new concepts are generated during this process.

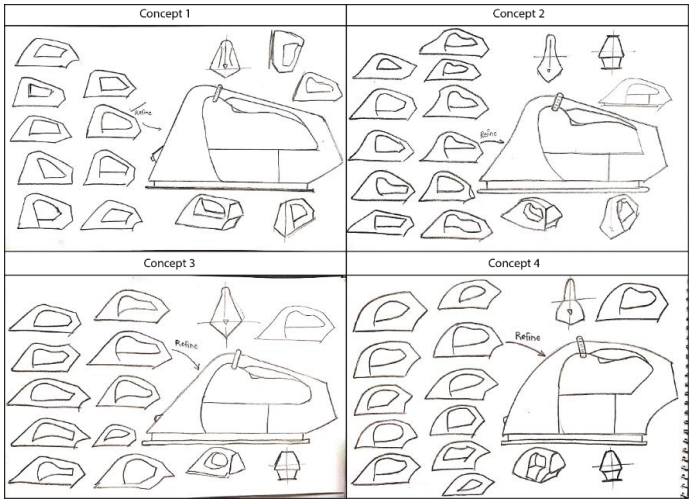

Figure 14. Versions from the above-mentioned concepts.

Rejecting concept 1 as it kind of look bulky. Concept 2 and concept 3 had so many curves in the body which would increase the price of manufacturing — hence finalizing concept 4 as it was somehow related to the shape of the existing present product.

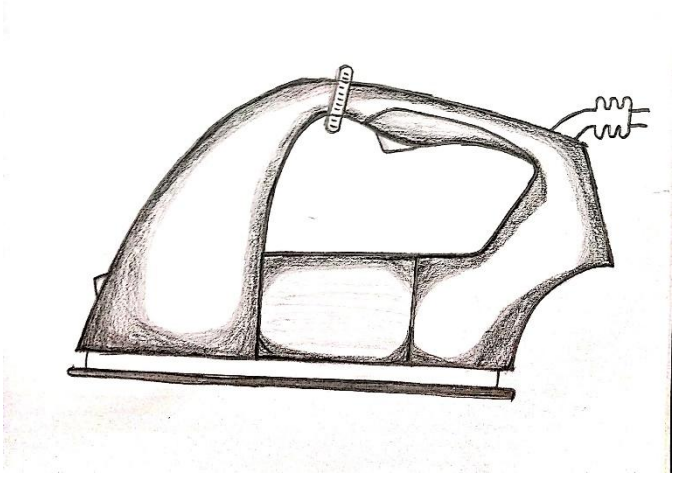

Figure 15. The final detailed concept of cloth iron.

This concept has a tank with a large tank where the top lid could be opened and closed by the user and water could easily be filled through a large opening.

Final concept

The final concept was made in CAD. 3D CAD model is divided into the front and back part, a soleplate, buttons, temperature regulator, water tank and cord holder. Base body of iron took more time than excepted. Making of handle and heel rest was easy, but the placing of the water tank was quite complicated.

Figure 16. The final concept.

The final concept consists of several details described in the list below, guided by the numbers in figure 17.

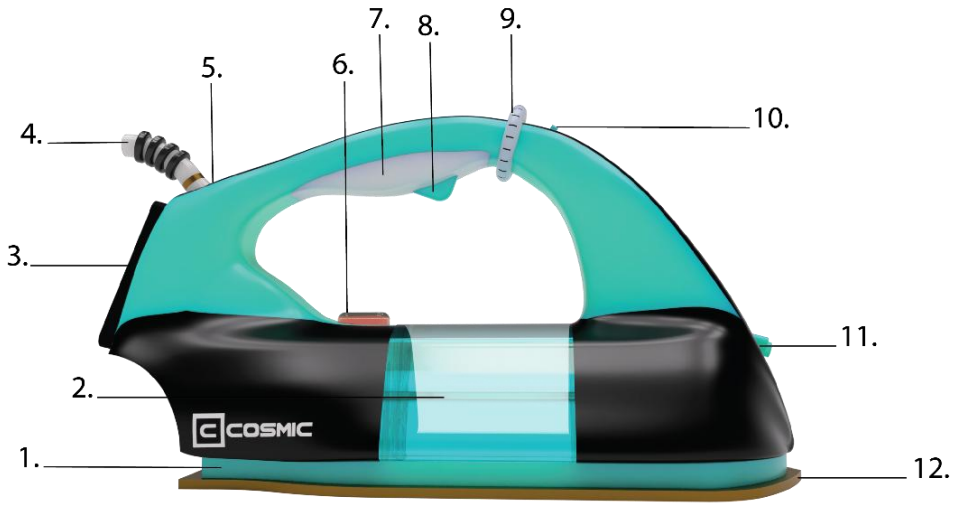

Figure 17. Final design with details.

1. ***There is enough gap between the soleplate and iron body so that buttons will not stick any more while ironing between them.***
2. ***A water reservoir with a capacity of 280ml that is enough for 4 to 5 uses. It has a lid on its top part through which user can easily fill water. Also, the tank is transparent through which user can get the idea of water level.***
3. ***A stable heel rest with rubber on its boundary that will provide extra grip while placed in standing position.***
4. ***A cord of length about 1.5 meter that is enough for a user to iron cloths away from the socket.***
5. ***Cord holder with 360º movement that will make the ironing task easier. As a result, cord interruptions will not be there while ironing the clothes.***
6. ***LED that will glow red when the iron is not ready to use. It will automatically turn off when the iron is ready to use.***
7. ***A comfortable and ergonomic handle that will enable the user to iron with his/her natural posture without adding any strain in the user's hands.***
8. ***Press button that can be controlled by the middle finger while holding the iron and is used to control sprinkler.***
9. ***Temperature regulator in the shape of donuts that will enable the user to set the temperature according to the fabric. It has a display near it where the type of fabric is displayed according to which a user can set the temperature according to him.***

10. ***Steam control with sliding function and the user can select between less to more steam by sliding button through them.***
11. ***Sprinkle at an optimal position that will sprinkle on a large area.***
12. ***A non-sticky soleplate that will allow the user to iron any type of fabric according to him.***

Figures below show all different perspectives of cloth iron for better understanding.

Figure 18. Left from Right-front and isometric back view.

Figure 19. Left to Right- top and standing view.

The iron has variant of two colors. Neon Blue and Neon Pink.

Figure 20. Design with two color versions.

Iron has a height of 172mm and length of the handle is 129mm with a diameter of about 37mm. Also, the tank has a capacity of 290ml.

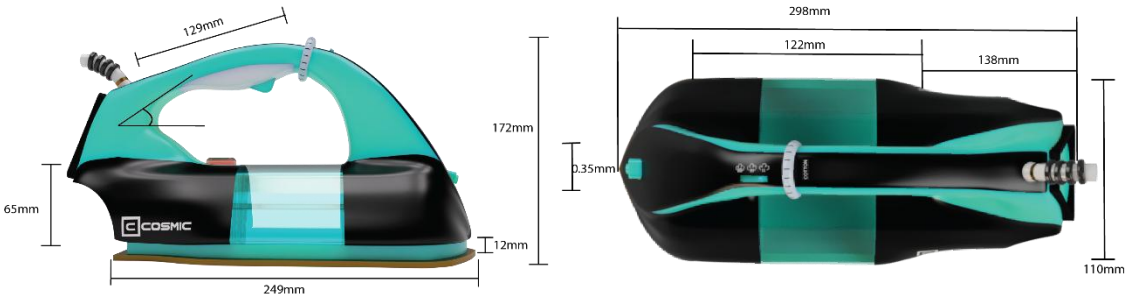

Figure 21. Measurements of iron design.

On its handle, there is a temperature regulator which can be rolled by the thumb. Also, there is a display in front of it which will show the type of fabric needs to be ironed.

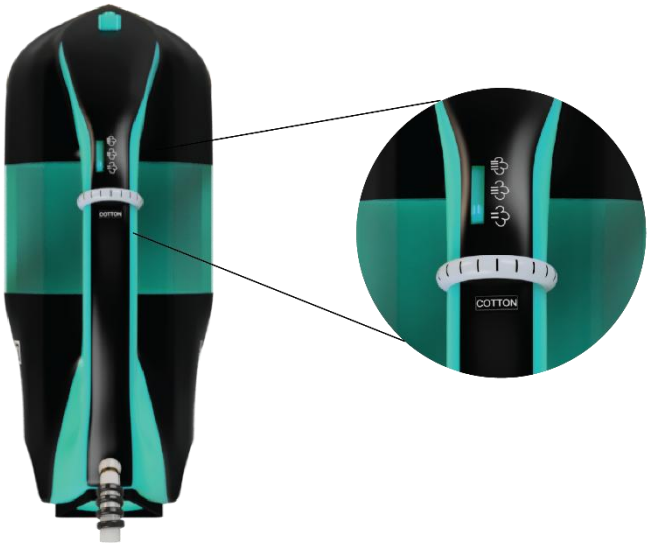

Figure 22. Placement of temperature regulator and steam control.

Also, steam control is placed forward to temperature with the sliding function. User can decide the amount of steam by sliding the button.

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Conclusion

User study

The final product is a result of every single research done for this project which includes surveys, interview, research, etc. All decisions were based on the user study in order to meet the needs and aspirations of the user.

Ergonomics

The ergonomic handle was a result of research and user tests. The result was a good comfortable ergonomic handle which can enhance the user experience.

Design

Design concepts are developed from the interview, sketches, and research work. The result was to get a user-friendly iron that would increase user experience while ironing.

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AYUSHI SURI

Ayushi is currently pursuing her Bachelors in Design at Delhi Technological University (Formerly known as Delhi College of Engineering).

She chose the field of industrial design over others because she's passionate about creating beautiful, elegant as well as functional designs out of raw ideas. She's not only a dreamer but also a doer and goes to great lengths to convert those dreams into reality. Other than that she can be seen rocking to the beat.

POPUP-TOASTER

ABSTRACT

The main aim of this project was to redesign the exterior of pop-up toaster keeping in mind the pain points experienced by the target audience while interacting with it. Toasting is a process in which slices of bread, of any kind, superficially, attain a slightly charred and caramelised surface having a brownish hue to it.

The most common household toasters are the pop-up toasters and toaster ovens. Apart from these, convection ovens and toasters are also available for commercial use, in restaurants and big kitchens. The process of toasting bread in toasters has remained nearly unchanged since its conception in the early 1900s, albeit the fast-paced and enormous developments in technology over time. However, there is an enormous scope of innovation with various features by playing with the form, aesthetics, and material.

INTRODUCTION

Toast is one of the reigning components of breakfast foods across the globe. This seemingly bland, crunchy piece of carbohydrate can be paired with almost anything and act as a supplement to it. Since toast is firmer than untoasted bread, it becomes easier to spread toppings on it. It is generally eaten with butter, sweetened toppings such as jam, or savoury toppings such as peanut butter or yeast extracts in some parts of the world.

Toasting refers to, mostly, browning of bread slices due to constant and concentrated exposure to radiant heat generated by a heating element inside the toaster. This radiant heat is essential to initiate a non-enzymatic reaction called the Maillard reaction, responsible for altering the texture, odour, taste, and moisture content/elasticity of the bread.

In toasters, there are slots made of stainless steel for the bread slices to go into and are surrounded by fragile, nichrome wires throughout. These wires are a part of a circuit which gets closed by pushing the lever down after setting the thermostat. This enables current to flow through the circuit. Nichrome wires have very high resistance, and so, glow bright red and radiate extreme heat when current passes through them, effectively toasting the bread slices. More significant the intensity and duration of heat in contact with the bread slices, the browner they become and the more moisture they lose.

A Pop-Up toaster was studied, and the following research was done to go through the redesign process.

- ***Surveys through questionnaires***
- ***Task analysis & Sketches***
- ***Analysis leading to:***

1. Problems fundamental to almost every demographic & their possible solutions

2. User persona

3. Persona directed pain points

4. Final brief

- ***Sketches of existing products***

In order to find and identify problems present in pop up toasters, a 20-year-old college student was observed while toasting some bread slices in the toaster. The entire task was documented from start to finish through pictures and sketches; the documentation stretched from unboxing the toaster to cleaning it after use.

A survey was done of sample size 50, with different age groups and occupations, through questionnaires.

The tasks above were done in order to empathise with the users and better understand their aspirations. This method helped in identifying the frustrations and pain points experienced by the users.

Mind maps were used to figure out possible solutions. The survey and interview data was analysed, and a persona of the target user was generated. This pain point of the persona was fundamental across almost all demographics, and hence these were taken up to while redesigning the toaster.

The next steps included:

- ***Studying Ergonomics***
- ***Learning about different materials***

- ***Taking inspiration from already existing products and their forms***
- ***Coming up with different concepts, some of which eventually got converged to form the final concept***
- ***Prototyping (Thermocol and 3D CAD model)***

This whole redesign process employed the 'Double Diamond Model' as well as the 'EDIPT – Design Thinking Process'.

OBJECTIVE

The main objectives of this project were:

- ***Researching and analysing the various designs of pop up toasters, study the timeline of toasters, in terms of their form, ergonomics, colour and material.***
- ***To understand the psyche of the target users through User research.***
- ***Redesigning the product that helps address the critical problems faced by the users.***

NEED STATEMENT

The need for this project was to redesign the outer casing of pop up toaster in terms of its ergonomics, form, and aesthetics while improving the appliance's usability and intuitiveness.

BACKGROUND STUDY & RESEARCH

ERGONOMICS

Different grips were studied and found that the cylindrical grip and hook grip to best suited for gripping the toaster on both sides in order to invert it and shake it vigorously to get rid of the crumbs.

The bottom part of the toaster was designed in such a way that it followed the contour of the palms of the hands. It was done for the people in the 5th percentile because doing so will make sure that the 95th percentile will be able to grip the appliance as well.

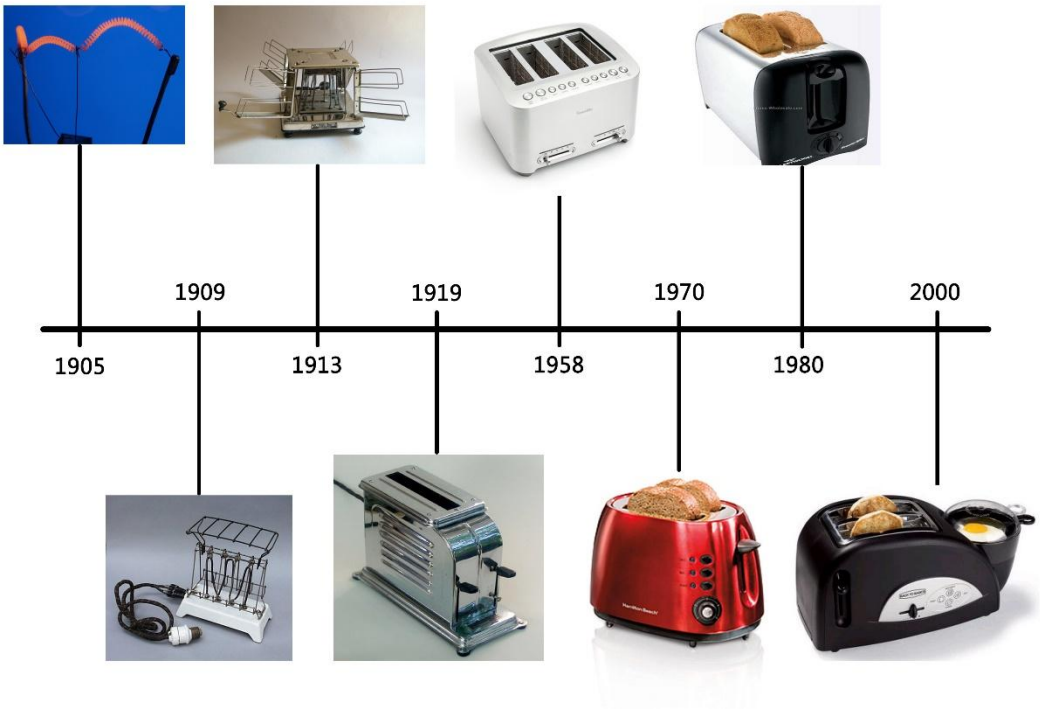


Figure 1 Evolution of Pop-up Toaster

In 1905, the nichrome wire filament was invented and used in the earliest form of toasters as a source of radiant heat. This wire filament has extremely low electrical conductivity and very high resistance.

In 1909, the implementation of nichrome wires was seen in the first-ever electric toaster. This appliance toasted only one side of the bread slice per cycle, and the slice had to be manually turned in order to toast the other side as well.

In 1913, a new feature got added to the previous version, i.e., automatic bread turning.

In 1919, the first-ever pop-up toaster got invented, called the Toastmaster. The lever would automatically spring back up once the toasting finished. Also, the nichrome wires would toast both the surfaces of the slices at the same time now. This version can aptly be called the 'father' of the new pop up toasters.

Since 1919, a lot more options for toaster designs have opened up because of the development of heat resistant plastics. Now, toasters are generally made up of stainless steel or such plastics as they remain cool to the touch even when exposed to high temperatures. Furthermore, features like four-slice toasting at a time, more full slots for thicker bread sliced and buns, crumb tray etc. have been added throughout the years. Since the process and mechanism of toasters have remained the same, people have taken to improve the aesthetics, form and ergonomics of the appliance.

In 2000, a pop-up toaster was designed that also cooked eggs along with toasting bread.

TINKERING

The tinkering of a Prestige 2-sliced pop-up toaster (750 Watts, 220-240 Volts) was done in order to understand its anatomy. This was done in order to better understand the working of the appliance, the structure and also the mechanism behind it.

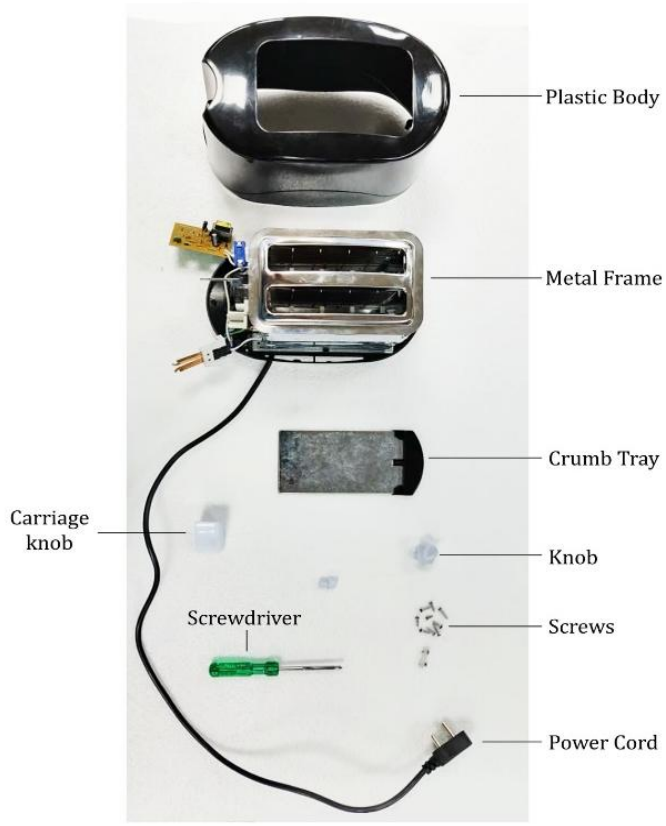
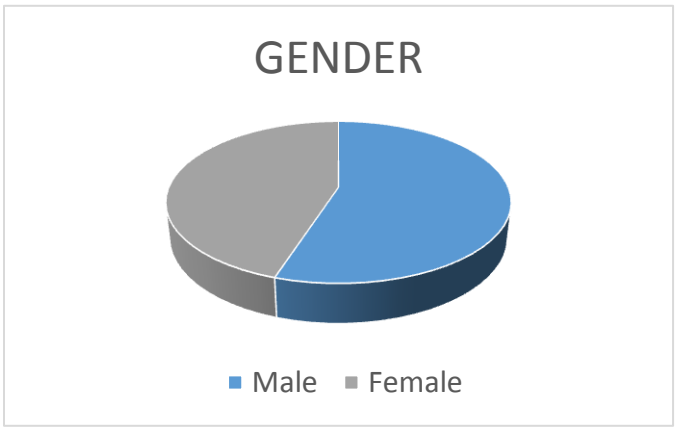
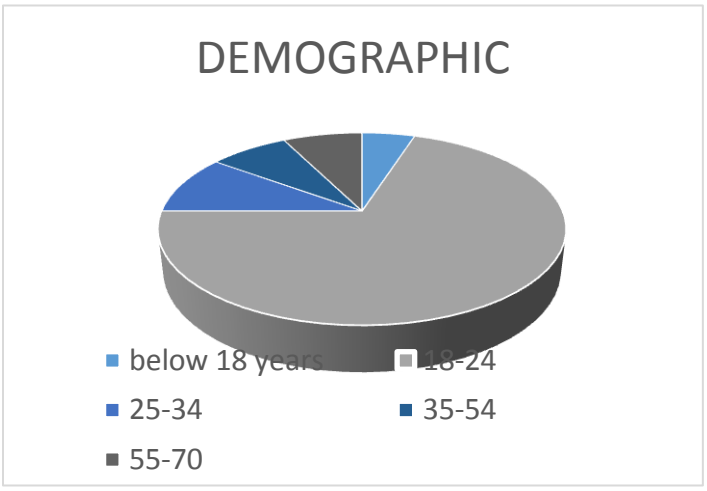
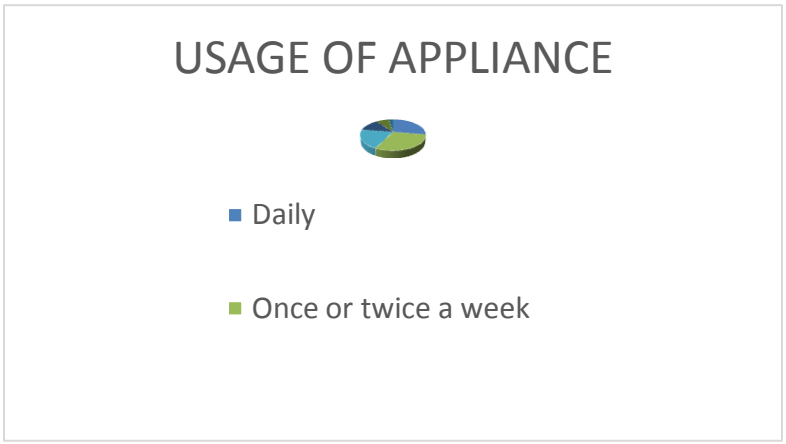


Figure 2 Components

SURVEY ANALYSIS







Out of the 50 or so people surveyed through questionnaires, around 55% were males while the rest were females.

Almost all demographics were surveyed although the majority were 18-24-year-olds, about 70%, followed by 25-34-year-olds, about 10%, and 35-54-year-olds and 55-70-year-olds, each about 7.5%.

About 67.5% of people were students, followed by 27.5% of people who were employed for wages either in govt. Offices or MNCs. The rest were housewives, retired people or those who are unable to work.

About 27.5% of people used the appliance daily, 50% of them used it either 1-2 times a week, while the rest either used it extremely rarely or not at all.

About 60% of the users had a preference for 2-slice toasters over 4-slice toasters.

Most of the people surveyed found it hard to clean the interior of the toaster of crumbs even though there is a provision of crumb trays as a lot of the crumbs get stuck in between the nichrome wires along the sides of the toast.

People use their fingers, majorly, to get the bread slices out of the toaster slots. When that fails, they go as far as using knives and forks to do the same, making them more susceptible to getting electrocuted.

People also invert the toaster and jerk them vigorously to get rid of the crumbs present inside of the toaster. Sometimes, the appliance falls while doing so because of a lack of grip while holding it inverted. Also the plastic or stainless steel is shiny and slippery, and the bottom portion of the appliance does not follow the contour of their palms, hence, not providing places to grip it.

Burning of fingers, getting electrocuted, the toasters falling while inverting it trying to get rid of the crumbs and the toaster getting infested with pests are some of the bad experiences people have had with toasters.

Build quality (material of construction, mode of adhesion, robust built), aesthetics (looks, colour, shape, form), portability, ease of cleaning and safety were the aspects users paid a lot more attention to while buying a toaster.

TASK ANALYSIS AND SKETCHES

The task analysis of toasting slices of bread was done on an 18-year-old college student. The Task began at Unboxing the Toaster and ended at cleaning it after use. This was documented through pictures and sketches. The Task Analysis helped to empathise with the user and identify the grievances and pain problems the user had faced while using the appliance in real-time.

Table 1 Task analysis.

No	TASK	SUB-TASK	INPUT AVAILABILITY	ACTIVITY PERFORMED	OUTPUT GENERATION	DIFFICULTY LEVEL (*****) Easy →Difficult	SATISFACTION LEVEL (*****) Low→High
1.	Unboxing the toaster	Inspection of the box	The cardboard flap meant to aid in opening the box	Opens it using the flaps	The unveiling of the toaster	*	****
2.	Placing the toaster on a flat surface	Keeping it onto the slab	Flat surface		Toaster on the slab	*	*** A college dorm room has very little space; it is filthy and untidy. So, the toaster has to be portable.
3.	Plugging the toaster in the		The socket			***	***

	socket						
4.	Placing bread in the toaster's bread slots		The bread slots	Tried to put the slices in the slots with utmost precision but failed to do so		*** Always afraid of putting his fingers the slots and electrocuting or burning himself	****
5.	Setting the browning level		The browning knob	Rotating the knob to achieve the desired setting		*	*** There is no indication of the actual level of browning of the bread corresponding the numbers present on the knob Hit and trial, which can be

							especially frustrating.
6.	Pushing the lever downwards		The lever	Pushes the lever down	The bread slices go down along with lever's motion. The LED lights up indicating the start of the toasting process	*	*****
7.	Waiting for the toast to be done					* He is on his phone, surfing the web and listening to music	*****
8.	Post-	plugging	Popping up	Uses his	Toasted	****	***

	Toasting activities	the toaster off Taking the bread out of the slots	the bread slices	fingers to get the slices out and burns them in the process	bread slices	Burns his fingers and in turn throws the bread away	
9.	Adding butter/jam to the bread slice		Toasted bread slices	Uses the knife to spread the topping	Buttered/jam bread slice	*	*****
10.	Cleaning the appliance	Cleaning the crumb tray Cleaning the inside of the toaster		Pulls the crumb tray out of the appliance, gives it multiple jerks, washes it with soap and water(occasionally) Flips the appliance upside-		****	* The crumb tray and the inside of the appliance never get thoroughly cleaned and free of crumbs. The appliance also falls many times

				down and jerks it multiple times			because of lack of proper grip at the bottom of the toaster while the user inverts it.

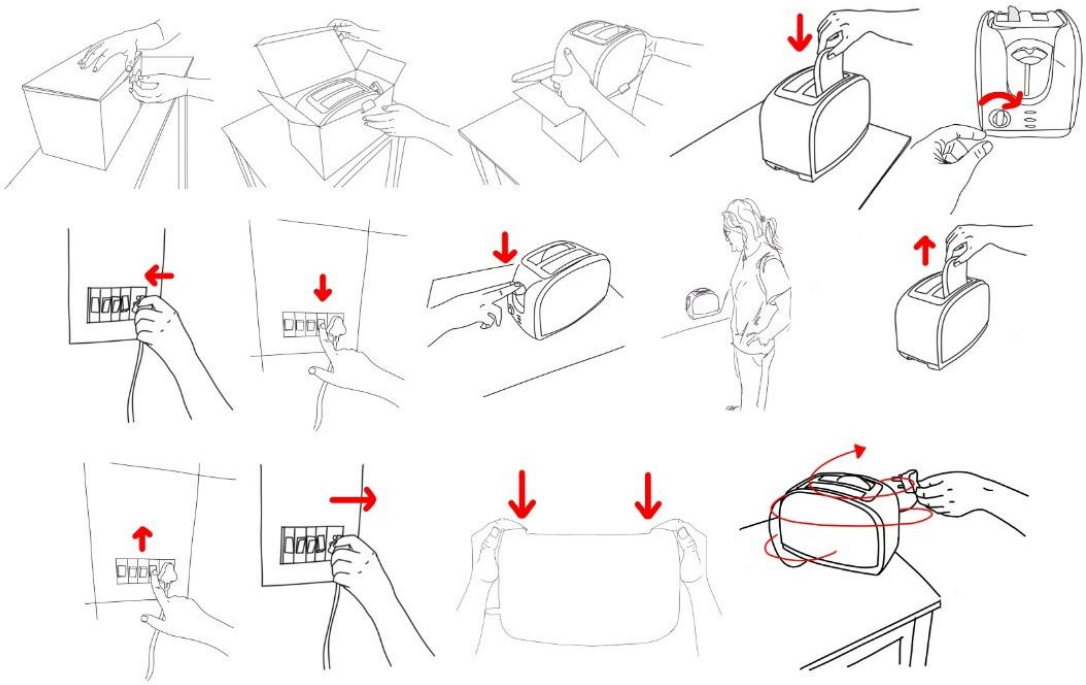


Figure 3 Hierarchical Task Analysis

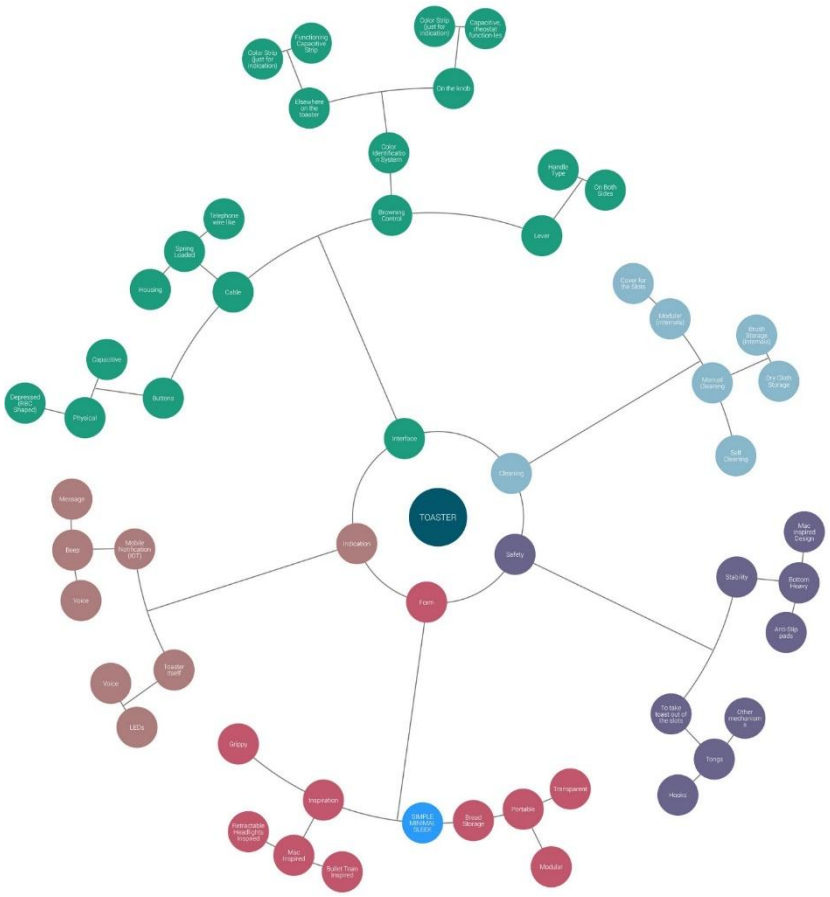


Figure 4 Mind Map

FUNNELED PROBLEMS & SOLUTIONS

These problems were narrowed down from the above mind map based on them being the most recurrent ones across almost all the demographics surveyed. The probable solutions to these problems have also been written down alongside them.

• **FORM** – simple, minimal, sleek grip portable transparent **inspiration** – bullet train mac by apple retractable headlights of sports cars • **SAFETY** – stability - bottom heavy anti- slip pads - cover for slots • **CLEANING** - modular	• **INDICATION** - LEDs timer • **INTERFACE** - buttons capacitive concave - cable management spring-loaded - browning control browning level identification - lever ergonomic handle on both sides of the toaster

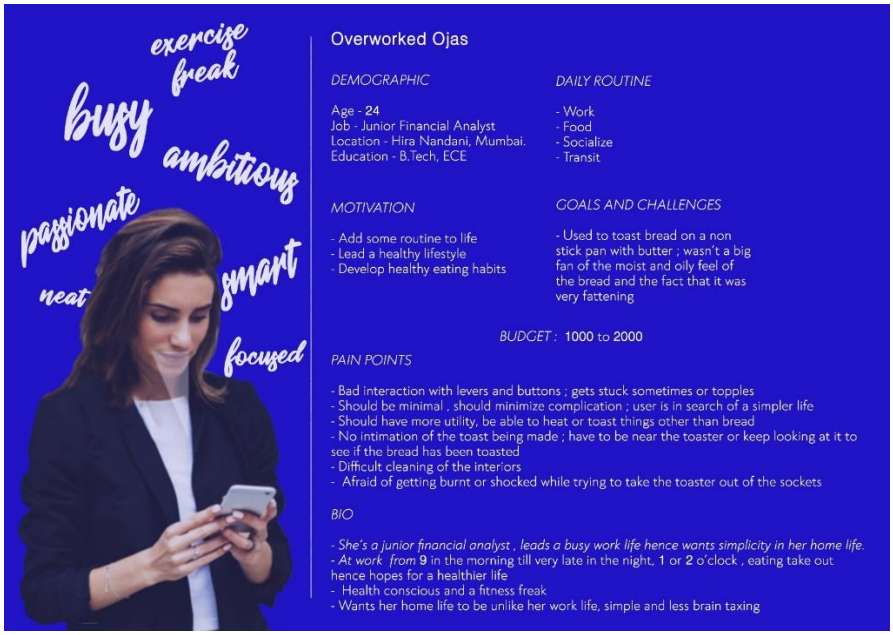


Figure 5 Persona

AREAS OF IMPROVEMENT

The following were the persona directed problems were decided to be worked on:

- **Cleaning - Easy, quick**
- **Safety - If the toaster shocks, burns or injures the user in any way, he/she will throw it away rather than repair it**
- **Interface -Less cluttered, intuitive and straightforward**
- **Better usability – How easily the user interacts with the product**
- **Form – Should be sleek, minimal and ergonomic**

FINAL DESIGN BRIEF

- ***To create a SIMPLE, ELEGANT, INTUITIVE toaster design to make the user's home life unlike his/her work life, i.e., simple.***
- ***Adding minimal changes and features, but those changes should be fundamental in elevating the functioning of the toaster in terms of its usability and interaction with the user.***
- ***Make an ergonomic toaster that does not fall while trying to clean its insides by inverting it.***

INSPIRATION FROM ALREADY EXISTING PRODUCTS

Inspiration was taken from three products majorly, which were the sleek design of bullet trains, iMac's CPU by Apple and the concept of retractable headlights as seen in old supercars.

Figure 6 Mood Board

CONCEPT GENERATION

After the research phase came to the ideation and concept generation phase. Inspired by the products above, many ideations were sketched out of which four concepts were further worked on.

GENERAL FORMS:

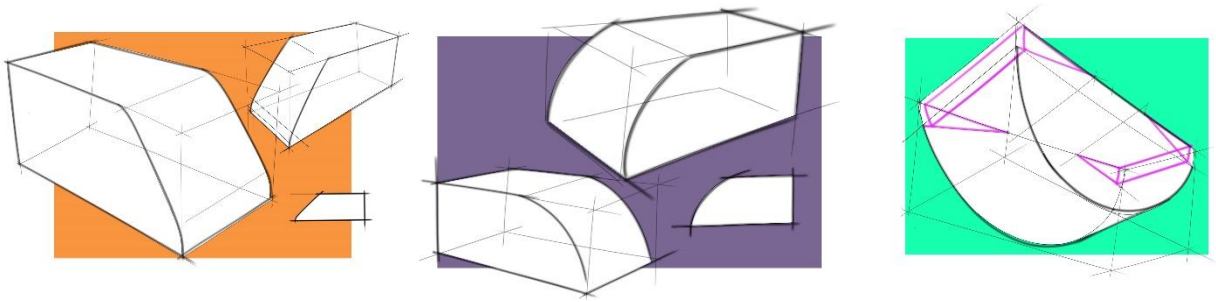
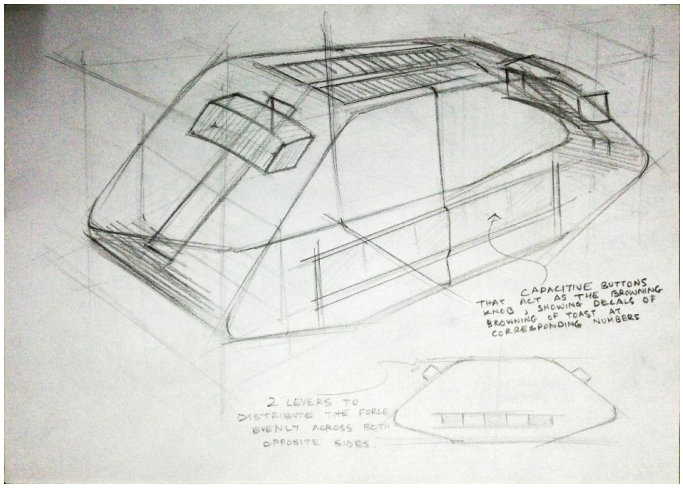


Figure 7 Form Explorationo

Concept 1

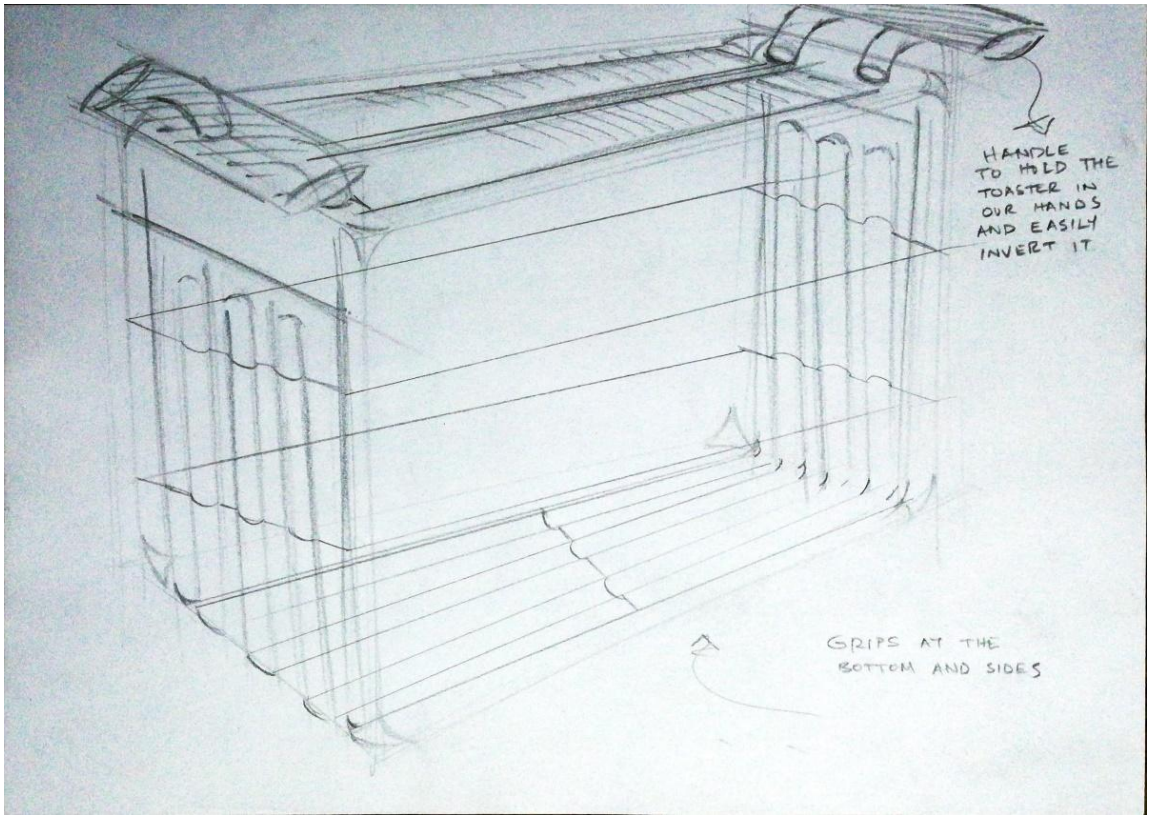


ADDITIONAL FEATURES

There are levers on either side of the toaster. This is done to distribute force on both ends of the toaster evenly, hence, less force needs to be exerted by one hand. Also, now that both the sides will experience the same force, the chance of the bread holder getting skewed from its place lessens considerably.

It also has a capacitive sheet across its side. This sheet has various decals of toasted bread slices corresponding to different browning levels, respectively.

Concept 2



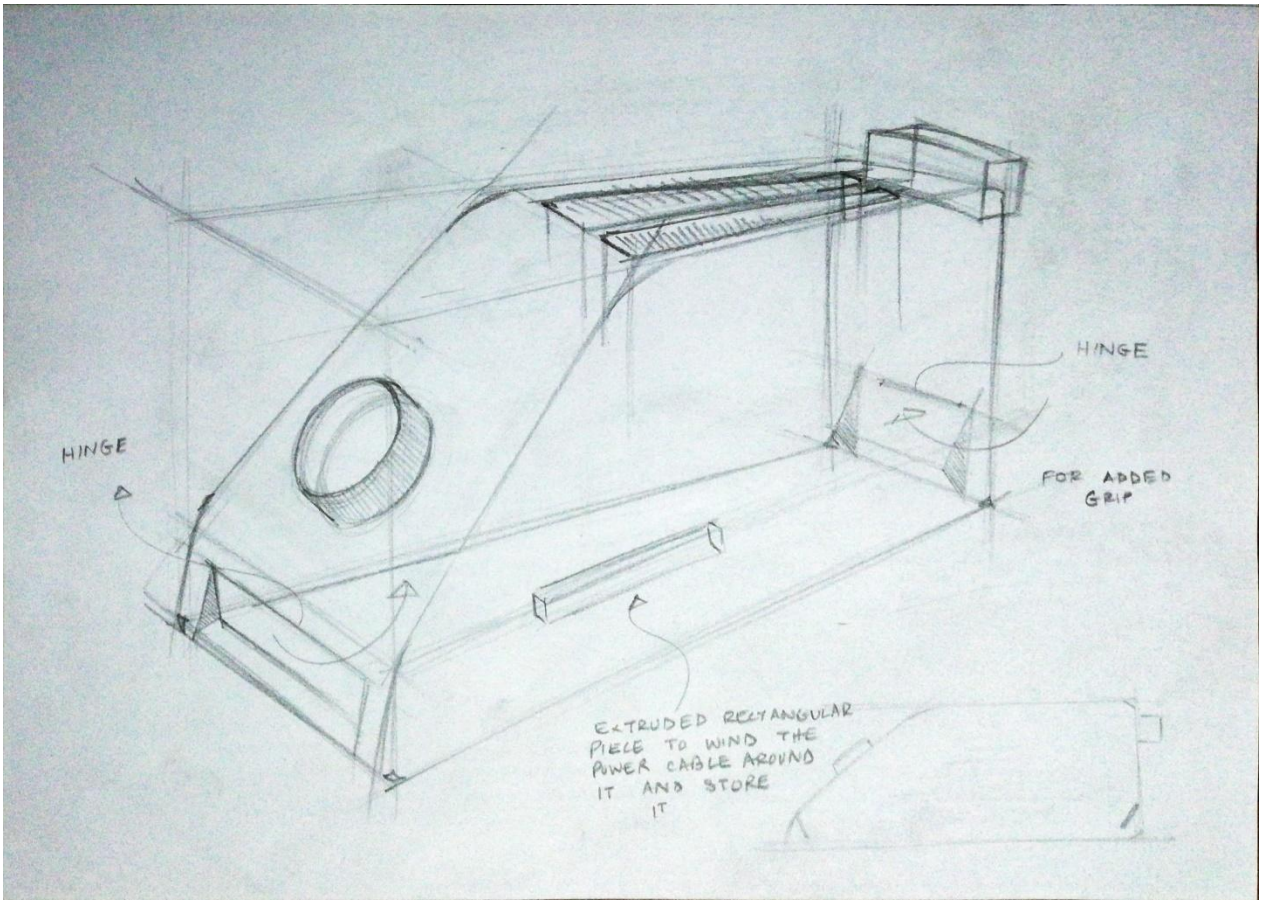
ADDITIONAL FEATURES:

The form of this concept is inspired by Mac Pro.

It has handles on either side for better portability and the user to easily be able to lift it and invert it to get rid of crumbs present inside the bread slots.

There are also grips both and the bottom and its sides to increase its stability and prevent it from falling or toppling, which was a significant concern.

Concept 3

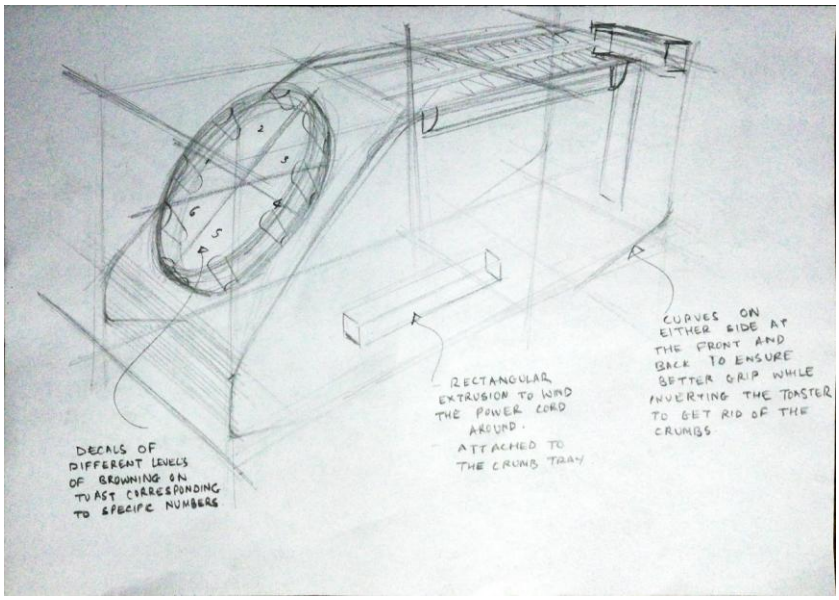


ADDITIONAL FEATURES:

There are hinges on both sides of the toaster which the user can push inside with the help of his/her fingers when trying to grip it in order to invert it and get rid of the crumbs inside. This hinge mechanism is inspired by the retractable headlights which were there in earlier sports cars. Also, there is a rectangular extrusion at the bottom around which power cord can be coiled.

FINAL CONCEPT

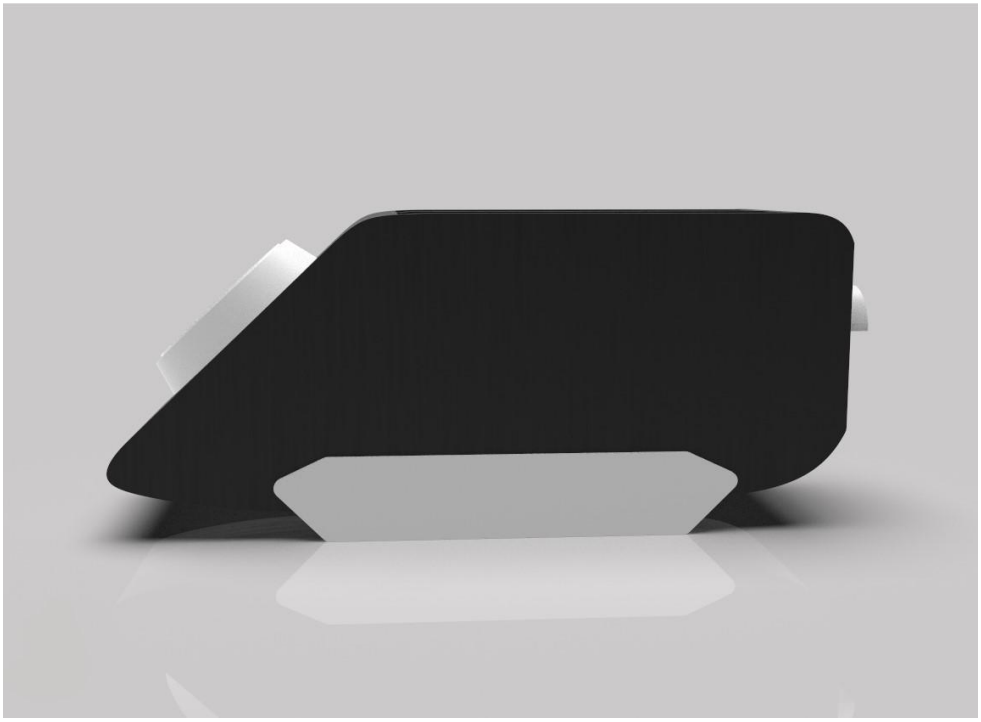
CONCEPT IDEATION:



THERMOCOL PROTOTYPE:

This prototype reflects the general form of the toaster and is not an extremely accurate depiction of the original design. The sleek one of bullet trains inspire the form.

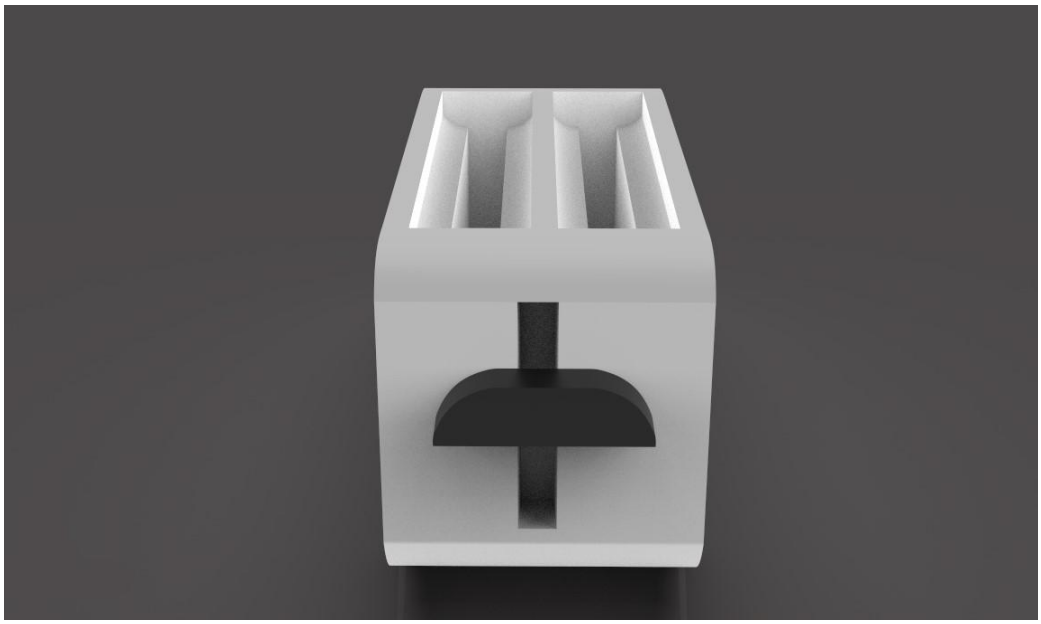
CAD MODEL:



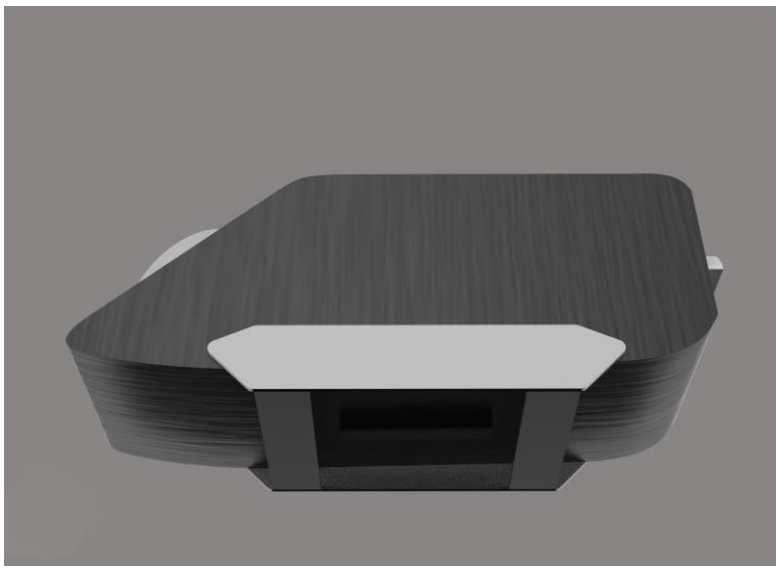
(Side view)

(Front view)

(close up of the browning knob)



(showing the fingertip shaped divots on either side of the bread slots)



(A rectangular from the bottom for cable management; two planks on either side at the bottom to support the hands when inverting the toaster)

KEY FEATURES:

- ***Rectangular extrusion at the bottom of the toaster, so, the cable can be coiled around it for better cable management and to reduce clutter on the kitchen marble top. (seen in Picture 6)***

- ***The front and the back towards the bottom are curved and inclined to ensure better grip when handling the toaster.***

- ***There are two slabs (as seen in Picture 2) at either side of the toaster which are essential in lifting up the main body of the toaster above the surface on which it is kept for the users to easily slide their fingers along the front and back of the toaster***

to lift it and invert it in order to get rid of the bread crumbs inside the bread slots and/or pests.

This space between the main body of the toaster and the surface ensures better handling of the appliance.

- ***The second function of the slabs is to hide the sight of the power cable coiled underneath the toaster and around that rectangular extrusion.***

- ***There are two planks (as seen in Picture 6), joint to the slabs, at the bottom of the toaster that the hands then support instead of gripping the curved sides of the bottom that they grip initially when inverting the toaster.***

  Due to gravity, the whole weight of the toaster is supported through the placement of the hands beneath the planks when it is inverted and jerked vigorously to get rid of the crumbs and pests. This mitigates the chances of the toaster dropping down because of the lack of proper hold when gripping the bottom of the toaster.

- ***There are fingertip shaped divots/grooves on either side of both the bread slots to ensure that toast can be quickly taken out without getting their fingers burned or getting electrocuted. A lot of the people surveyed often used metal forks and knives and their hands to get them out.***

When the toast pops out of the slots, it only comes out a centimetre or so at max, which is not optimal when people who have significant or thick fingers need to get them out. Hence, the divots.

- ***The browning knob is (as seen in Picture 1,3 and 4):***
  1. ***Inclined at an angle, instead of it is perpendicular to the surface.***
  2. ***More prominent and smoother, easy to rotate around its axis because of lesser torque requirement***
  3. ***Has decals/stickers attached to which denote how the toast will look like once it completes browning at a particular level instead of digits from 1-6 as it often becomes a game of trial and error to get the desired browning on the toast that way and users get frustrated***

All of the above points ensure a better user experience as the knob becomes more visible, usable and operable.

- ***The lever (as seen in Picture 5) is ergonomically designed to reduce the strain on the joints of the fingers.***

- ***There is also a cover for the slots that will majorly reduce the risk of pest infestations.***

- ***The material of the main body of the toaster is polypropylene plastic in a stainless steel finish except for the inside bread slots, its supporting structure and the lever mechanism, which is made up of real stainless steel.***

  The lever, the knob, the slabs and the planks are all made of white coloured polypropylene plastic.

  Polypropylene has very high heat resistance.

CONCLUSION

This redesign was a result of the EDIPT design thinking system and the double diamond diagram. User-Centric Research was carried out to identify the pain points experienced by the user while operating the appliance. A final design was done after funnelling and sorting through all the ideation sketches and concepts created. The research included questionnaires, task analysis, interviews etc.

Principles of product design were taken into consideration to come up with a redesign that aimed at solving almost all the user-centric problems and improve its overall usability and interaction with the user.

Ergonomics and form were also some of the significant aspects taken into account.

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AKSHITA MISHRA

Akshita Mishra is a design sophomore at Delhi Technological University and is a part of the pioneering batch of Department of Design. A self-motivated and keen learner and thinker, she strives for excellence in all that she does through perseverance and dedication.

***Born and brought up in the metropolitan city of Delhi, she is truly inspired by and appreciates nature. Passionate about books, travelling, painting, crafts, music, photography and, of course design, she can often be found reading about various scientific phenomena as well as memes. A keen linguist, she has learnt German, Japanese, English, Sanskrit and Hindi. She also takes immense interest in Greek, Roman, Egyptian and Hindu mythology. Her creativity flows through her work and she enjoys to experiment around with different styles of graphic design and strongly believes that the rise in need for sustainability and waste reduction strategies in all spheres of life, will mark the* beginning of a new era of design.**

HAND GRATER

Abstract

The following project had been initiated with the intention to enhance the form of an existing hand grater to make it more functional and comfortable to the user. Various observations were made through different methods of research that contributed to the final concept.

Introduction

A standard hand grater or a shredder may seem like an insignificant and simple kitchen product but the amount of assistance it provides in day to day food preparation activities is immense. The sheer number of times it is used directs to the fact that its simplicity is its greatest feature. The basic intent of this design task was to enhance an existing simple hand grater by working on its physical form and simultaneously increasing its usability and aesthetic appeal.

During the first leg of this project, it was important to study the types of graters that are already existing. It was observed that there were changes generally in the form of a standard box grater with varying perforation sizes, a trapezium or triangular standing grater with varying perforations on all sides and a simple hand grater which is linear in fashion.

The first stage in this process was to empathize with users and make use of basic User Research Methods such as Task Analysis, Contextual Inquiry, User Journey Mapping, Persona and Scenario building, etc. This was all done in an attempt to better understand and relate with the user and observe them while working with the product in real-time. This process also shed light on the frustrations and grievances the users had undergone along various stages of the process of using a hand grater. This helped in defining the problem and arriving on the areas of focus and attributes that were decided to work upon. Stability, fatigue, grip turned out to be key factors that needed to be focussed on, mainly because these were the most recurrent issues that most users seemed to face.

Objective

The objective of this project was to

- ***Understand how a user interacts with the given product, and study the user-product relationship in-depth try understand their frustrations with the product***
- ***Identify the problem areas and defining the problem that needed to be worked on***
- ***Conceptualize potential solutions by sketching, CAD models and work on the most appealing and functional concept***

Need statement

To enhance an existing hand grater ergonomically for better comfort, grip, and stability.

Methodology

The entire design process roughly follows the double diamond process, which includes divergent thinking followed by convergent thinking, which can be represented by a diamond shape. This process widely consists of 4 stages; Discover, Define, Develop and Deliver.

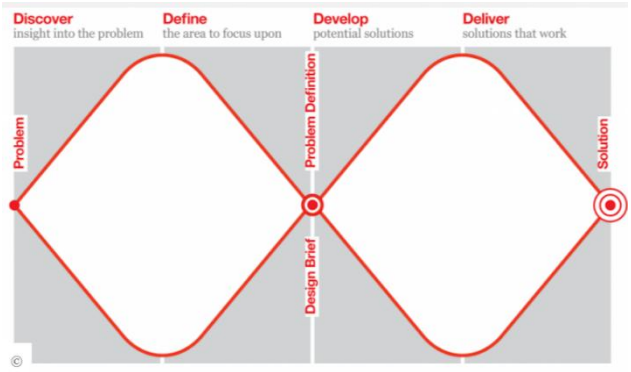


Figure 1 Double Diamond Process

Discover: This stage of the process deals with just mainly gathering insight and educating oneself about the product and existing work done on it. This was done by observing how the grater is used, how the user interacts with it by conducting surveys, questionnaires, etc.

Define: The second stage of the process aims at compiling all the data collected from the first stage and defining the problem areas

and potential opportunities for improving the product. The key task was to identify the problems that are of the highest precedence and develop a design brief that captures the essence of the project.

Develop: This is the ideation phase which revolves around generating concepts and solutions according to the design brief. It is an iterative process where prototyping and reiterating through trial and error helps one to refine their ideas.

Deliver: This is the last phase of the design process which includes prototyping, documentation and presentation of one's concept or solution.

Background study and research

The entire research is broadly divided into two sections, the Literature Study which deals with the history of the grater in terms of design and functionality, existing versions of the product, areas from where inspiration was taken and the User Study which aimed at understanding the user and how he or she interacts with the product. Graters were invented in the mid-16th century in France to grate cheese with ease, which used to go hard over a long duration of storage. The first-ever garter was said to be made by sharpening the holes of a metal shower drain, however, it did lead to the production of more sophisticated graters. This invention soon started being used to shred other hard fruits and vegetables, and over the years developed into the various types of box graters and hand graters.

Figure 2 Mouli graters

Figure 3Cheese graters made in France, 1940s & 1950s

In recent times, the way graters have found their use in the modern kitchen varies vastly. They have proved to be a staple kitchen

product in all houses and have added to the overall efficiency greatly.

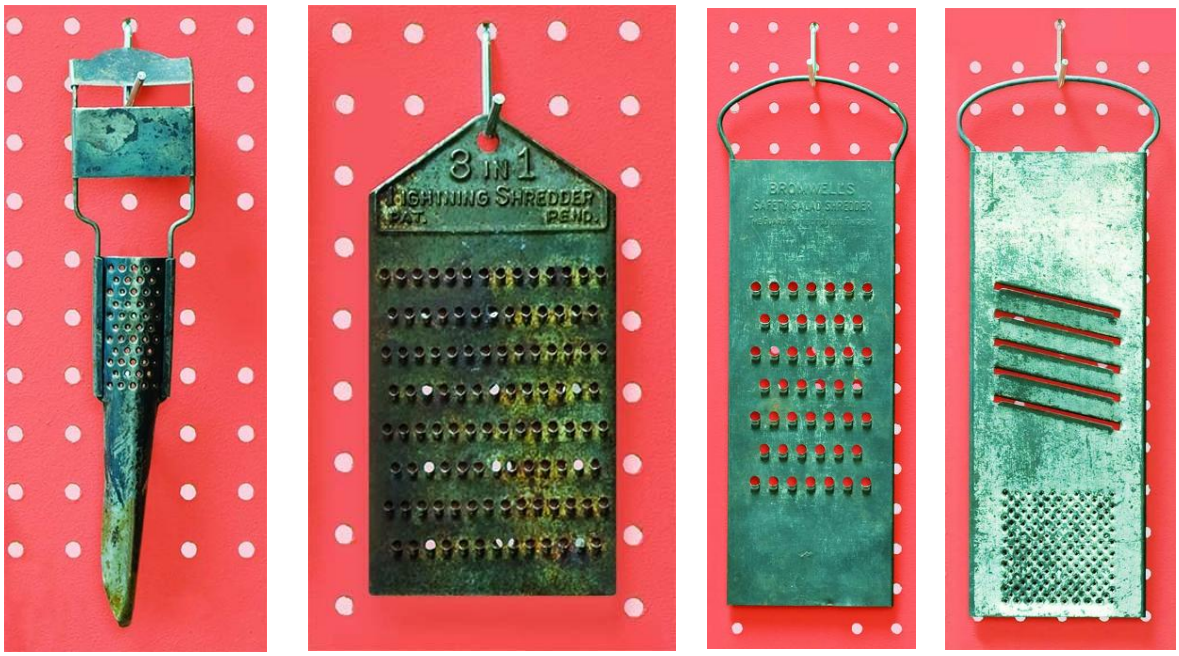


Figure 3 Different cheese graters and shredders made in the USA and England in the 1900's

User study

A number of user research methods were done to delve deeper into the user-product relationship and that would help empathize better with the users. The methods used have been discussed in detail as under.

Task analysis

Job description: To grate a small piece of ginger on a handheld grater

The given task was divided into roughly 6 subtasks, which resulted in better problem solving and decision making.

The entire idea of breaking down the task into subtasks was to generate more simple and mechanical tasks and really observe the user's way of working very closely, in order to understand both the product and the user with a better perspective and hence come up with more empathetic and functional solutions.

The subtasks are as follows:

1. ***To hold the handheld grater with the non-dominant hand***
2. ***Ensure that the sharp side of the blade is facing upwards***
3. ***Placed hand grater at a 45-degree angle to the working surface***
4. ***Drag the ginger piece in a direction opposite to that of the blades and keep repeating***
5. ***Tap the hand grater gently on the surface to remove ginger stuck on the blades***
6. ***Wash under tap water and wipe with a sponge in direction of blades***

This task analysis was carried out for a set of people, and it was observed how common factors like age, profession, gender, being left or right-handed person, prior knowledge and past experiences in

the kitchen affected the way the user would go about fulfilling the task. Even though everyone had the same motives to achieve while using a hand grater, they had very different techniques and hence different outcomes.

People who were right-handed as well as left-handed underwent a similar experience using the hand grater. The efficiency of grating or time consumed wasn't effected. However, the hand grater was the position in which it was held varied from person to person.

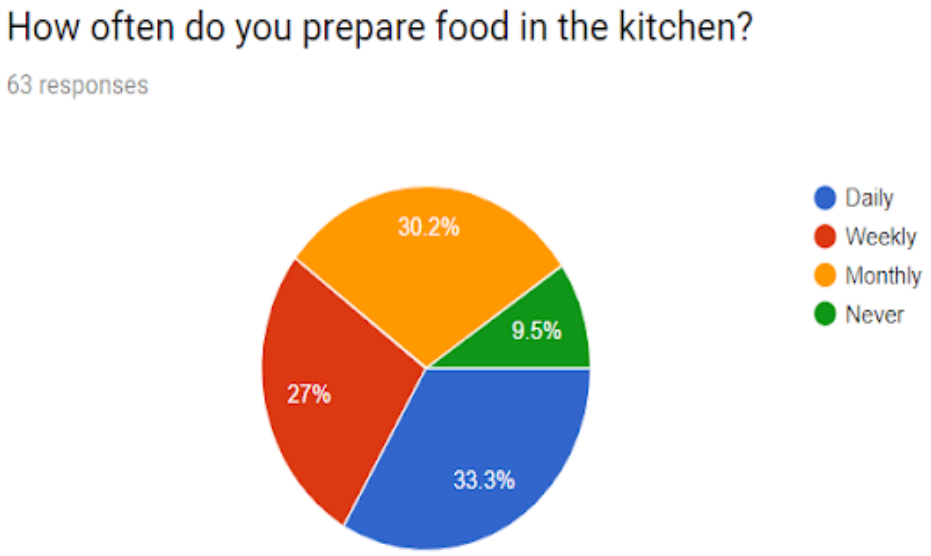
It was observed that a worker at a tea shop who is skilled in the profession, is quick and completes the task fast, a homemaker is also very efficient in the process of grating but seems to have a certain amount of patience and poise in her actions. A person who enjoys culinary arts as a hobby is less fixated on getting things done quickly but rather seems to enjoy the process. Whereas a teenager has no such emotions and is probably as hasty in their actions as a worker at a tea shop if not more.

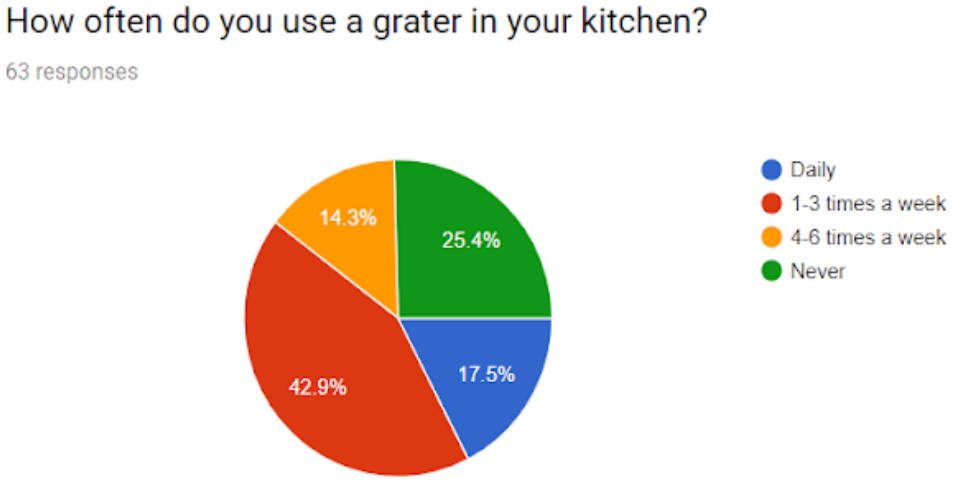
Another noteworthy observation was that of the way the hand grater was dealt with while after performing the said task. About 40% of the sample size did not care enough to wash the hand grater and get rid of the stuck ginger particles, while the other 60% who did so, did not yield super impressive results either. This is mostly because there was a general fear that one may nick/cut their fingers in an attempt to remove all the stuck food items. Almost everyone had unpleasant memories related to this and the level of caution has increased to the point they don't care a lot about cleaning the product

Contextual inquiry

Contextual inquiry revolves around directly communicating with the user and trying to identify the underlying problems, the medium being a semi-structured interview of sorts where the user answers a set of questions. The results of contextual inquiry can be used to define requirements, improve a process, learn what is important to users and customers.

This helps to empathize with the users as they directly open up about their needs, wants, aspirations, past experiences regarding the product and hence come up with better solutions to existing problems.





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How

63 res

The results of the contextual inquiry which were collected by asking a specific set of questions to about a sample size of about 80 people, were as follows

- ***About 70% of the users who used a hand grater belong to the age group of 20-40 years, 60% of them being females.***
- ***About 80% of the sample size of users prepared food in the kitchen on a daily/weekly basis and have had past experiences with the product.***

- ***The majority of the people used a hand grater about 1-3 times a week, while the rest used it about 4-6 times a week.***
- ***An average user uses the grater for about 10 minutes or less.***
- ***70% of the users preferred a handheld grater over a standard box grater.***
- ***Problems faced while cleaning/washing the grater after use included accidentally cutting or nicking fingers, inability to clean it all and the sharp metallic edges.***
- ***About 60% of the users had a granite kitchen counter which affects the way the hand grater interacts with it and provides a good base grip.***
- ***About 30% of the people had problems with having to hold down the hand grater firmly while grating due to the slippery work surface or the material of their kitchen counter.***
- ***About 20% of people faced problems with the handle/ grip of the hand grater.***
- ***30% of the people were not satisfied with the amount of substance grated with each repetition.***
- ***Users were unable to grate substances completely till the end due to difficulty in holding on the small piece of ginger, sharp edges, space inside the box grater gets filled up or because they're scared they will accidentally cut their fingers.***
- ***About 60% of the people were bothered by the fatigue that develops in the arms after grating for a long interval of time.***
- ***People use various ways to clean handheld graters, including sponge, stiff brush dishwasher, hands, tap water stream, sponge being the most widely used one.***

- ***The material of the handle, Size of blades/holes, Durability and sturdiness, Aesthetic appeal, Functionality are all factors that users consider with functionality being at the top spot.***
- ***About 20% of the people had injured themselves in one way or another while using a grater in the past.***

User journey mapping

A user journey map captures users' entire journey while using a product or doing a task. The story is interpreted from the user's perspective and is more user-oriented, focussing on the user's needs, aspirations and expectations while using the said product and evaluating the user's satisfaction level at each moment.

Job description: To grate a small block of cheese on a handheld grater

Persona and Scenario: A 40-year-old working woman, who prepares food for her family. Right-handed and with moderate experience in the kitchen, she enjoys spending the little time she gets to be in the kitchen and cook for her family as she finds it to be mentally relaxing and therapeutic.

Expectations: She plans to grate a small block of mozzarella cheese while preparing pizza for her family. She expects to be done with the entire process of making a pizza in about 20 minutes, and an additional 5 minutes to clear up her working station. The mozzarella cheese is of the packaged kind and had been extracted from the chiller box in the freezer.

Phases: ***The entire process has been divided into three parts to map the woman's frame of mind and to map the journey in better detail. We shall consider the three phases to be as before, during and after working with the hand-held grater and performing the required task.***

Before using the hand grater

The woman prepares about 90% of the pizza and has to grate mozzarella cheese on the top. She then fetches the cheese from the freezer and let it sit at room temperature for about 5-7 minutes to let it thaw a little bit. She then gets the hand-held grater and tries to decide whether she should grate the cheese directly onto the pizza or first onto a plate or a bowl and then transfer it to the pizza. After about a minute of indecision and confusion, she decides she won't dirty another plate and just grate it directly on to the pizza. She removes the cheese from its plastic packaging and prepares to grate.

While using the hand grater

The woman holds the hand grater almost at right angles, directly above the pizza, which sits on a cutting board. She tries to grate the block of cheese but is unable to do so effectively and gets very little cheese grated with each swipe, as she is unable to hold the hand grater firmly in the air and grate the medium-sized block of cheese.

She then decides to go with the initial plan of grating first onto a plate and then transfer it onto the pizza. She then holds the grater at an angle of 45 degrees to the plate and grates the mozzarella

cheese. She has to apply a considerable amount of pressure since the cheese is solid and frozen. She finds this entire process of grating and the repetitive motion to be very therapeutic and enjoys every repetition.

The handle grip of the hand garter is comfortable for her to hold with her left hand and grate the cheese with her right hand. The hand grater, however, slips about 2 times due to the slippery metal plate and she has to readjust her grip. Since the block is medium-sized she doesn't even need to worry about grazing her fingers and she gets done with the entire task in about 3 minutes.

After using the hand grater

After having used the hand grater, the woman now needs to clean it up for future use. The first step to do this is to bang the grater on the kitchen counter to get rid of the particles. This is also an enjoyable part for her as she likes to the sound the hand grater makes when hitting upon the granite kitchen slab.

She then proceeds with the hand grater towards the sink and just lets tap water pour onto the metal blades. After about 30 seconds of letting it stay under the water stream, she checks to see if it is clean but to her mild frustration, she notices that it's a little greasy. She puts more water on it, only to yield no better results. She then takes a kitchen towel and wipes away the water from the blades and sees the greasiness is gone by almost 80%.

The remaining greasiness doesn't bother her as the entire process was already very time consuming and mentally frustrating and she leaves the hand grater to dry.

PERSONA AND SCENARIO BUILDING

Based on the research done from the previous three research methods the following user persona is come up with.

Age: 35-45 years

Gender: Female

Profession: Home Cook

Dominant Hand: Right

The user works 5 days a week to make ends meet in her lower-middle-class existence. She has a family of 5, with a husband, two children and her mother in law. She cooks in various households to earn a living, multiple times a day, 5 days a week. With minimal educational background, she was never encouraged to pursue a very sought after modern career. Her family comes foremost for her and their wellbeing and comfort is her number one priority. Her husband is a taxi driver who earns almost the same as her and her children to go to a public school.

As a person who cooks for a living, she is familiar with most of the kitchen utensils, appliances, and tools and knows how to work her way through them, a hand grater being one of them.

She has had many accidental injuries in the kitchen and is afraid of blood, and cautious around oil and fire. She always carries a band-aid or two in her bag as a precaution and believes that hygiene is one of the most important things that she has to maintain while giving out her services as a cook.

Her frustrations with the hand grater are as follows

- ***Lack of stability when working on the kitchen counter as the hand grater slips***
- ***The constant possibility of grazing her fingers and bleeding***
- ***Inability to clean the hand grater with efficiency due to the fear of cutting herself***
- ***Fatigue in her upper arm muscles due to the repetition and monotonicity of the entire process***
- ***The grip being uncomfortable to hold when working for a long time***

Her aspirations/expectations from the ideal hand grater are as follows

- ***A grater that is stable and easy to hold and does not require a lot of pressure to maintain stability***
- ***Lightweight***
- ***Easy to clean***
- ***A comfortable handgrip made out of a suitable material***
- ***More substance is grated with each hand repetition***
- ***Feeling secure and not having to worry about grazing her finger***

Observations

The problems that were observed from all the user research methods are consolidated as under

- ***Difficult to clean due to the very nature of the blades and hand grater***
- ***Lack of safety while using a hand grater***
- ***Problems in holding onto the hand grater due to design flaws in the grip***
- ***Wastage of small amount of food items that get left in the end***
- ***Generation of muscle fatigue due to the repetition of the same hand movement***
- ***Grating small items right to the end on a grater with sharp blades often leads to grazes, nicks, and cuts on fingertips and this ends up in users being dissatisfied and unwilling to use a grater. This also leads to wastage of a small number of food items.***
- ***Most of the times, small food particles remain inside the blades due to ineffective washing methods and then they lose their water content and dry out and get stuck inside the blades. This becomes really tough to clean without cutting one's fingers.***
- ***The material of surface that one is working on also plays an important role as it is a major deciding factor whether one would be able to establish a firm grip and grate without facing issues related to the hand grater sliding on a slippery surface.***
- ***The material and form of the handle of the hand grater greatly determine the way a user will grip the product while using it***

and since the pressure is applied while holding on, it determines the usability of the product in general.

- ***Cleaning the hand grater is one of the problem areas for all users.***
- ***Grazing fingers on the hand grater is something that bothers all users and often leads to wastage of small amounts of food.***
- ***The working environment affects the kind of experience the user has while using the grater as it affects factors like stability and slipping.***
- ***The grip of the hand grater and factors such as the material used and form of the handle also determines the usability of the grater.***
- ***Removing the food particles in the blades is a tedious task as most of the people do not clean it effectively, the food particles lose their water content and are very hard to remove.***

Concept generation

The basic intent of designing the grater was to work on its stability, balance and how to make it easier for someone who uses it on a daily basis. In the early ideations form was played around with and how it could have modified to suit the user better.

Inspiration board

An inspiration board was made to study design elements that were taken inspiration from.

Figure 4 Inspirational Board

Concept 1

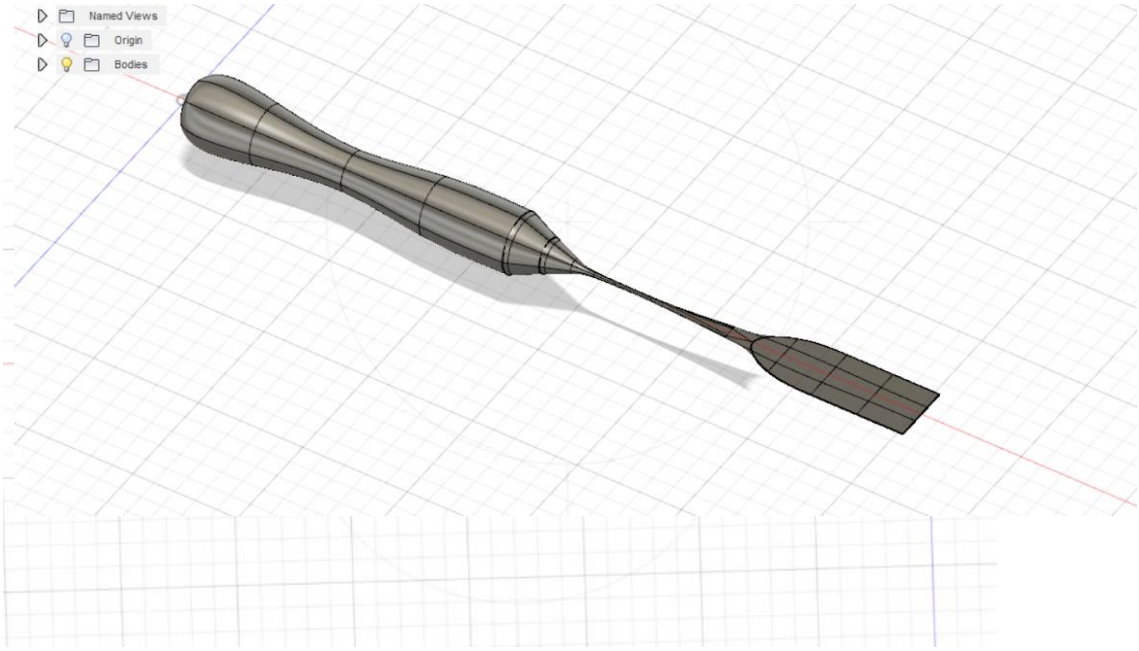

Figure 5 Concept1 images of hand grater

The idea behind this concept was to add the comfort of holding a knife or peeler to a hand grater since a knife is used in most of the kitchen activities that one is involved in. However, the main issue with this was whether or not people would adapt to such a drastic change since a knife and hand grater are poles apart.

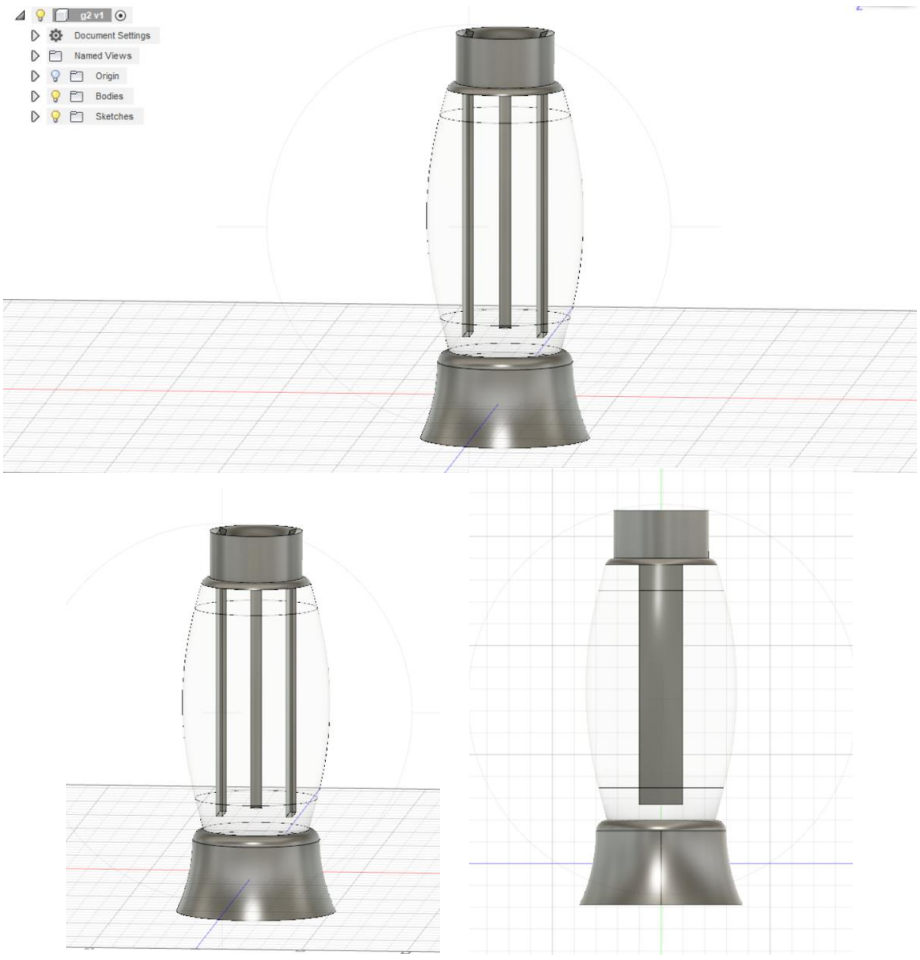

Figure 6 Concept 2 images of hand grater

Concept 2

The basis of this concept lies in the conversion of linear motion to rotational motion. The central spike would have the food particle poked through and on rotating the top part, it would get grated through both the perforated metal sheets and get collected at the bottom grater. The mean position of the two plates is when they

both are stuck together and that ways the food item would always be in contact with the walls of the plates.

Although it would have greatly increased the efficiency and speed of grating food items, the rotational force would generate way more fatigue in the wrist than linear motions create in the upper arm. Only hard food items would be able to get grated and the rest would get squished.

Moreover, in an attempt to oversimplify things, the entire task of grater a simple cheese block now seems so complicated.

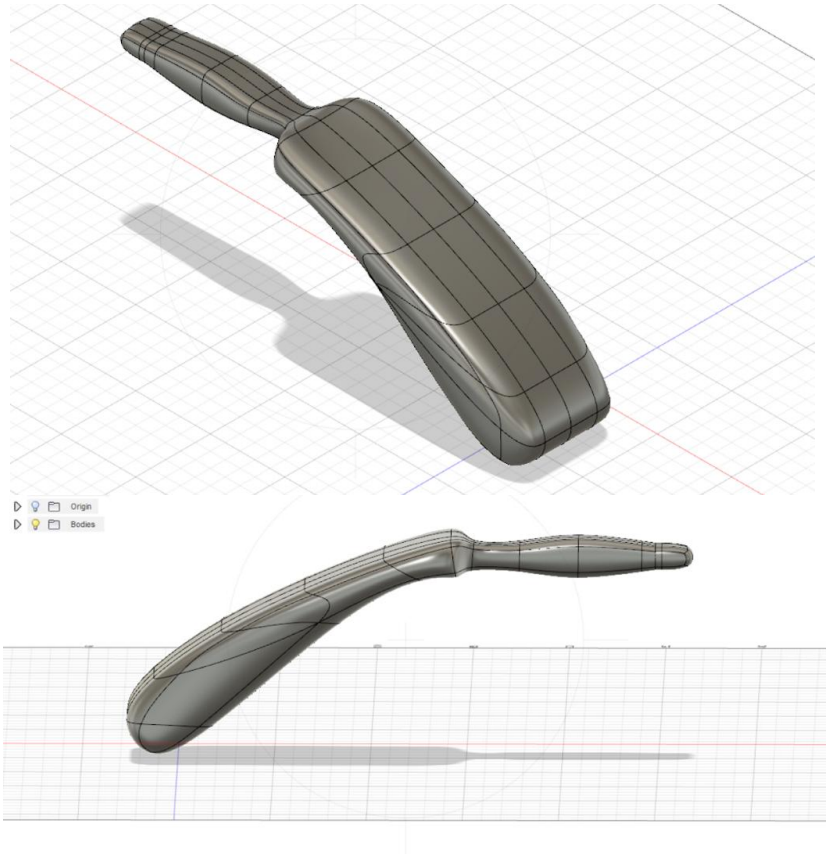

Figure 7 Concept3 images of hand grater

Concept 3

The idea of this concept was to lessen the amount of pressure applied to keep the hand grater stable on the kitchen platform by making the grating surface slant downwards and therefore decreasing the amount of physical fatigue generated due to work done against gravity.

The main problem here, however, was that due to the heavy bottom part, the grater would never be stabilized and extra energy would be spent in making the grater stay still.

Concept 4

Since stability was an issue in the third concept the shape more balanced while also keeping in mind the slanting grating surface.

The reason for not to going with any of these designs was mainly that in the process of making the hand movement minimum to reduce fatigue, it was felt that designs were getting more complicated than it was required.

While being very focused on specific areas of problem, the product as a whole was disregarded and this proved to be very important learning.

Final concept

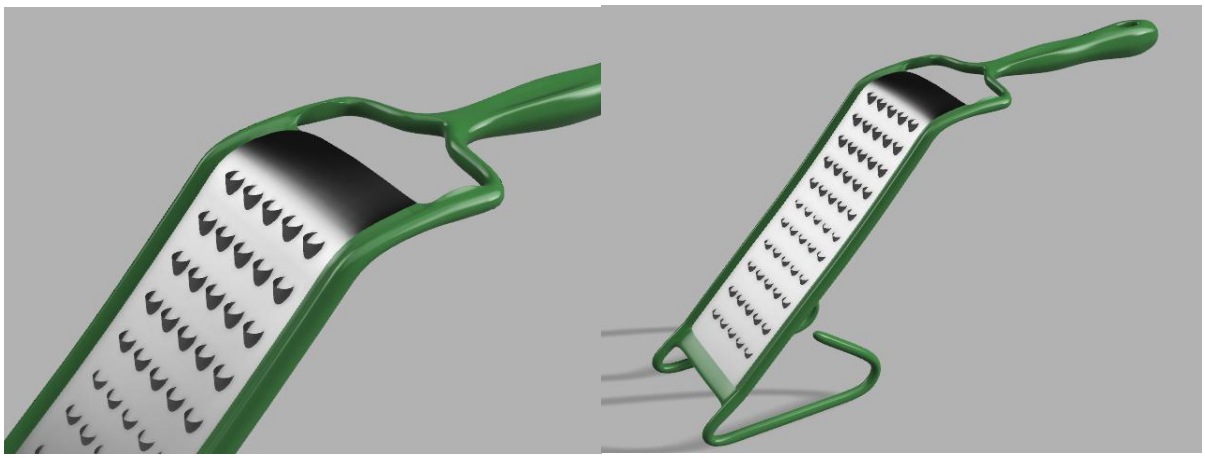

Figure 8(i) Final concept images of hand grater

- ***The grip facilitates the arm movement and enhances the grating experience.***
- ***Ergonomically designed grip for better comfort levels for long usage.***

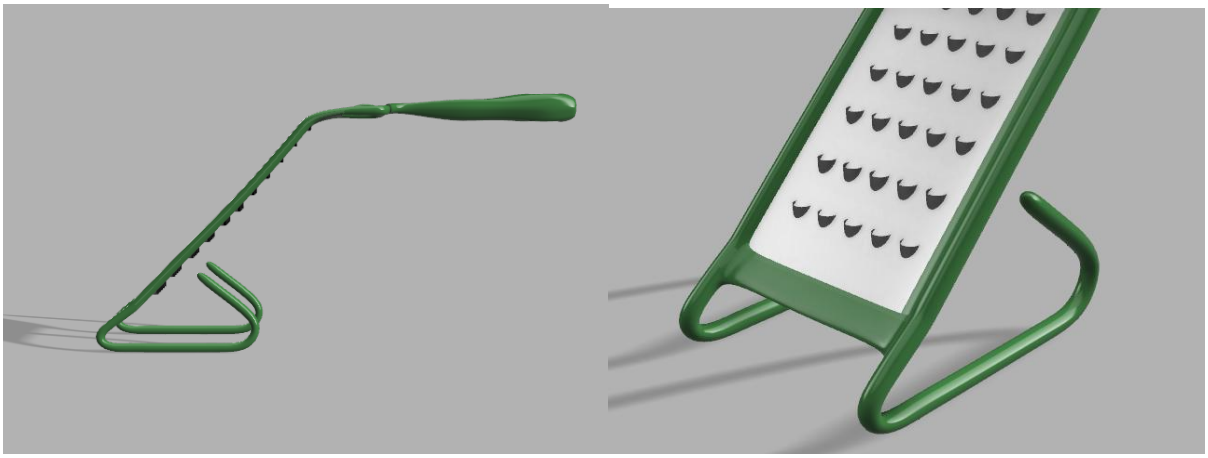

Figure 8(ii) Final concept images of hand grater

- ***The resting rubber-coated base provides extra stability and ensures that the grater doesn't slip on slippery surfaces and causes injuries.***

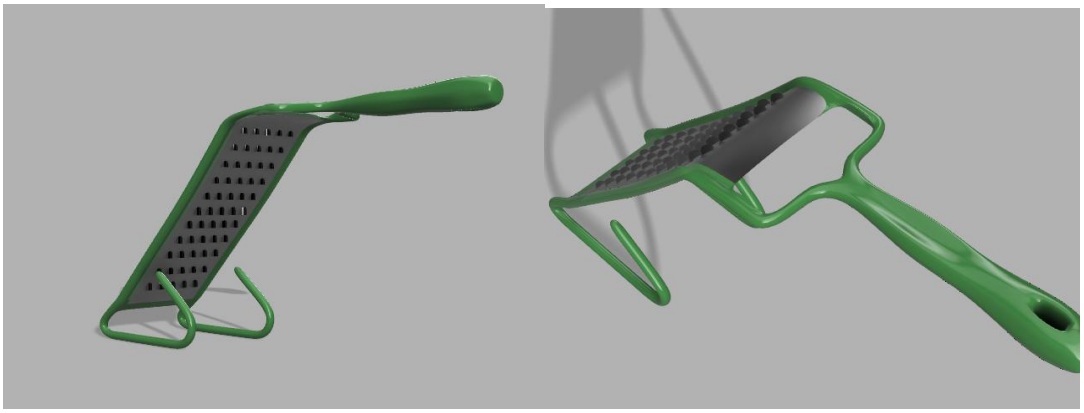

Figure 8(iii) Final concept images of hand grater

- ***Sloping perforated surface facilitates grating motion and reduces the pressure required to keep it in place as it directly rests on the base.***

The aim of this grater tries to fulfil is to provide more stability and comfort while grating any food substance. The slanting perforated surface aims to reduce the fatigue generated in one's arm while doing an intense repetitive action in a short duration of time.

The ergonomically designed handle makes sure the hand rests in a comfortable position and this has been done by providing a groove for the thumb to be in whilst holding the handle.

The handle is attached to the metal plate in such a way that it runs parallel to the working surface and the hand of the user rests in a neutral position. The rubber grip provides comfort and the rubber-coated base also makes it easy to stand on marble and granite kitchen counters.

Conclusion

The entire project helped in realising the extreme importance of user-centric design. There's a massive difference between the type of people who use the same product which depends vastly on their background, profession, gender, age and so on. The user study is essentially the most important part to truly understand and empathize with the user in all aspects to come up with the persona for whom the product will be designed. While going through the continuous and iterative process of converging mere ideas into concepts, many problems faced by users were identified. This was a major step in developing designs that offered good user feedback.

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Ipshita Singh is a passionate and enthusiastic student pursuing her Bachelors in Design from Department of Design, Delhi Technological University. She has been a sincere student with a reputation of being helpful and generous. Being a creator at heart, she has worked for numerous events and organizations alike. She strives for excellence in every project she takes up. Apart from design, she is a traveler and loves to talk about her experiences.

Electric Kettle

Abstract

The main aim for this report is to focus upon the process of using an electric kettle and further redesign the form keeping in mind the problems faced by the users. An electric kettle by Prestige was studied and tinkered with to understand the basic working. Surveys were conducted on a sample of 41 participants. For deeper understanding Task analysis and User journey was observed on individual users and mapped.

In order to conceptualize ideas, vessels used in the kitchen were studied and the key elements were considered for further development.

Introduction

Many households in India are comfortably using the gas stove for all purpose heating. But a transition can be seen as people are shifting towards the use of electrical alternatives.

The Question arises on the need of electric kettle in our kitchen. It is seen as a safer way to warm milk, make tea and coffee. Many a times the electric kettle due to its portability is used by students staying in hostels or travellers for ready to eat meals that can be prepared by boiling or adding boiled water.

An electric kettle was tinkered with to understand the working mechanism. It involved understanding the front end, back end and

the core mechanism of the product. Surveys on the usage of electric kettle was conducted that required the participants to give their feedback on their experience while using a kettle. Task analysis was done and observed for further understanding the drawbacks in the current design of the kettle.

A problem encountered by the user group was that of cleaning the kettle. Many a times food particles used to get stuck to the inner container. A few more issues observed were with the power cable and the handle.

Referring to the studies and analysis, different concepts were generated so as to solve the problems and overcome the drawbacks of the kettle. Ideations were done keeping in mind the current scenario. Different parts like the handle, the power base, the container, the lid was redesigned.

Objective

The study objectives of this report are:

Understanding the behavior of the user, and the drawbacks in the current scenario of using an electric kettle.

Analyzing the problems faced by the user while using an electric kettle.

Redesigning an electric kettle keeping in mind the current problems and the demands.

Need Statement

Redesign an electric kettle for use by the students and that ensures a wide range of cooking.

Background Study and Research

Basic mechanism: The electric kettle has a heating element and a thermostat. The high resistive coil is responsible for the heating provided to the electric kettle. When current is provided the electric energy is converted into heating energy that is transferred to the container. The thermostat is responsible for the energy cut off, from the kettle. It controls the heating element.

Tinkering Kettle: To understand the basic anatomy of an electric kettle (as shown in figure 1), a product by Prestige (Prestige PKGSS, 1.7L, 1500W, Stainless Steel) was tinkered and the structure and mechanism was observed and studied.

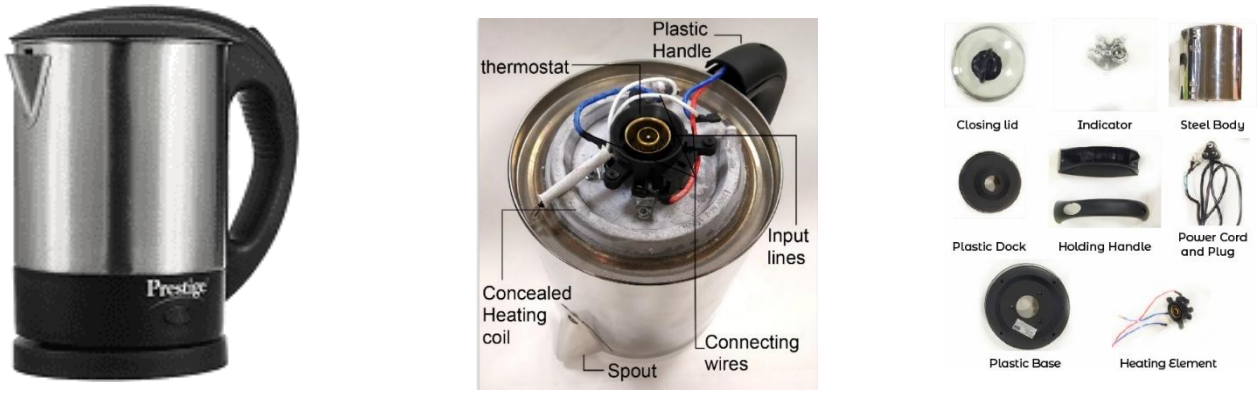


Figure 1 components from the tinkered kettle

User Study

Next a questionnaire was released and a survey was conducted with a total of 41 respondents of varying groups including students, homemakers, working professionals and senior citizens, majority of them being students.

The demographics of the sample space is shown in figure 2 (age distribution) and figure 3 (gender distribution) and the findings from the responses is shown in table 1.

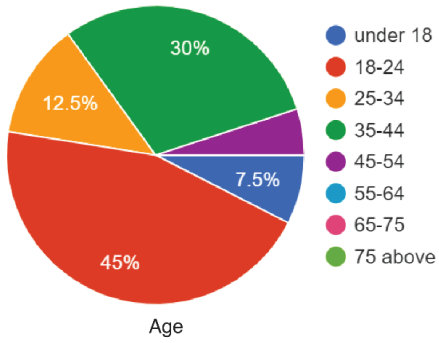


Figure 2 Age Distribution

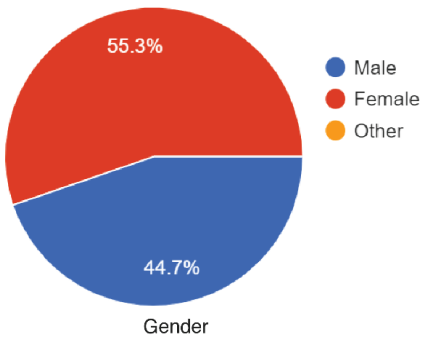


Figure 3 Gender Distribution

Table1 Survey Analysis (findings from the survey)

Demographic	General Usage	Functioning issues	Observational Analysis
Students [< 25 years]	-Making noodles, -Boiling milk, water, etc.	-Cleaning -Supplying power	Food gets stuck in the mating edges and the spout filter

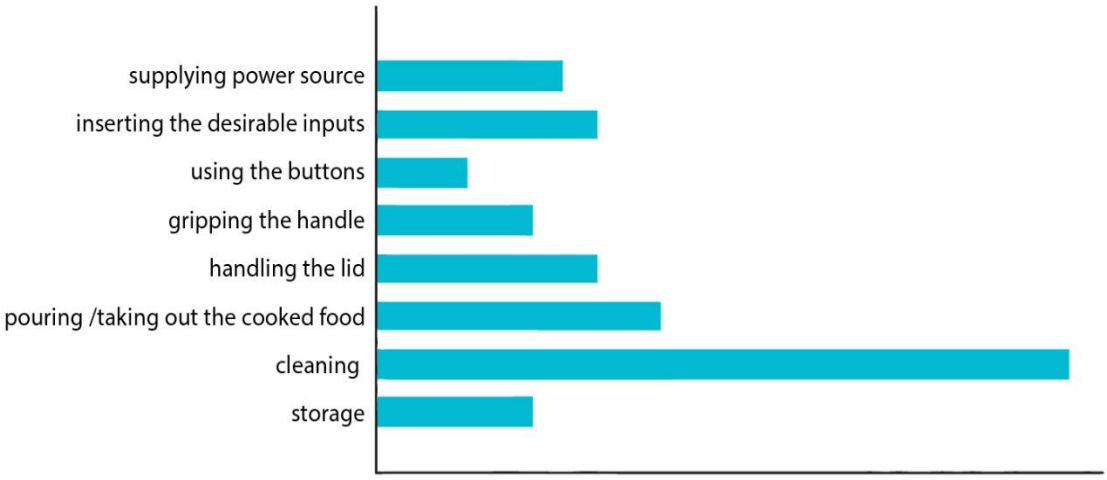
		-Inserting inputs -Handling the cord	
Working Women [<35 years]	To make tea coffee, noodles, porridge	-Supplying power, -Inserting the inputs	-Shorter Cord resulting in accidents -Narrow mouth of the container
Homemaker [<35 years]	-Boiling water -Making food while travelling	Supplying power	No temperature control resulting in spillage
Professional Men [<45 years]	-Boil water, make tea and coffee usually in the office	Cleaning	Opaque walls disable visibility
Elderly [>46 years]	Boils water	Cleaning	The lid gets loose and often hurts the hand

Some of the key insights from the survey were as follows: -

1. 70% of the users faced problem while cleaning the kettle.

2. 34% of the users claimed/faced compatibility issues with lid and handle.

3. 40% of the users found it tedious to pour and serve food from the kettle.



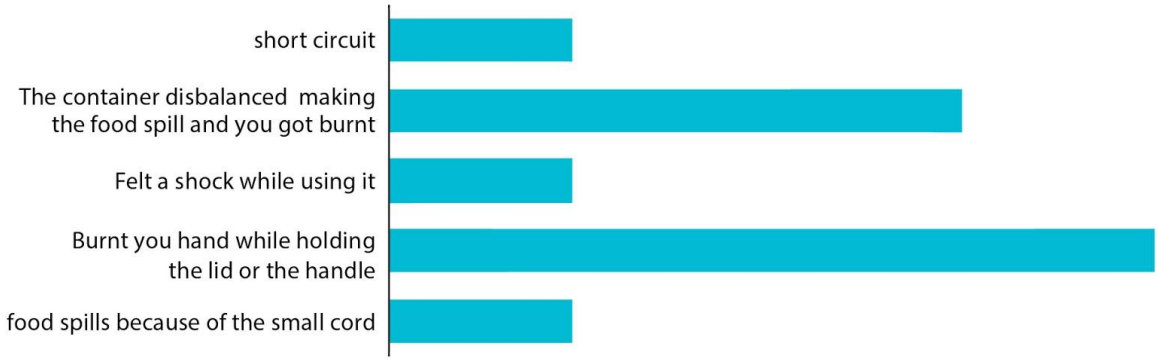


Figure 4 User Study

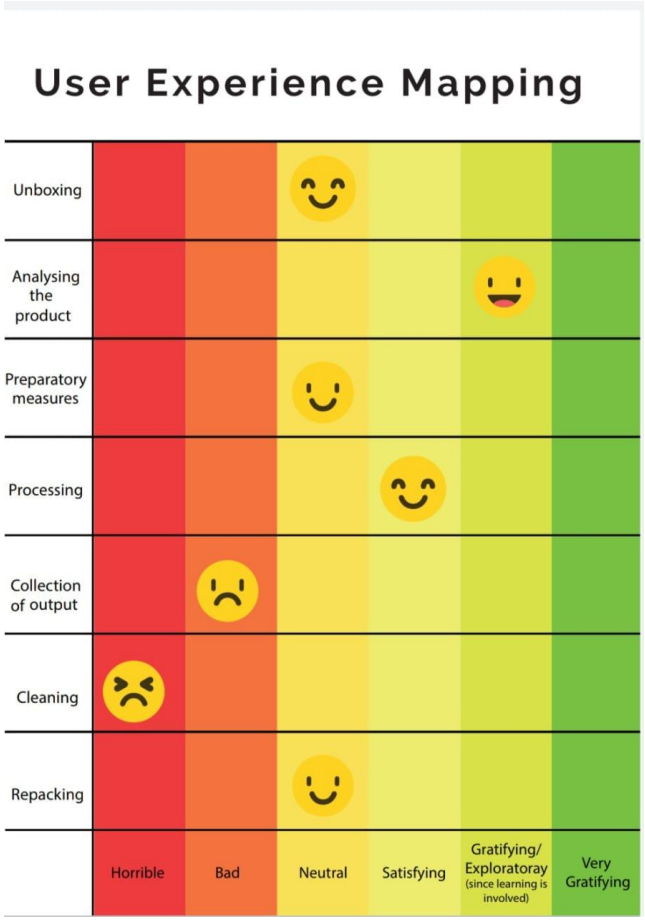


Figure 5 User Journey experience mapping

Task Analysis: A user study was conducted to observe the user behavior for the task of boiling water in an electric kettle. The interaction and the observations were recorded in the table. The study was conducted on four different types of users, a homemaker who was aware of the usage of the kettle, a service man who has used the kettle quite often, a student who use the kettle for cooking and a grown-up child who could just follow the instructions given.

The users were given a packed box that they had to unbox and boil water. The task initiated with the user unboxing the product and it concluded with pouring out the boiling water. The observations were recorded and feedback was taken. The task satisfaction did not vary for a left-handed and a right-handed person. But it did for the age groups. Overall placing the container on the power supplying base was comparatively difficult than the other steps involved. The pouring of water was also difficult for male and the child but not for the female as she is quite used to doing this task. After the surveys and analysis some of the points about the drawbacks in the design of the electric kettle, the problems faced due to them and the reason behind them were noticed. Some of the problems associated with different part of the kettle are given in the table.

Figure 6 Journey map

Focusing on the problems encountered while using the electric kettle the answer might lie in the use of the kettle.

For example: An electric kettle is meant to be used to boil water but people often boil milk, make coffee or tea or at times even make noodles, oats, rice, pasta, boil eggs etc. as a result they encounter problems. Some other problems faced are handling the lid with ease, balancing the container on the power base and supplying power. The probable reasons could vary with the variant uses.

Table 2 Scope of improvements

Parts of the kettle	Problem Associated
Long narrow container	Not easy to cook as it often stuck at the bottom
Lid	The hinged lid gets loose after few uses and keeps on falling on the hand The detached lid often has a rubber around its bottom that gets stretched and loses up after a while
spout filter	the spout filter is attached with the container and so the food gets stuck in it while taking it out
Wobbly power base	at times maintaining the balance of the power base while the container is not attached to it is difficult

Building the Persona: User Persona is the next step in research, basically refers to the building of a fictional character that represents the target audience. Here the persona of a student was

taken with various other information relevant for the research as shown in the fig 7.

Areas of improvement: After the above research the major areas of improvement in the electric kettle are listed below,

- ***The shape and form of the container***
- ***The wobbly base of the detachable electric kettle***
- ***The detachable lid***
- ***Spout filter***
- ***Handle***

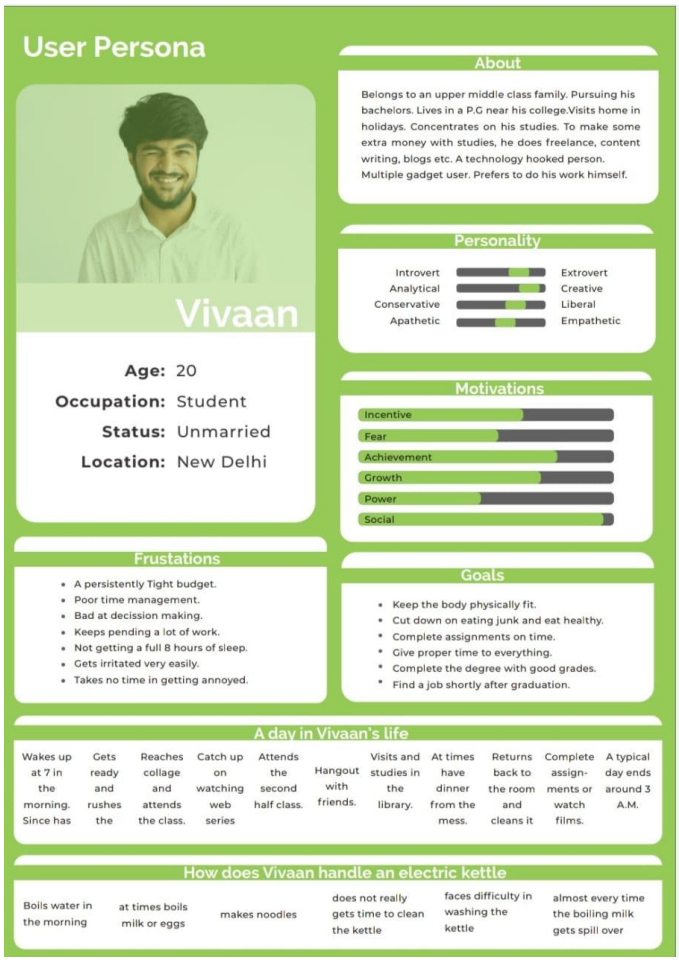


Figure 7 User Persona

Concept Generation

The process of concept generation involved a lot of observation. Objects from day to day lives were perceived and how they could affect the design change in the kettle. This phase included the evolution from rough sketches to the final form. Various iterations were done keeping in mind the drawbacks and the problems that were taken from the research study. Various forms were iterated, revised and evaluated by keeping them in the scenario.

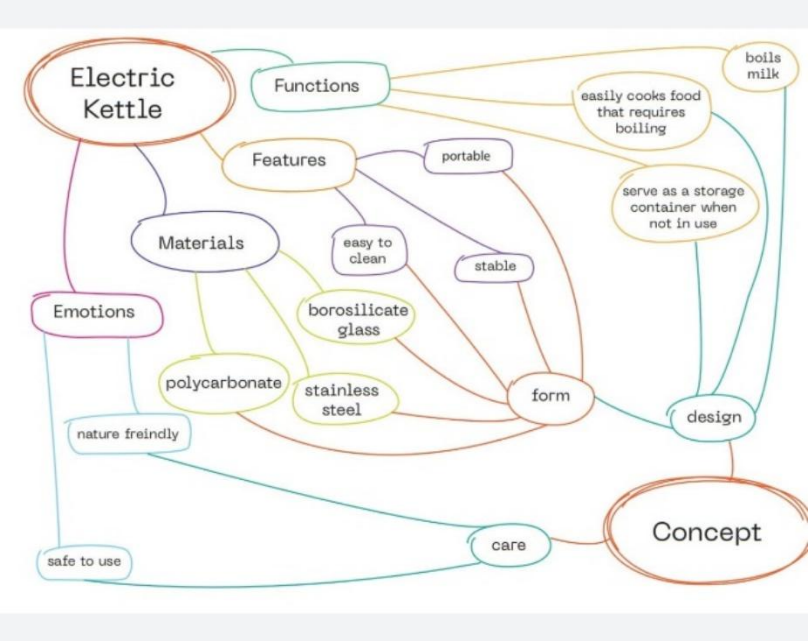


Figure 8 Concept Map

Design Development: Focusing upon different components of the kettle and their redesigning, different concepts for the developed form were generated. The journey of the evolution is showed in the fig 9. This was the first rough idea where the focus was on making the container compact and portable. The container was ideated to have a form that could fold up, reducing the space occupied with it.

Some of the major flaws encountered were the lack of proper material for the task, moreover it lacked in the physical stability of the product. The above image refers to the initial ideation combining the features of a traditional and an electric kettle. It was observed that the handle provided could be held both ways that is from the top as well as from the side.

The reason for not going further with any of these was the fact of lid opening that hindered the use of such extended handle.

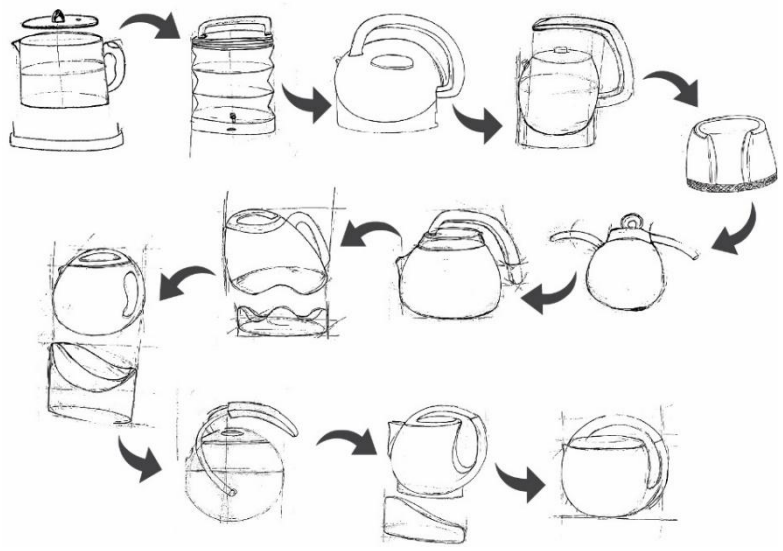


Figure 9 Design Evolution

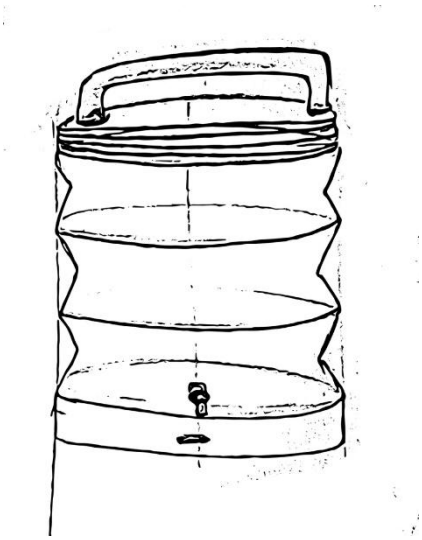


Figure 10 Concept 1

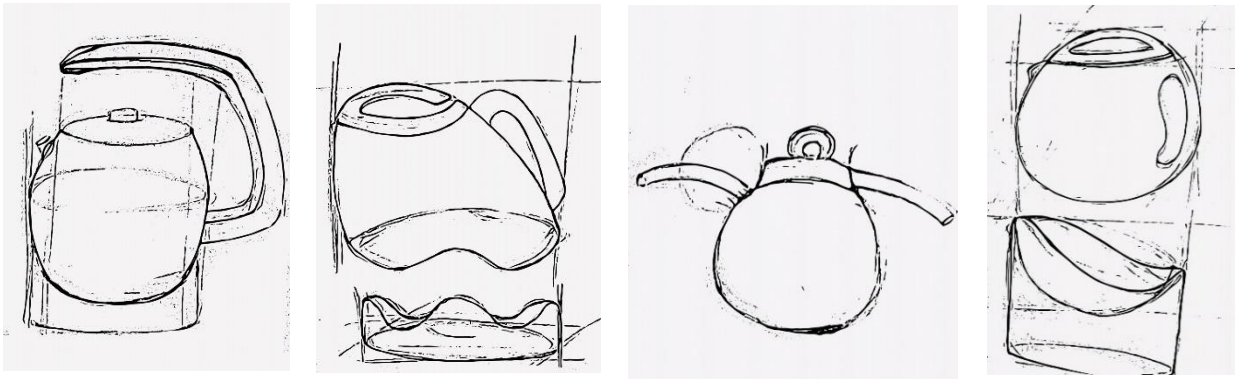


Figure11 Concept 2

The above image refers to the initial ideation combining the features of a traditional and an electric kettle. It was observed that the handle provided could be held both ways that is from the top as well as from the side.

The reason for not going further with any of these was the fact of lid opening that hindered the use of such extended handle.

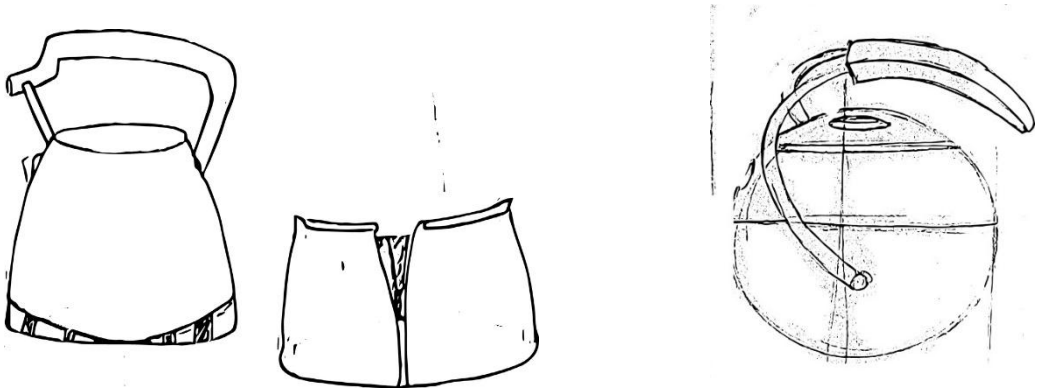


Figure 12 Concept 3

The next concept ideas that were thought after acknowledging the drawbacks of the last ideations. These comparatively resolved the problem of the lid, as they were now made movable.

The problem for these designs was that there was no steadiness in the grip of the handle and its ability to hold the weight of the electric kettle while the container is filled.

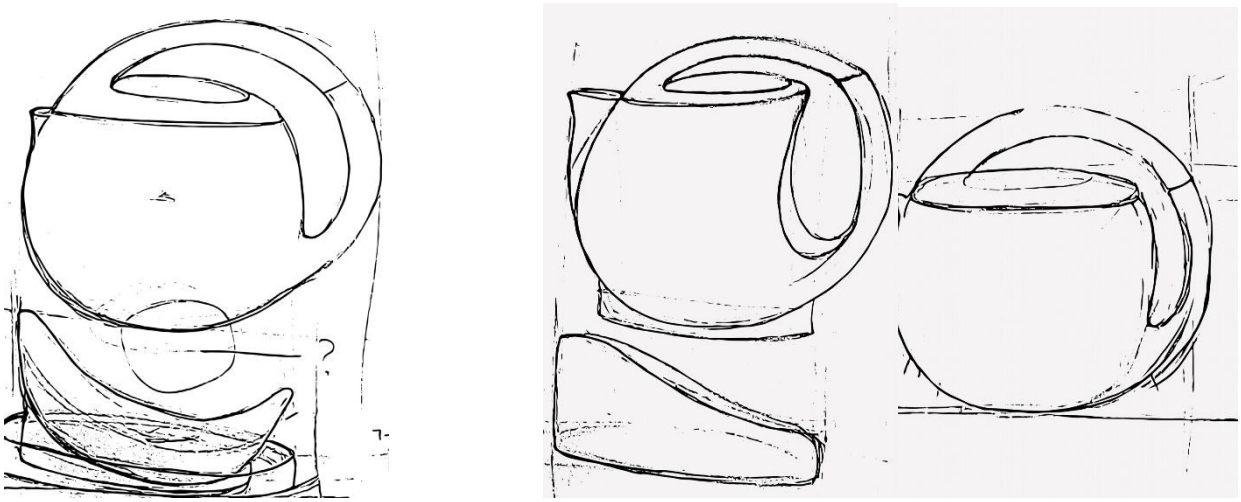


Figure 13 Final Concept

These can be considered as the final step to the generation of the final design. These resolved the issue of stability of the lid and also an additional lock system was added giving them the capability to hold the weight of the kettle.

Final concept

The final prototype is a CAD Model that has stated all the developments in the design discussed above. The different advancements can be seen in the overall prototype. There are developments in the design of the handle, the lid, power base, the form of the container and even the spout filter.

Figure 14 Rendered images of final concept

Structure and Components of the kettle are listed below

- ***The kettle is given a spherical form keeping in mind, better cooking.***

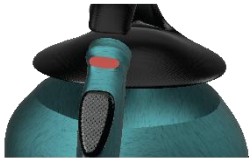
- ***The lid is provided with a spout filter to resolve the problem of food getting stuck in the filter.***
- ***The lid comes with a rotatable handle that locks with the handle attached with the container. This is done for better handling of the product, as a fact that upper lift is easier to carry and side lift is easy to pour.***
- ***The power button is provided on the handle itself.***
- ***The bottom of the kettle has an intrusion as it is a part of the power supplying component. It is provided on the side and not at the bottom for an easy view while handling the kettle.***
- ***The power base provided has an enclosing structure that ensures better support to the base of the kettle.***

Figure15 Labelled Image

Different features added to the concept:-

- ***Spout filter is provided on the lid for preventing the food to get stuck.***

Figure 16 Spot Filter



. Rotatable handle along with the lid and container for better hold.

Figure 17 Handle lock

Current carrying socket is placed at the front for better handling.

Figure 18 Current Element

Curved surface of the power base to provide stability.

Figure 19: Power Base

Final Prototype

Figure 20: CAD Model

Figure 21: Final Thermocol Model

Conclusion

The process of redesigning the kettle required a lot sensitive thinking towards the scope of improvement of the product. The final prototype presented has been designed after studying and going through all the research and the analysis of the various methods of analysing the use of the product in actual scenario. The different components are designed keeping in mind the difficulties that the user was facing while using the product. The report consists of all the research, analysis, and other aspects that were taken into consideration for the development of the product.

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Letter from the Chairman's Desk

By Sunil Bhatia PhD

One day I was travelling in metro rail services and was desperate for seat because I was carrying some valuable and sitting provides more safety compare to standing reason was my entire body was exposed in standing position and venerable for attack by pick pocketers and as I sit my body surface area shrinks and less chance that pickpocketer will try his art on me. Similarly when someone attacks we squeeze ourselves for not easily be targeted and protect the venerable part from damage. when young and was playing the ball of hitting the opponent I normally run backward as I found trapped by opponents just not to give easy body space for hitting by showing my back that was great square for hitting and other side showing front gave confusion to the attacker where to hit because body was not exposed as my back and otherside I could protect by stopping the hitting ball by using hands as shield. Running showing back gives complete expose for hitting. It means size of the product changes with situation in human body. It is very natural in animal kingdom where in defence shrink their body and in attacking mood expands body for fearing others.

Size of the products is generally defined by the limitations of users and their limitations are defined sometime by internal constraints as well as external compulsion. When I think of era of hunter when they were without any designed tools and an individual were completely relying on his her physical strength. Some situation surfaced where his/her individual physical strength proved weak and it forced them to hunt in group for overpowering giant animals for killing for foods. Size of the large group creates fear among an individual large wildanimals and it was to kill for food. As many minds come togther for striking the problems for the suitable solution for that very moment humans' first step for seed for civilization begun. I do not figure out why animals that are living in heard never moved to next level as humans progressed and I believe nature has designed in such a manner so that ecological balance should not be disturbed and it is her deliberate attempt not allow them to grow. It may be animals still think internally where humans was designed for think externally as well internally and designed various tools for hunting. It might have begun with branch of tree as stick for hitting or scaring the attacking animal. They used verbal sound as noise for confusing and made them scary so that never think of attacking rather slip to defensive and that very moment kill that. How come they thought of using sound by designing drum is still mystery for me. Size of the stick was such that it could carry easily and hit with all possible might force by user to enemy. If the size of animal was huge and hitting with stick did not create any damage or failed in scaring, thought of hounding by making tools of sharp end for quick not to give time for attack as well kill instantly .

I do not how pointed end came in their mind and it might have started with noticing the thorn in plants that wounds and by rubbing one end of dry stem on stone to make it sharp and as metal age was discovered it turned to knife or sword. Sword was nothing but extension of stick but easy to hold in running and kill with sharp edge before wild animals could attack.

As a small child it is still in my vivid memory that introduction of domestic electric supply bring ebonite switches with base of thick ceramic and baton of wood were laid for wiring arrangement. It was deliberate because of people were illiterate and handling of electricity was unknown so design the switches where force was required for put on off of electricity unlike today piano switches that has feather touches for operation. It was external parameters of users that decide the size of the products.

Handle of the containers is made with various things like clay in cup for lifting 200 or less milli litre of weight in container and cooking utensils are made with insulated metal to meet dual purpose of avoiding burning because of the heat and it should have enough strength to lift more than kilogram weight and size of drum that can hold 50 kilograms or more need strong metal fix with rivet and ultimately hooks of heavy thickness made of cast iron in cranes for lifting is altogether different. It is the external demand that decides the size of the products.

I have witness when either my shoe is not fitting on my feet or it is little bit lose creates discomfort to even that extent that shoe bites occurs. Just imagine design of spoon more than size of average

mouth and serving spoon is smaller for transferring food is just tiresome and irritating exercise. Think about size of button hole if it is large it will not hold the button so it will not hold the dress.. Sewerage pipe is designed for meeting the challenges of inflow and if size is not proper the outlet water will flush back and purpose of design of sewage will defeat. Roads are designed for carrying the different transport means and express highways are designed for fast moving transport vehicle and any slow vehicle will create blockade in traffic. Similarly highways are designed for different purpose and these transport vehicles will face challenges in service lane or artery roads. Once roads has designed that force the vehicle to design according to size of the road for easy maneuvering.

Idea of flexible size struk to them where requirement or purpose changes so size changes and size is not defined or different size products are replaced for quick functioning designer introduces flexible for accommodating different sizes for proper functioning . As I have noticed in drill machines where device is same but pins can fix for meeting different purposes. Similarly rabber band for holding the hair is convenient design where thickness of head hairs varies in different female but it changes sizes according to hhairs size.

I am grateful to Prof Ravindra Singh and Prof Parth for accepting our invitation and showcasing the design thought process of students. It is the first batch of this university and the students are from first year. It also reflects the sincerity of faculty members in grooming the students for contribution for making better society.

LAMBERT Academic Publishing has published book "Design For All, Drivers of Design" author Dr. Sunil Bhatia of Design For All Institute of India and it is available on www.morebooks.de one of the largest online bookstores. Here's the link to it:

https://www.morebooks.de/store/gb/book/design-for-all/isbn/978-613-9-83306-1

This book is dedicated to our esteem readers, contributors and well wishers.

With Regards

Dr. Sunil Bhatia

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Tel 91-11-27853470®

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Forthcoming Issues

November 2019 Vol-14 No-11

Elisabete (Bete/Bebé) Castanheira from Brazil will be Guest Editor for this special issue. Designer, university professor, researcher and consultant in the development of design projects, Elisabete Castanheira has solid market, academic and content experience. As a lecturer she works in the courses of Design, Graphic Design and Product Design.

As a volunteer, she is a member of the board of directors of adp (Brazilian association of product designers), as an administrative director (having served as a financial director for the two previous managements) and is a member of the advisory board of objeto brasil association and the brasil criativo institut. She participated in several exhibitions in brazil and abroad, receiving awards and honorable mentions.

In 2017 participated in the group that represented Brazil at the Cannes Festival as jury in the category of Product Design and

coordinated the team that prepared the application process of Brasília to the Creative Cities Network of Unesco - Category Design (application that was accepted).

December 2019 Vol-14 No-12

Dr (Ms.) Ketna L Mehta, PhD. Founder Trustee, Nina Foundation, an NGO for rehabilitating friends with Spinal Cord Injuries, an incurable permanent disability. Editor & Management Advisor, S. P. Mandali's Prin. L. N. Welingkar Institute of Management Development & Research. Author, Professor, Researcher, Thought Leader on Disability Solutions, Inspirational Speaker and Management Curator. Recipient of the prestigious NCPEDP Shell Helen Keller Award.

WOMEN DESIGNER YEAR 2020

January 2020 Vol-15 No-1(INNAGURAL ISSUE)

Onny Eikhaug is the founder of Innovation for All AS and President of EIDD Design for All Europe, a network comprising of 36 members, consisting of both design institutions, innovation centres and academia. She was for more than 13 years Programme Leader at Design and Architecture Norway, responsible for promoting the Centre's activities in the fields of people-centred, inclusive design as a strategy for innovation. She was Programme Leader for the Innovation for All programme promoting inclusive, people-centered design as a practice and an effective tool for innovation in both private and public sector.

She is committed to sustainable, people-centred design and is focused on demonstrating the potential of this approach as a powerful and profitable strategy for innovation. A key aspect of this is presenting and implementing effective methods that can easily be adopted by any organization or enterprise. She writes, publishes, lectures, facilitates workshops and curates exhibitions both in Norway and internationally, and works closely with designers, education, industry, research and government using real projects and other knowledge transfer mechanisms to achieve this. She advises and coordinates people-centred inclusive design projects

within business and public sector applying and testing new tools and methods for user research and involvement. She is responsible for the books Innovating with people –The Business of Inclusive Design» and Innovating with People - Inclusive Design and Architecture as editor-in-chief and author.

She holds an MBA from the Norwegian School of Economics and Business Administration. She has a broad executive experience in international marketing, sales, innovation, product development and design management in the fields of personal products, ergonomic lighting, and contemporary furniture having worked for companies such as Unilever and Luxo across Europe and the US. She was also Managing Director of a Norwegian Graphic design company.
She was in 2015 appointed Inclusive Design Champion Award by an international jury at HHCD Royal College of Art, London at the Include conference.

February 2020 Vol-15 No-2

Sharmistha Banerjee is an industrial designer with an experience in working in collaborative innovation and sustainable product design. Currently I am working as Assistant Professor at Department of Design, Indian Institute of Technology Guwahati. My area of PhD research is Design for Sustainability in the arena of agricultural equipment design. I did my bachelor in Industrial Design from IIT Guwahati and a master in Integrated Product Design from Technical University of Delft, Netherlands.

I have co-founded the Sustainability and Social Innovation Lab at Department of Design, IIT Guwahati. The lab focusses on creating systems for sustainable human consumption and production through a complete revamp of the consumption structure with our design interventions. We are part of the global network on sustainability, the Learning and Education Network in Sustainability (LeNS) consisting of 150+ global universities. Currently a large part of our sustainable product-service development projects are in the domain of agriculture.

At IIT Guwahati I teach courses like System Design for Sustainability, Usability Engineering, User Research Techniques, Product Detailing, Interaction Design, Product Design, Design Management, Plastics and composites and Design Semantics. I have also developed a MooC course on System Design for Sustainability which had more than 600 subscribers in the academic year 2018 - 19. In the past few years, I have worked in India, Bangladesh and Netherlands with companies like Philips, Infosys, MIDCO, VU Medical University Amsterdam, Conpax Verpakking, Beat Belly, Botanische Tuin Delft, ACC Ltd, educational institutes like IIT Guwahati, MIT Institute of Design Pune, IDC, IIT Bombay and L'Ecole de Design (Indian Operations), Nantes-Atlantique, France and NGOs like International Development Enterprise Bangladesh.

March 2019 Vol-15 No-3

Archana Bade Shrestha completed her Bachelor in Architecture in 2008 from Khwopa Engineering College, Bhaktapur, Nepal. I have completed my MSc. in Urban Planning in 2013 from Institute of Engineering, Pulchowk Campus, Lalitpur, Nepal. After completion of B. Arch I worked in a private consultancy named Tekton Consultancy, Lalitpur, Nepal for 5 years. Currently I am a full time faculty working as senior Lecturer in Khwopa Engineering College. I take design studios (housing + residential design), Vernacular Architecture, Building Construction-II, A- cad, Interior Design as the course subjects. My field of research is in analyzing the socio-economic status of Apartments in Urban areas of Nepal.

April 2020 Vol-15 No-4

A Doctorate qualification in the fields of: interior architecture, architecture and urban design Dr Dolly Daou has 18 years experience in: teaching, research, quality assurance, and leadership, specialised in multi-disciplinary design projects. Currently the Director of Design Lab: New Eating Habits at L'École de design Nantes Atlantique, France. Previously, the Director of the Association of Interior Designers in the MENA region, an external

reviewer to many international educational quality assurance agencies and the Program Director of Interior Architecture and Master of Interior Design at Swinburne University of Technology, (Australia and Hong Kong). Also, was the Treasurer of the Board to the Interior Design Educator Association (IDEA) for Australia and New Zealand. Author of co-edited book Unbounded on the Interior and Interiority.

May 2020 Vol-15 No-5

Having been a wheelchair model from an early age, Samanta has always felt frustrated by the lack of luxurious clothing available for disabled people. Working as an advocate for inclusion within the fashion industry, Samanta has decided to join forces with some of the most innovative emerging designers to develop her brand, 'SB' – a unique line of clothing based on the principle that "its not about being disabled, but about feeling beautiful and comfortable whilst in the siting position".

Born in Brazil, Samanta moved to London 10 years ago and has since dedicated her life to improving the lives of people living with disabilities. She hopes that her collection will open people's minds and hearts. Samanta is a former Brazilian no. 1 wheelchair tennis player winning a doubles silver medal at the ParaPanAm Games in Rio de Janeiro in 2007 & representing Brazil in three World Team Cups.

"We must be seen to exist" – Samanta Bullock

June 2020 Vol-15 No-6

Debra Ruh is a Global Disability Inclusion Strategist, Market Influencer, internationally recognized keynote speaker, published author, branding expert, successful entrepreneur, and an exceptional mother. Debra is host of popular program: Human Potential at Work (Audience in 84 countries).

Debra Ruh received her call to action when she was told by so-called "experts" that her daughter, Sara, who was born with Down Syndrome (Trisomy 21), would never walk or talk. She refused to accept the prognosis and perception of this condition. Driven by her unshakeable faith in the power of human potential and the love for her daughter, Debra was determined to dedicate her life to create a path to empowerment and the success for all those with disabilities.

Debra had built a multi-million-dollar firm focused on ICT accessibility. Debra was convinced that "the real disability is being unable to see human potential" formed Ruh Global Communications. This new firm focuses on Global Disability Inclusion Strategies, Digital Marketing, and Branding among many other services.

Debra consults with Multi-National and National Corporations and the United Nations. Debra is now internationally renowned global keynote speakers and travel the world inspiring and advocating for governments and corporations to include people with disabilities.

Debra Ruh is an active public figure she was invited to address the United Nations General Assembly at the Conference of State Parties 9th session (COSP9) by the President's office of the UN on May 13, 2016. More recently Debra was selected as the North American representative for the United Nations (UN), International Labor Organization´s (ILO), Global Business and Disability Network (GBDN). Additionally, in 2018 the U.S. State Department selected Debra Ruh as a global speaker and ambassador for the United States when visiting foreign nations and speaking on inclusion and disability. Selected as a Global Goodwill Ambassador in 2018.

Debra is a recognized global influencer, frequently interviewed by various media outlets and she has gathered a significant presence on many social media platforms, with over 300,000+ followers across all mediums. Co-founder of the award winning #AXSChat the second biggest tweet chat in the world with a reach in the billions. Debra was also named in the "Top 5% of Social Media Influencers" and "Top 0.1% of people talking about Disability Inclusion and Accessibility" by KLOUT. Named #15 in Digital Scouts Top #100 Global Digital Influencers in Sept 2018.

July 2020 Vol-15 No-7

Jani Nayar , Executive director of the SATH (Society for Accessible Travel & Hospitality), a tireless advocate and effective educator on travel & disability.

August 2020 Vol-15 No-8

Maria Luisa Rossi, Chair and Professor, MFA Integrated Design Maria Luisa's work at the College for Creative Studies Graduate Studies brings her entrepreneurial, globally-focused, and empathetic cultural approaches to the next generation of designers. She focuses on the seamless capacity to deal with the tangible and intangible aspects of people's experiences. At CCS she is preparing "facilitators" capable of addressing global-local grand challenges, focusing on social innovation. Her projects are concentrated on research, co-creation and people-centered processes.

Maria Luisa's professional career has been independent and international. She attended the premiere master's program in industrial design at the Domus Academy in Milano, thanks to a European Scholarship she won from designing the first wearable computer. The project was featured in the prestigious Domus magazine and gave her a lot of visibility around Europe and the design world. The wearable computer project "The Walking Office" can be found in the Henry Ford Museum Permanent Design Collection.

Following her studies, she founded the design consultancy Iavicoli & Rossi, working on various models varying from interior architecture to tableware.

Maria Luisa's interdisciplinary attitude, design strategy knowledge, and business acumen brought her to be hired in the team that launched the new Graduate Program at CCS in Detroit, where she set standards of excellence for MFA Integrated Design.

Her effort to provide meaningful teaching experiences is validated by a successful alumni job placement in corporations and design consultancies. Throughout her career, Maria Luisa has conducted workshops and lectures in Singapore, Los Angeles, Mexico City,

Istanbul, Ankara, São Paulo, Shanghai, Gratz, Brasilia, and Taiwan. Her specialties are Design Strategy, Experience Design, Scenario Design, Service Design, Interdisciplinary approach, with an in-depth knowledge of American, Asian and European culture and markets.

New Books

it is available on **www.morebooks.de** one of the largest online bookstores. Here's the link to it:

https://www.morebooks.de/store/gb/book/design-for-all/isbn/978-613-9-83306-1

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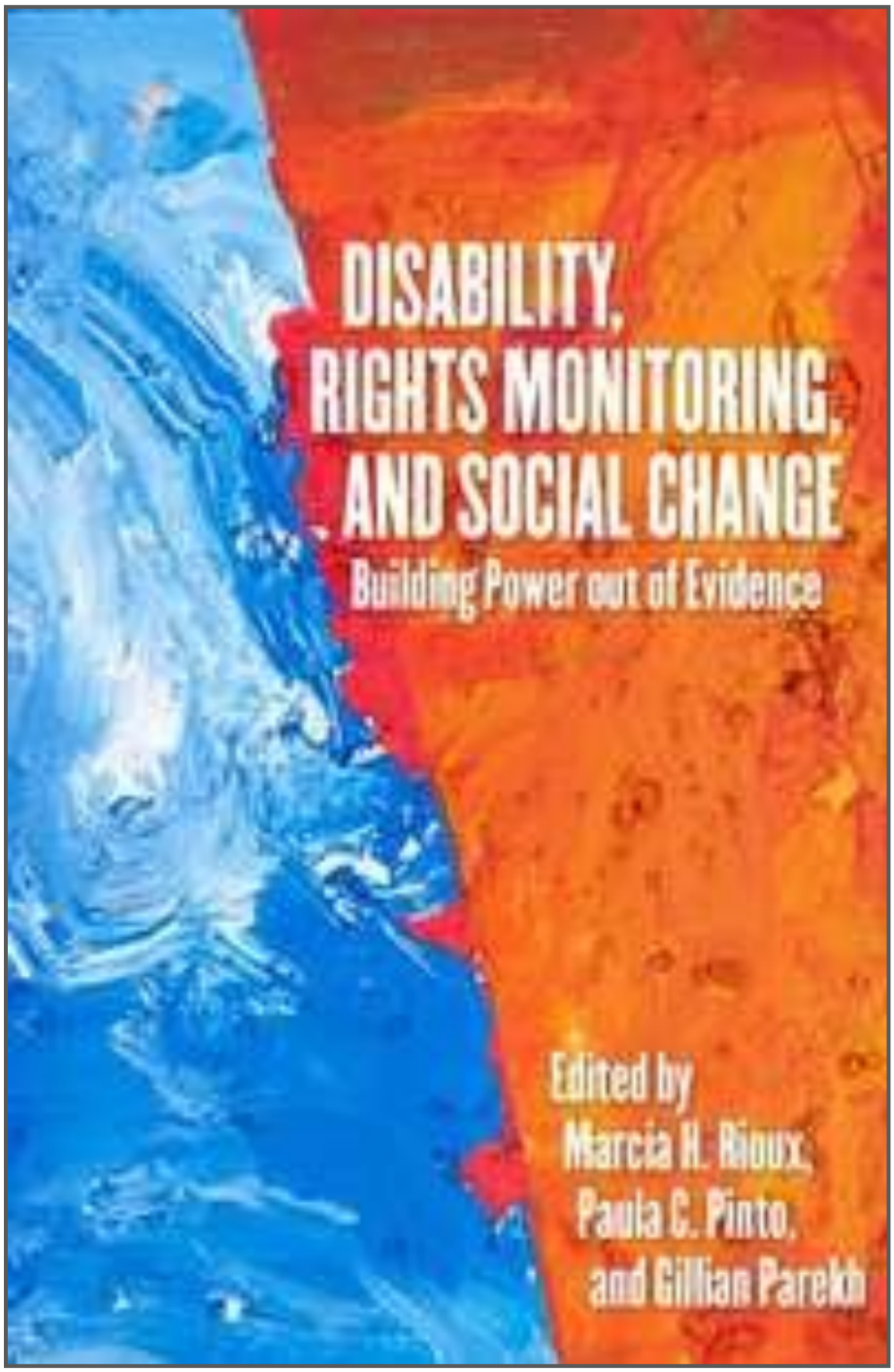

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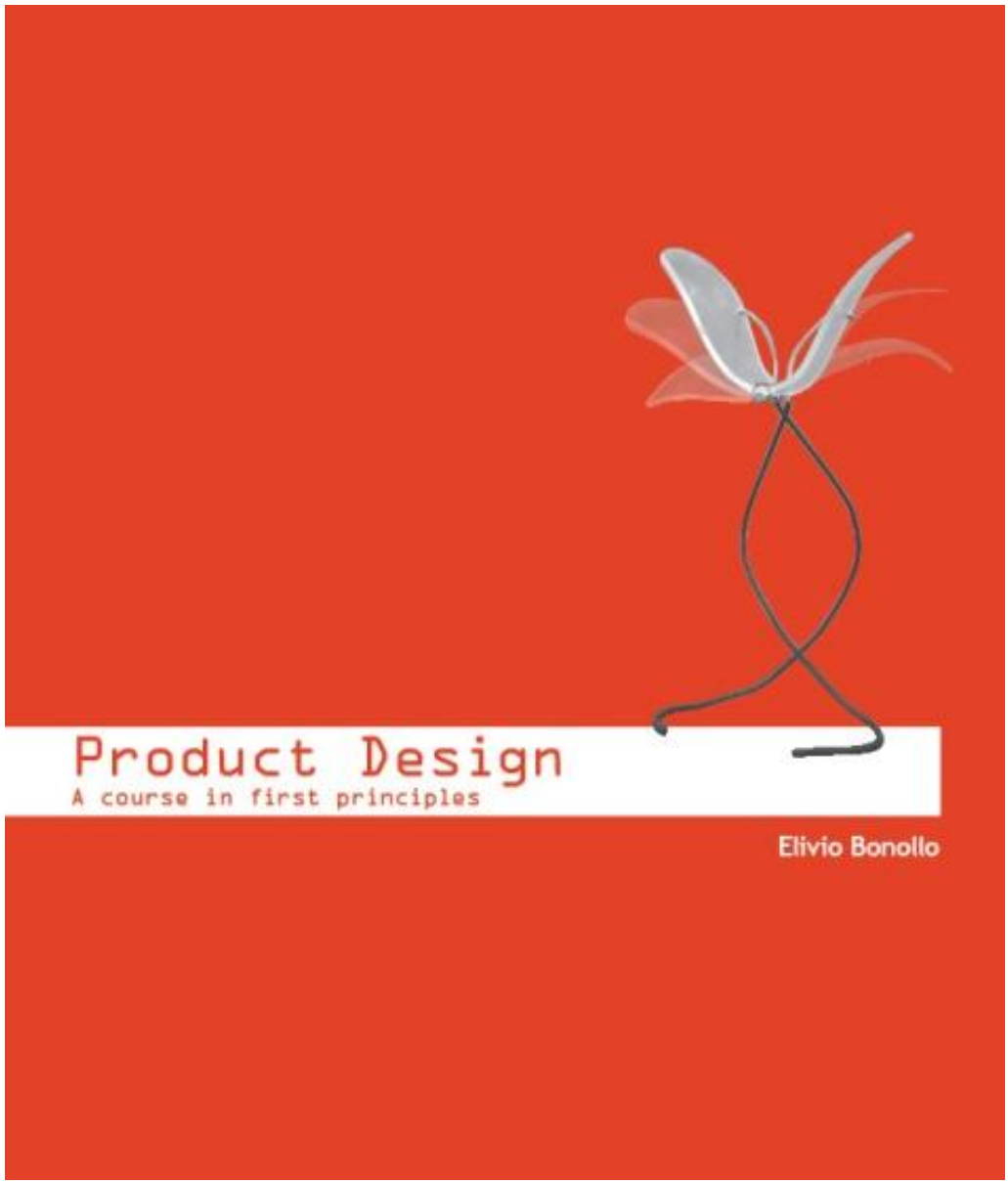

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http://www.amazon.com/Product-Design-course-first-principles/dp/1784562939/ref=sr_1_sc_1?ie=UTF8&qid=1456434322&sr=8-1-spell&keywords=Bonollo+Product+Design%3A+A+course+infirst+principles

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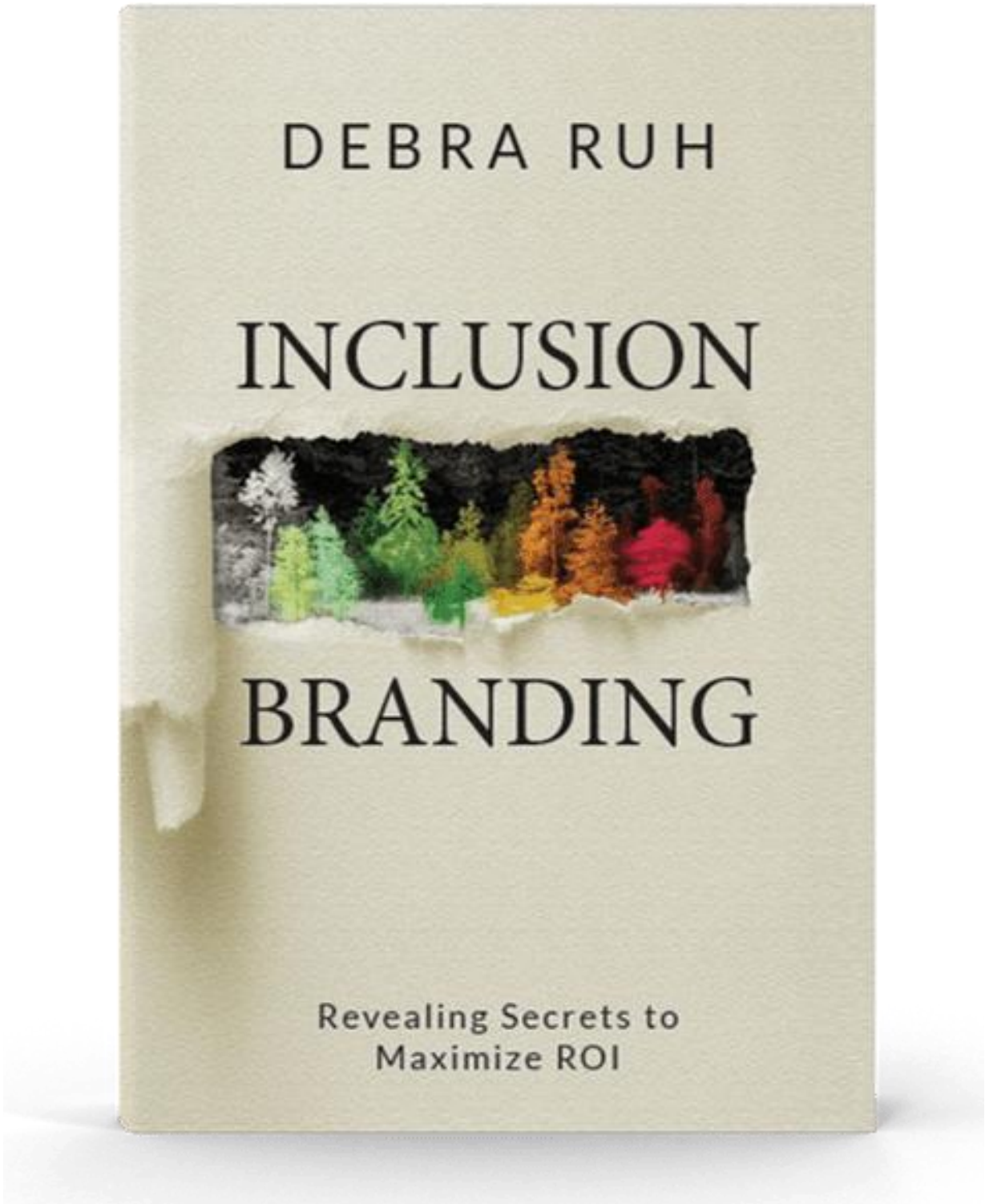
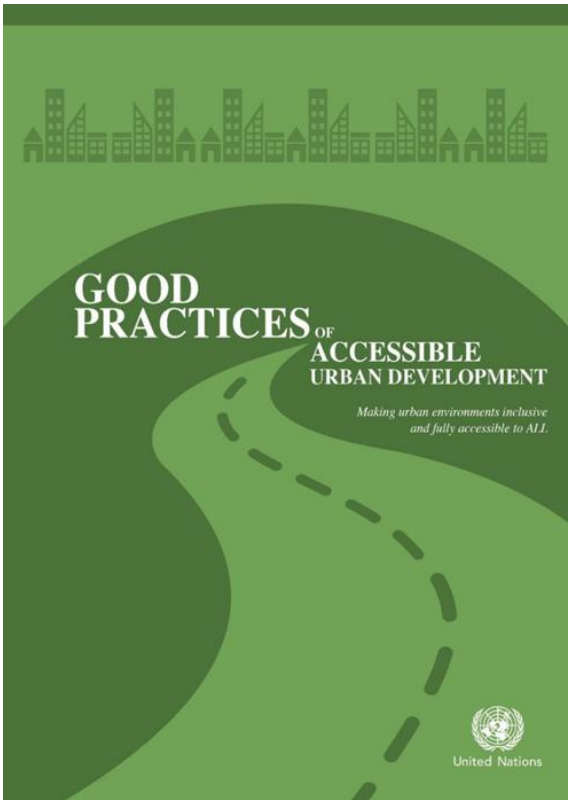
https://www.amazon.com.au/Product-Design-Course-First-Principles-ebook/dp/B07FNV2F4L/ref=sr_1_fkmr0_1?ie=UTF8&qid=1532497383&sr=8-1-fkmr0&keywords=Product+Design+a+course+in+first+principles

READING HINTS: ePub files can be read with the iBook app on Apple MacBook/iPad devices; ePub files can also be read on Desktops PCs, Laptops and Surface devices using readers such as the Microsoft *freda*ePub reader. The Kindle (mobi file) reader isflexible and suitable for reading the eBook on PCs; Kobo readers can also be used to read ePub files on MacBook and iPad. All formats are very interactive with very good navigation.


DEBRA RUH
INCLUSION
BRANDING
Revealing Secrets to
Maximize ROI

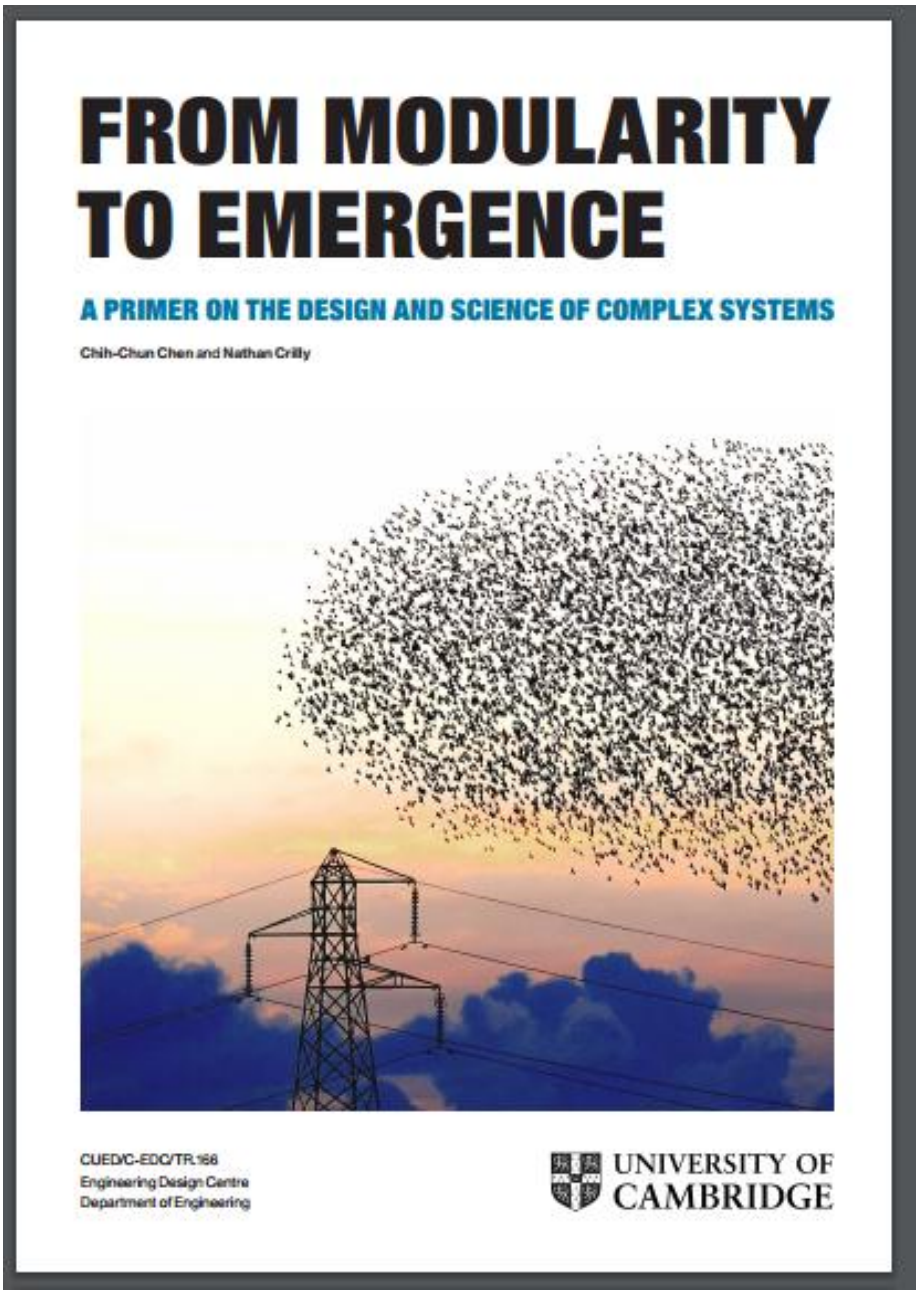


In light of the forthcoming United Nations Conference on Housing and Sustainable Urban Development (HABITAT III) and the imminent launch of the New Urban Agenda, DESA in collaboration with the Essl Foundation (Zero Project) and others have prepared a new publication entitled: "Good practices of accessible urban development".

The publication provides case studies of innovative practices and policies in housing and built environments, as well as transportation, public spaces and public services, including information and communication technology (ICT) based services.

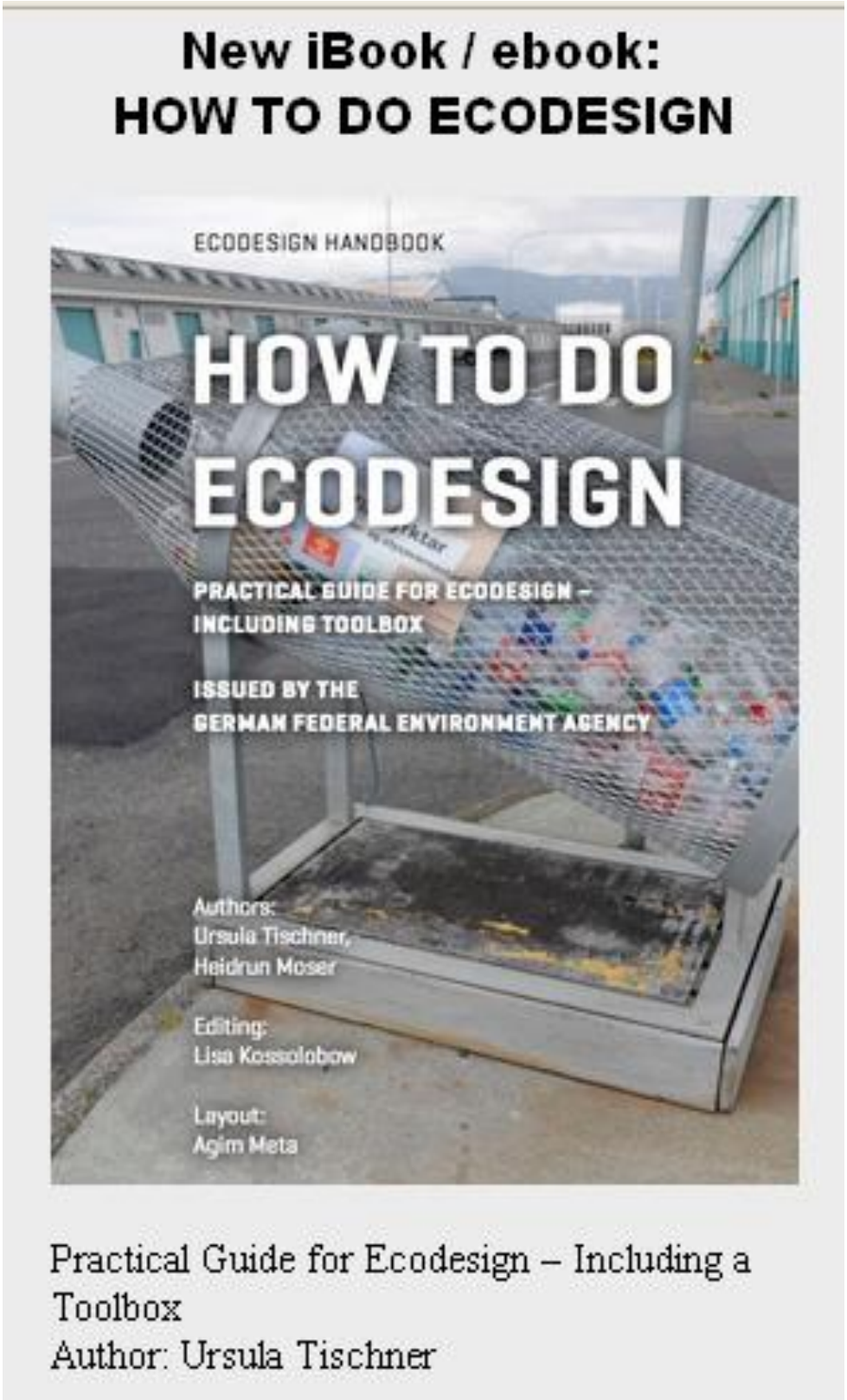
The publication concludes with strategies and innovations for promoting accessible urban development.

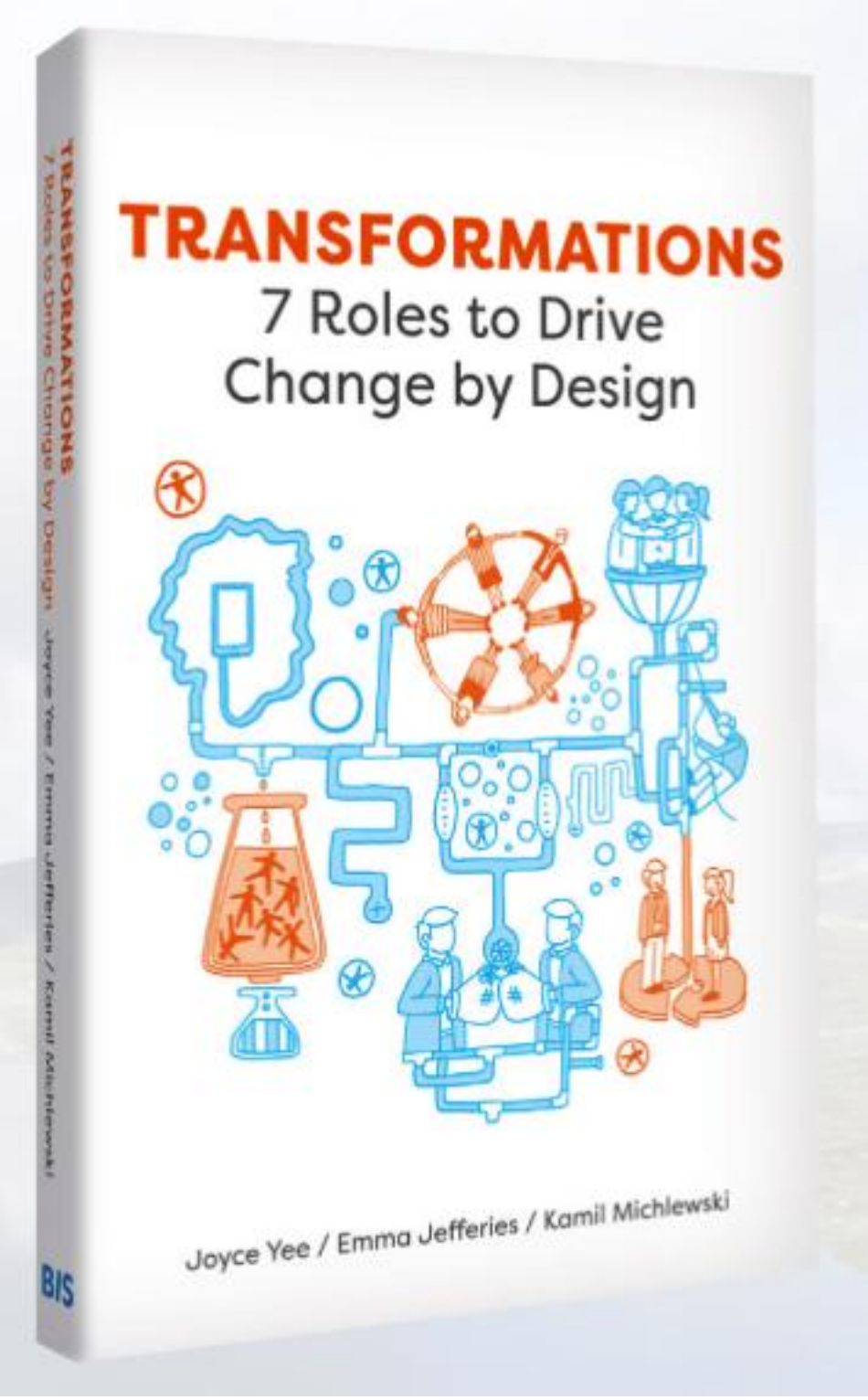
The advance unedited text is available at:http://www.un.org/disabilities/documents/desa/good_practices_urban_dev.pdf



Dr Chih-Chun Chen and Dr Nathan Crilly of the Cambridge University Engineering Design Centre Design Practice Group have released a free, downloadable book, _A Primer on the Design and Science of Complex Systems_.
This project is funded by the UK Engineering and Physical Sciences Research Council (EP/K008196/1).
The book is available at URL: http://complexityprimer.eng.cam.ac.uk

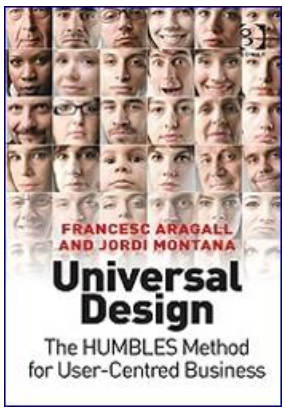
Changing Paradigms: Designing for a Sustainable Future


New iBook / ebook:
HOW TO DO ECODESIGN
ECODESIGN HANDBOOK
HOW TO DO ECODESIGN
PRACTICAL GUIDE FOR ECODESIGN – INCLUDING TOOLBOX
ISSUED BY THE GERMAN FEDERAL ENVIRONMENT AGENCY
Authors:
Ursula Tischner,
Heidrun Moser
Editing:
Lisa Kossolobow
Layout:
Agim Meta
Practical Guide for Ecodesign – Including a Toolbox
Author: Ursula Tischner


TRANSFORMATIONS
7 Roles to Drive Change by Design
Joyce Yee / Emma Jefferies / Kamil Michlewski
BIS


Arnar Árnason and Sigurjón Baldur Hafsteinsson
DEATH AND GOVERNMENTALITY
Neo-liberalism, grief and the nation form

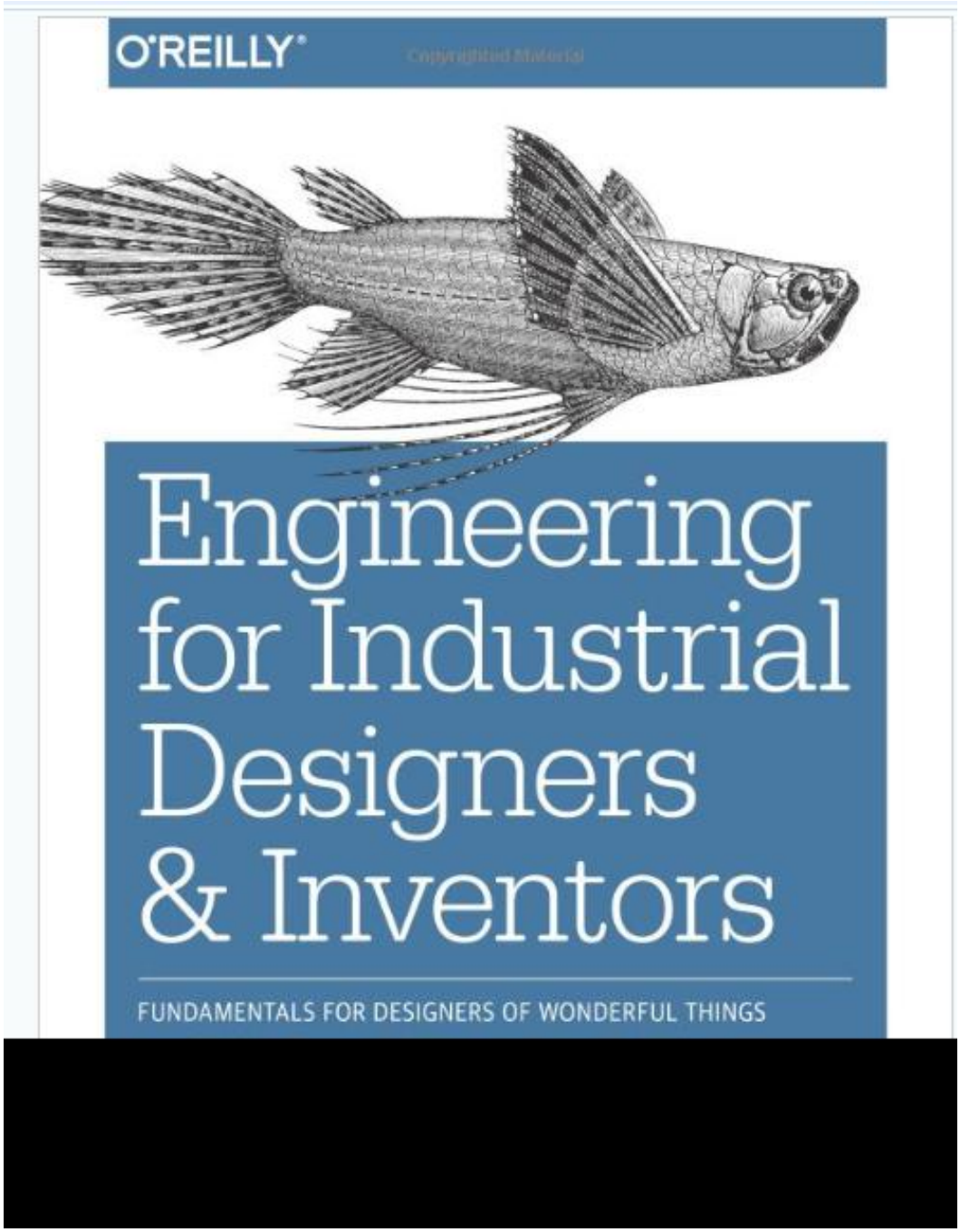
Universal Design: The HUMBLES Method for User-Centred Business



"Universal Design: The HUMBLES Method for User-Centred Business", writtenbyFrancescAragall and JordiMontañaandpublishedbyGower, providesaninnovativemethod to supportbusinesseswishing to increase the number of satisfiedusersand clients andenhancetheirreputationbyadaptingtheirproductsandservices to the diversity of their actual andpotentialcustomers, takingintoaccounttheirneeds, wishesandexpectations.

The HUMBLES method (© Aragall) consists of a progressive, seven-phaseapproach for implementing Design for All within a business. Byincorporating the user'spoint of view, itenablescompanies to evaluatetheirbusinessstrategies in order to improveprovideanimproved, morecustomer-orientedexperience, andtherebygain a competitiveadvantage in the marketplace. As well as a comprehensiveguide to the method, the bookprovidescasestudies of multinationalbusinesswhichhavesuccessfullyincorporated Design for All intotheirworkingpractices.

According to SandroRossell, President of FC Barcelona, who in company withotherleadingbusiness professionals endorsed the publication, it is "requiredreading for thosewhowish to understandhow universal design is the onlyway to connect a brand to the widest possible public, increasing client loyaltyandenhancing company prestige". To purchase the book, visiteither the **Design for All Foundation website**



I have a new book that presents fundamental engineering concepts to industrial designers that might be of interest to you. This is the
link:
https://www.amazon.com/Engineering-Industrial-Designers-Inventors-Fundamentals/dp/1491932619/ref=sr_1_1?ie=UTF8&qid=1506958137&sr=8-1&keywords=engineering+for+industrial+designers+and+inventrs

Appeal:

Greetings Dr. Sunil Bhatia,

I hope this greeting and collaborative outreach communiqué finds you well.

I am seeking International Academic Collaborative Partners to explore the possibility of engaging this year (Fall Semester 2019) with 2020 Stanford Center on Longevity Design Challenge that will address "Reducing the Inequity Gap: Designing for Affordability!"

I will be leading a Graduate Seminar this Fall Semester, "Design for Living, & Social Innovation" that will participate in the intellectual & innovative exploration of the Stanford Design Challenge theme. As a result, I am reaching out to my design scholars, leaders, & advocates, like yourself to gather insight, interests & case studies on this inclusive subject matter that impacts the society & constituencies that we may represent, or consider. In this regard, I am also seeking to establish a network of international academic partners and colleagues to share in an open-source shared discourse on this subject matter, and competition.

If you have not seen the following video from The Stanford Design Challenge, please do: Check out this short video for more information and advice from previous winners and industry leaders. (Further details can be found on our website.)

https://youtu.be/lChsiBmMFwo

I am also seeking to establish a network of international academic partners and colleagues to share in an open-source shared discourse on this subject matter, and competition.
(Possible Outreach with Prof. Mugendi M'Rithaa, University of Machakos, Kenya; University of Science & Technology, Kumasi Ghana; the School of Art & Design, University of Nairobi; Prof. Ephias Ruhode, Cape Peninsula University of Technology, Cape Town, South Africa; Dr Eddie Appiah <eddappiah@gmail.com Kwame Nkrumah University of Science and Technology (KNUST); *Dr. Cecilia Loschiavo Dos Santos, University of São Paulo, Brazil; Dr. Qiu Yue, Beijing Institute of Technology; Dr. Paola Trapani, Tongji University, Shanghai, China)*

Your thoughts and comments are welcome on the consideration of the following books, for my Graduate Seminar's references:

Required Reading

https://learning.oreilly.com/library/view/the-business-solution/9781609940775/xhtml/ch01.html
from The Business Solution to Poverty
Optional Recommended Reads:

"Diversity and Design," Beth Tauke, Korydon Smith, Charles Davis, Routledge,

Diversity and Design explores how design - whether of products, buildings, landscapes, cities, media, or systems - affects diverse members of society. Fifteen case studies in television, marketing, product design, architecture, film, video games, and more, illustrate the profound, though often hidden, consequences design decisions and processes have on the total human experience. The book not only investigates how gender, race, class, age, disability, and other factors influence the ways designers think, but also emphasizes the importance of understanding increasingly diverse cultures and, thus, averting design that leads to discrimination, isolation, and segregation.

"Architecture & Design versus Consumerism: How Design Activism Confronts Growth," Ann Thorpe, Routledge

The mentality that consumerism and economic growth are cure-alls is one of the biggest obstacles to real sustainability, but any change seems impossible, unthinkable. Our contemporary paradox finds us relying for our well-being on consumer-driven economic growth that we actually can't afford — not in environmental, economic or social terms. Although architecture and design have long been seen as engines for consumerism and growth, increasing numbers of designers are concerned about the problems resulting from growth. But designers face a paradox of their own; in scenarios of sustainable consumption, where people consume or build significantly less, what will be left for designers to do?

The Ten Faces of Innovation: IDEO's Strategies for Beating the Devil's Advocate and Driving Creativity Throughout Your Organization

Over the years, IDEO has developed ten roles people can play in an organization to foster innovation and new ideas while offering an effective counter to naysayers. Among these approaches are the A*nthropologist*—the person who goes into the field to see how customers use and respond to products, to come up with new innovations; the *Cross-pollinator* who mixes and matches ideas, people, and technology to create new ideas that can drive growth; and the *Hurdler*, who instantly looks for ways to overcome the limits and challenges to any situation.

Filled with engaging stories of how Kraft, Procter and Gamble, Safeway and the Mayo Clinic have incorporated IDEO's thinking to transform the customer experience, *The Ten Faces of Innovation* is an extraordinary guide to nurturing and sustaining a culture of continuous innovation and renewal.

Design for Good: A New Era of Architecture for Everyone In *Design for Good*, John Cary offers character-driven, real-world stories about projects around the globe that offer more—buildings that are designed and created with and for the people who will use them. The book reveals a new understanding of the ways that design shapes our lives and gives professionals and interested citizens the tools to seek out and demand designs that dignify.

TED Talk: How architecture can create dignity for all | John Cary

https://www.ted.com/talks/john_cary_how_architecture_can_create_dignity_for_all?language=en

If architect and writer John Cary has his way, women will never need to stand in pointlessly long bathroom lines again. Lines like these are representative of a more serious issue, Cary says: the lack of diversity in design that leads to thoughtless, compassionless spaces. Design has a unique ability to dignify and make people feel valued, respected, honored and seen -- but the flip side is

also true. Cary calls for architects and designers to expand their ranks and commit to serving the public good, not just the privileged few. "Well-designed spaces are not just a matter of taste or a questions of aesthetics," he says. "They literally shape our ideas about who we are in the world and what we deserve." And we all deserve better.

Hope to hear from you soon

Ricardo Gomes, IDSA
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Design Center for Global Needs/Shapira Design Archive
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ricgomes@sfsu.edu
415-338-2229
https://faculty.sfsu.edu/~ricgomes/

News

1.

Melanie Tran is one of the Australian Financial Review's Top 100 Women of Influence

- Chris Boulous

Inspiration: Melanie Tran.

Picture: Simon Bennett

Edensor Park resident Melanie Tran has been named as one of the 2019 *Australian Financial Review's* Top 100 Women of Influence.

The 23-year-old, who was the first person with spinal muscular atrophy to complete the Duke of Edinburgh Award, will now be considered for the Diversity and Inclusion award at the gala awards on October 22. Melanie became the first person in the world with a physical disability to receive the Duke of Edinburgh's International Award.

The *Champion* caught up with the Torrens University graduate to talk about her many titles including innovator, entrepreneur and activist.

How does it feel to be named as one of AFRs Top 100 Women of Influence?

It's an absolute honour to be named one of the *AFR's* 100 Women of Influence for 2019! I can't find the right words to describe what this means to me, but the thing I can say is that this recognition is more than just about my journey and the work I do. It also represents the army of people behind me that have made all this possible and helped me become the person I am today. I can't tell you how grateful I am to have these people by my side because they were the ones who believed in me, taught me to turn barriers into a force of innovation and gave me a platform to create opportunities not only for myself, but also for those around me.
Most importantly, this recognition acknowledges the power of diversity and inclusion. To me, this serves as a reminder for all of us on how this simple, yet key, principle can unite us, as we stand together to embrace all that makes us unique and leverage this as a platform to discover talent.

I'm so excited to be sharing this experience with all the incredible finalists in 2019, as well as joining over 700 alumni in this network.

"I can't tell you how grateful I am to have these people by my side because they were the ones who believed in me."

How have you made the world more inclusive and fundamentally more accessible through user experience design?

One of the main goals that I work towards throughout my career is to make the world we live in more inclusive and fundamentally more accessible through the lens of user experience design and technology. To achieve this, it has two folds:

1. **Hireup. My role as a User Experience (UX) Designer in the product development team allows me to leverage the power of technology to help disrupt and innovate the traditional model of enabling people with a disability to connect with support workers. One of the key factors that help drive this to success is to bring the voice of our end users to the heart of the development process, and aligning our user needs with our business goals. Perhaps this approach can be summarized in three words: Collaborate. Co-design. Co-create.**
1. **Torrens University Australia: I'm fortunate to have the opportunity to also work as a UX Designer in the product development team at Torrens University Australia and look at education through the creative lens. Education is the most powerful tool one could have and if we want diversity and inclusion to become part of our DNA then it needs to begin with education. The work I do with Torrens University Australia is predominantly focused on embedding the principle of universal design into our product development process within the online learning environment, so that we can create a learning environment that is flexible enough to adapt to different needs.**

The best part about my work is that I get to witness a magical moment that occurs when the power of design and technology meets positive social change. More importantly, it reinforces the importance of harnessing the principle of diversity and inclusion, and how this can be seen as a force of innovation.

What are the ways you are leading disruptive change in the traditional model of provision of support services for people with disabilities?

The disability sector has shifted dramatically since the roll-out of the NDIS. People with a disability started to have more choice and control. Service providers started to create more products and services to suit individual needs. Businesses started to be more inclusive. When I bring this back to the work I do, I think there was something missing from this equation: technology.

The best part about my work is that I get to witness a magical moment that occurs when the power of design and technology meets positive social change.

MELANIE TRAN

Technology is a powerful tool that surround us every single day, and if we combine this with social impact, something magical happens. As a person living with a disability and a UX Designer with knowledge in product development, it puts me in a unique position where I am able to bring together design and business; two worlds that don't always work side by side. And that itself, is enough to enable me to look at the disability sector through a new lens.

You have become sought-after public speaker presenting at a range of events including at Google's first-ever Asia Pacific UX Design Summit. What's the key message you try to get through when you're a public speaker?

My speaking engagements give me the opportunity to take a step back and look at diversity and inclusion from a holistic perspective. It allows me to look at the bigger picture and convey one key message to the audience: diversity and inclusion goes far beyond disability. This simple concept encompasses everything that makes us unique. But mostly importantly, it provides a platform for me to showcase how technology and design can become a catalyst to help us achieve this vision.

What are some of the challenges you have faced and how you used them to create opportunities for yourself and others?

We live in an environment that was not built to be flexible and adaptive and the solution is not as simple as making our physical environment accessible because there are two sides to a coin. In order to truly embrace diversity and inclusion, it needs to be embedded within our culture. It's about attitude and perception. It's about how we can turn the challenges we face into a force of

innovation. Because when that happens, we will learn to create opportunities for ourselves and for those around us.

- **Melanie recently graduated with a Bachelor of Digital Media at Torrens University and is now enrolled to begin her Masters of Philosophy with plans to complete her PhD. The 2018 global Laureate Here for Good Award winner is leading significant conversations globally with companies like Google, Laureate International Universities and the Commonwealth Bank and setting a new agenda about the role that designs plays in building greater access, inclusion and participation for all members of society.**

(Curtsey: Champion)

2.

Assembling the accessibility toolkit

By TAYLOR RICO-PEKEROL

Photo by Taylor Humby.

Gundy Kaupins and his wife were spending their evening watching a television program regarding the behaviors and actions of a person with high functioning autism. As the program continued, they noticed similarities that hit very close to home.

"My wife said, 'You're it.' I took some online test that said I was it. Then I went to a psychologist and he says I'm it," Kaupins said. "And going over my life, I'm the poster child for it."

Kaupins, a professor for the management department, has worked at Boise State for 33 years. Two and a half years ago, he was clinically diagnosed with high functioning autism (HFA). Since then, he has helped to educate faculty on ways to interact and teach students that have a disability like his.

Boise State has worked in recent years to accommodate students' needs for different forms of accessible resources, whether it be for physical or mental disabilities. Through the Educational Access Center, students may request support and accommodations, while Universal Design Learning tailors that support to their educational needs.

Resources

Graphic by Maddie Ceglecki.

Boise State's Educational Access Center (EAC) is an on-campus resource for students with temporary or permanent disabilities. According to Wendy Turner, director of the EAC, students must seek out help if they believe they need accommodations.

"You know, we've had a real uptick in the number of students requesting accommodations," Turner said. "And I don't know if it's because people are learning about us and figuring, 'Oh, I can actually use an accommodation for this,' or if there's more diagnoses."

Often, students will reach out to the EAC for help with different types of disabilities, both physical and emotional. Most of the students they work with have hidden disabilities, or non obvious disabilities, meaning that the problem may not be visible to another person.

"A lot of times when people think, 'Oh, somebody has a disability?' People think physical disabilities, someone who is blind, deaf, [has]trouble walking," Turner said. "So what kind of resources (we give) depends on what the student needs and is determined through a conversation with them."

So far, there have been 245 new students reaching out to the EAC and 451 students are asking for accommodations again this semester, these numbers continues to grow, according to Turner. It is assumed that 11% of the Boise State population has some form of disability, meaning that roughy 2,800 students could be requesting accommodations.

Of the 600 students, about 25 to 30 have a form of autism and have gone to the EAC for accommodations. Faculty are made aware of a students needs, but are not told the reasoning unless the student tells them directly.

Disabilities can be hard to identify if they are not obviously visible to people, such as a broken arm. Emotional and hidden disabilities are harder to be aware of and notice because there is no constant reminder of them.

The most common type of disability the EAC accommodates is emotional, such as depression and anxiety. Necessary resources for disabilities can range from extra time on a test, a student helper in the class taking notes and making it known to the professor that a student has a disability.

"It's really been interesting to watch how faculty are changing. Not necessarily because of university design, but as they change their

format of their classes, you don't have as many just lecture, take a test, lecture, take a test," Turner said. "There's Blackboard work, there's tests, there's papers, there's presentations, there's group work, there's all kinds of ways students learn and demonstrate their mastery of the course material."

Programming and Workshops

The Instructional Design and Educational Assessment (IDEA) Shop works with faculty to train and give them the tools for effective course design and efficient use of technology for teaching, learning and assessment.

Kevin Wilson, instructional design consultant for the IDEA Shop, has been working with the Center for Teaching and Learning (CTL) to develop Universal Design for Learning.

"Over the last few years, I think the university administration has seen that accommodating students with those hidden disabilities is every bit as important as accommodating those with physical disabilities," Wilson said.

Universal Design for Learning (UDL) is based off the principle that there is no average student. Everyone learns differently, has different needs and approaches learning in a different fashion, according to Wilson.

"Over the past couple of years, we've been working a lot with campus partners on making things accessible to begin with this idea of universal design. So when you're setting up your class, you're setting it up so that things are pretty accessible to begin with," Turner said.

Wilson explained that instead of professors asking every student to write an essay for their project, they instead give options such as, creating a video, write a blog or making a website.

"The central principle of universal design for learning is that instructors should strive to provide multiple means by which learners acquire information and knowledge," Wilson said. "In addition to providing multiple means for students to express and demonstrate what they know."

Each semester, the Center for Teaching and Learning hosts workshops and other events for faculty relating to accessibility and incorporating tools for UDL. By giving students a choice, they will be able to better demonstrate their knowledge and acquired skills.

"Another principle of universal design for learning is working with faculty to provide multiple means of engagement so that we're challenging students appropriately," Wilson said. "So that, for instance, an advanced student isn't bored with the material and students who need more developmental work are provided opportunities to dive more deeply into the material."

Professors are aware of the need for accessibility and awareness on campus for behavioral and emotional syndromes, but there are few programs specific to interacting with students on the spectrum.

In October 2017, Kaupins, the professor for the management department, hosted an event for faculty called Dealing with Autism and Related Disorders. The presentation explained what autism spectrum disorder is, how one could interact with autistic people and obstacles that may arise.

Working with professors during his event in the past, Kaupins hopes to educate staff on how to interact with students on the spectrum.

"It did have the element of how to interact with individuals who have autism. And It's not easy I guarantee you but at least understanding what the issues are, or some of the problems, and not judging. That is important," Kaupins said.

(Curtsey: The Arbiter)

3.

Herbal Essences Continuing Commitment to Inclusive Design and Accessibility for All

(Photo: Business Wire)

INCINNATI--(BUSINESS WIRE)--There are 253 million people around the world who are vision impaired, yet only 4% of businesses are actively creating products with disabled people in mind. In observance of World Sight Day on October 10, 2019, Herbal Essences is expanding the brand's use of tactile markings and embracing technology like Alexa and the Be My Eyes app, making hair care easier for people with low to no vision. These new tools make it easier for everyone to browse Instagram, shop, shower and even style their hair.

Herbal Essences is continuing their commitment to making their products more accessible to the vision impaired community with sensory enhanced tactile indicators, a new partnership with Be My Eyes and a new Alexa skill!

Tweet this

Last year, Herbal Essences was the first mass hair care brand in North America to introduce tactile markings designed to help differentiate between shampoo and conditioner for those with a

vision impairment. This innovation was spearheaded by Sumaira "Sam" Latif, P&G's Accessibility Leader, who has been with the company for over 18 years and is herself blind. Latif pioneered this effort to help low vision consumers distinguish between shampoo and conditioner products through the sense of touch, with raised stripes on shampoo and circles on conditioner on the bio:renew line-up. Beginning in January 2020, all Herbal Essences shampoos and conditioners, such as the Hello Hydration, Color Me Happy and Smooth Collections, will have tactile differentiations to alleviate in-shower confusion and help consumers, especially those with low vision, confidently perform daily tasks.

"A universal tactile marking seems like such a small thing, and yet as a blind woman it's the little things that make such a big difference in my life. I'm excited to broaden the positive impact this has had for the vision impaired community and deliver on our mission to help everyone experience the positive power of nature every day," said Latif.

This year, Herbal Essences is bringing help beyond the shower with technology that makes searching for the perfect product and independently shopping more accessible. The brand is introducing an Alexa skill and offers specialized help on the By My Eyes app. Knowing the importance of audio assistance, the new Amazon skill allows consumers to ask questions about Herbal Essences' products, ingredients and personal recommendations. The Alexa skill is enabled by saying "Alexa Open Herbal Essences." Then, you can ask questions such as "Alexa, what Herbal Essences shampoo is good for

curly hair?" The Be My Eyes app is a free service that connects blind and low vision people with sighted volunteers through a live video call. Herbal Essences' has gone a step beyond with a specialized help feature that directly connects blind users with in-house experts to get assistance as they shop in-store, get ready at home or have hair care questions throughout the day.

"We get a lot of questions through the app about people's appearance – do my clothes match, does my make-up look right, do I have any fly-aways? It's great when we can have experts from a specific, in-demand field, like hair care, to provide an elevated level of service for our community," said Will Butler, VP Community, Be My Eyes. "We hope other brands will take note of this effort in making their products and themselves more accessible to this community in an effort to truly serve *all* consumers."

Knowing most consumers use social media and websites as resources, Herbal Essences is also increasing accessibility for the vision impaired in these areas. The brand is partnering with blind YouTube star Molly Burke to collaborate on inspiring content related to overcoming daily beauty challenges.

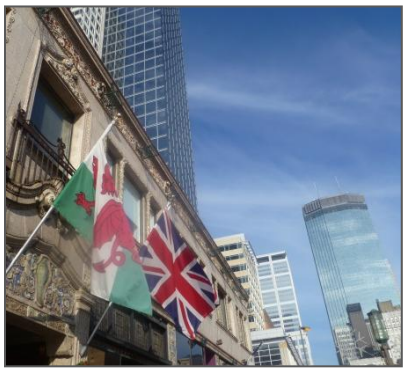
"I'm excited to work with Herbal Essences to co-create content that will benefit my community and drive toward greater inclusivity and accessibility for all," says Molly. "I know one of the most difficult things for me as a beauty and lifestyle creator has been finding products with cognizant packaging and designing a routine that works for me. I hope this content will serve as a helping hand for those who are figuring that out."

In addition, the Herbal Essences website will be accessible for assistive technology users, such as screen readers, in January 2020. The brand's Instagram page is also currently accessible for this community through Instagram's Alternative Text feature, which utilizes Apple's VoiceOver capability to allow users to listen to in-feed image descriptions.

The full roll-out for Herbal Essences tactile markings on shampoo and conditioner bottles will begin hitting stores in January 2020 everywhere that the brand's hair care products are currently sold.

To learn more about this initiative, please visit https://herbalessences.com/en-us/worldsightday, and join the conversation using #HerbalEssences and #WorldSightDay.

(Courtesy: Business wire)



Programme and Events

GOOD DESIGN NEWS

2019 VIC PREMIER'S DESIGN AWARDS ENTRIES NOW ONLINE

The 2019 Victorian Premier's Design Awards Entries are now available to view online. With over 200 entries across 8 categories, the entries showcase the high-quality of design in Victoria.

Winners of the 2019 VIC Premier's Design Awards will be announced at the 2019 VIC Premier's Design Awards Ceremony on 21 November at the newly opened MPavillion in Melbourne.

Good Design Australia proudly manage the VIC Premier's Design Awards in conjunction with Creative Victoria.

NEW FOR 2019 - THE WOMEN IN DESIGN AWARD!

Good Design Australia is extremely proud to announce the new **Women in Design Award**, that will

be presented as part of the 61st annual Good Design Awards.

The inaugural Women in Design Award seeks to recognise and celebrate women who have made significant contributions to the industry and hopes to encourage a more diverse and equal representation within the industry and leadership roles in particular within the design and creative industries.

The Selection Committee for this Award will comprise of Australian and international leaders in the design and creative industries. Confirmed Selection Committee Members include:

Liza Chong, CEO INDEX:Design to Improve Life (Denmark)
Margaret Petty, Executive Director of Innovation and Entrepreneurship UTS (NSW, Aus)
Sarah Weir, CEO Design Council (UK)
Claire Beale, Executive Director of Design Tasmania (TAS, Aus)
Eunjoo Maing, Director / Head of D-TEC at Korean Institute of Design Promotion (Korea)
Trish Hansen, Founding Principal Urban Mind (SA, Aus)
More to come...


DESIGN
THAT
EDUCATES
AWARDS
2020

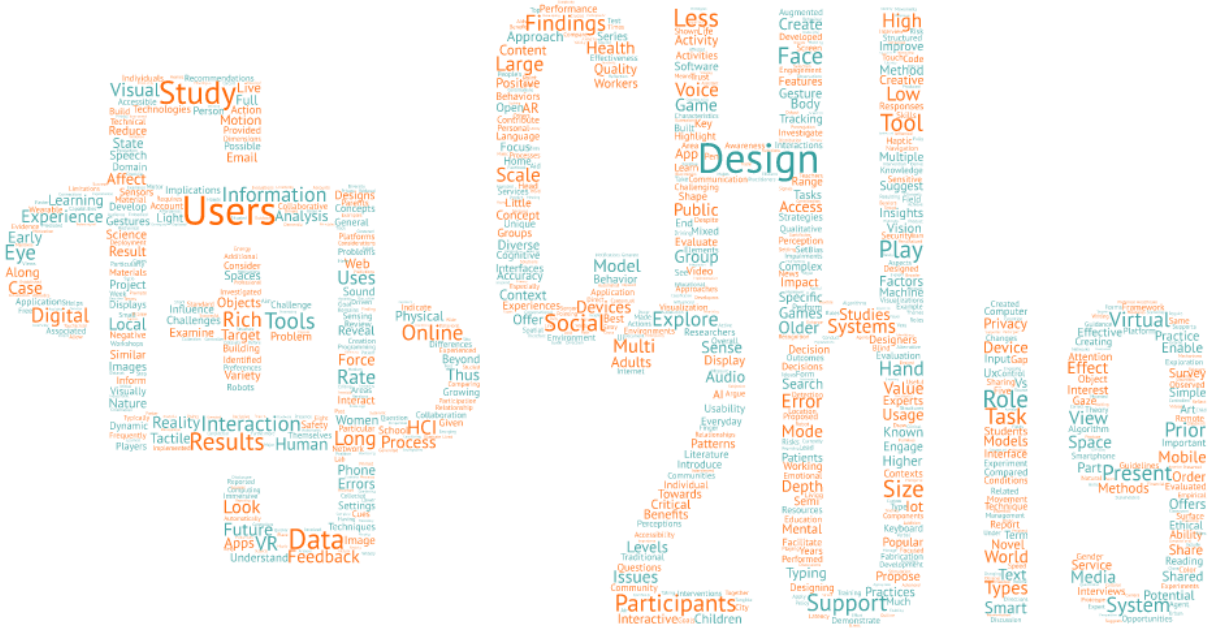

Design for all
FOUNDATION
Good Practices 2019 candidatures
Decembre
30
Now you can submit your project, product or service as
Design for All Good Practice opting to
the International Awards Design for All Foundation 2020

Design for all FOUNDATION

Good for everybody, easy for yo

IAUD Award 2019: Call for entries

IAUD INTERNATIONAL DESIGN AWARD 2019




ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA
aaate
ASSOCIATION FOR THE ADVANCEMENT OF ASSISTIVE TECHNOLOGY IN EUROPE
AIAS
International conference
Global Challenges in Assistive Technology Research, Policy & Practice
August 27-30 2019 Bologna Italy
www.aaate2019.eu
Call for Papers
Basic research & Applied research
Special thematic sessions
Deadline for submission:
28 February 2019
Call for other contributions
Educational sessions
Policy sessions
Product and Prototype presentations
See website for deadlines
Conference topics
Assistive technology (AT) for cognitive, sensory and motor disabilities
AT service delivery systems, practices, quality and outcomes
AT education, training and professional development
AT in low- and middle-income countries
Emerging and innovative AT Alternative and Augmentative Communication
AT and social assistive robotics
AAL, smart environments and IoT
eAccessibility
Universal Design
Mobility and seating solutions
Ageing and technology
AT for rehabilitation
AT, virtual and augmented reality
AT, digital health and innovation in care
AT in education
Policy and social aspects related to AT
Don't work in isolation!
Join AAATE! Join the Bologna conference
www.aaate2019.eu.
#AAATE2019
aaate2019@aiasbo.it

International conference on ‘Designing for children' with focus on 'Play and Learn'

Saturday 7th to Sunday 8th of December 2019

Spring Edition 2019 – Dateline New York

2019 Spark Design Awards Are All Underway

The Spark Awards are welcoming entries now. They include 10 general categories, with 2 student competitions and our brand new award for CleanTech Design. All of these awards have many sub-categories, so be sure to check them out at Spark:

2019 Awards

Student Design (Spring & Winter)
Product Design
Graphic Design
Health, Medical & Universal Design
Spaces & Architecture Design
Digital Design (includes UI, UX, IXO & HCII)
Mobility & Transport Design
Experience & Service Design
CleanTech Design

Note To Students & Educators

The 2019 Spring Student Awards are open and already receiving some cool designs. Standard deadline is coming up May 20th and the Late and Final Deadline is June 12. Join Us and tell your pals!

Venue: VMCC, IIT Bombay


TIEMS 2019 Annual Conference
November 12 - 15, 2019
GOYANG, KOREA
Conference Host:
TIEMS Korea Chapter jointly with the
Korean Society of Disaster & Security
I have the Pleasure to Announce and Call for Papers and Posters for TIEMS 2019 Annual Conference in Goyang, Korea!
The Conference dates are 12 - 15 November 2019

CONTEST PER
2 BORSE DI STUDIO
50% E 25%
PER IL MASTER
IN VISUAL DESIGN

2019 // RAFFLES MILANO

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This journal is published monthly for free for benefits for readers, by Design for All Institute of India,3 Lodhi Institutional Area, Lodhi Road, New Delhi-110 003 (INDIA) and publisher name Dr. Sunil Kumar Bhatia, address A/2/70 Sector-18 Rohini, Delhi-110089 Tel: +91-11-27853470 ,E-Mail: dr_subha@yahoo.com

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