

NEXT GENERATION DEVICE FOR BATHING EXPERIENCE

INDUSTRIAL DESIGN PROJECT II

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Guide
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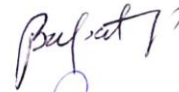


Industrial Design Centre
IIT-Bombay

APPROVAL

The Industrial Design Project-2,
entitled “Next generation device for Bathing
experience”
by Rajat Patle
is approved in partial fulfilment of the requirement of
the Master’s Degree of Industrial Design
at IDC-Indian Institute of Technology, Bombay.

Guide



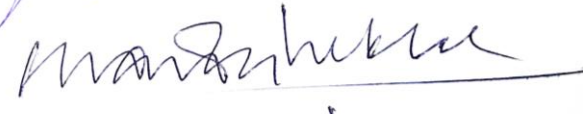
Chairman



Internal Examiner



External Examiner



Date [12-11-2018]

DECLARATION

The written submission is a part of my report, “Next generation device for bathing experience” is done as a Project-2 for post graduation program at IDC, IIT Bombay, under the guidance of **Prof. Vijay Bapat.**

I here by declare that the thoughts, ideas and words in this document are original and appropriate references are cited wherever due. I understand that the violation of the above can cause disciplinary action by the institute.



[12-11-2018]
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ACKNOWLEDGMENT

It is my pleasure to thank people who made this project possible.

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I also express my gratitude **to all Users whom** I have visited, they helped me very patiently with my constant enquiring during my user study and interviewing sessions.

A handwritten signature in black ink, appearing to be 'Vijay P. Bapat', written in a cursive style.

[12-11-2018]

ABSTRACT

We all are aware of the significance of bathing and taking quick refreshing showers, to drain out daily fatigue, as a part of our personal hygiene. But it is equally important that the value for money paid for any product related to shower or bathing is equally justified with the experienced achieved with it.

Presently, there are wide range of products available in the market that can bring in some valued experience, but involves a lot of overall cost. On the other hand, there are product that serves the purpose but don't leads to any remarkable experience with the product utilization. To enrich ones bathing experience, there are various technologies involved and developed these days and are available as a system for inside bathroom installations.

This project focuses on targeting a niche for an appropriate bathing facility & bringing together the function, experience and value for money paid by the user to enrich the overall scenario with the presence of the desired product.

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1

INTRODUCTION

WATER

Water is respected as one of the sacred five elements in ancient Greek philosophy, in the Indian Panchamahabhuta, and in the Chinese cosmological and physiological system of the Wu Xing.

It also resembles the qualities of emotion, pleasure, playfulness & intuition in contemporary esoteric traditions [1].

Greek And Roman Tradition

In ancient Greek medicine, Phlegm was the humor identified with water, since both were cold and wet. Other things associated with water and phlegm in ancient and medieval medicine included the season of Winter, since it increased the qualities of cold and moisture; the phlegmatic temperament, the feminine, the brain and the western point of the compass [1].

Indian Tradition

In Hindu philosophy, the term refers to water as an element, one of the *Panchamahabhuta*, or "five great elements". In Hinduism, it is also the name of the God- Jal, a personification of water. The element water is also associated with Chandra or the moon and Shukra, who represent feelings, intuition and imagination. It is also considered as the healer in the ancient Hindu philosophies. Its is a strong believe, even today, that a dip into the holy river water can take you to heaven and all the karmic account are then settled. Also the water is seen as the reflection of ones personality and hence, is a important part many Indian traditions even in todays modern world [1].

The above paragraphs helped me to understand the general perception of water as a personality and as an element.

BATHING AND WATER

Dating as far back as 2000 BC, ancient Egyptians were amongst the first to widely adopt the power of the water for its therapeutic values. The hot tubs consisted of a water-filled caldera that was then heated by placing red-hot stones in the water as shown in figure 1.[2]

Due to the climate, Egyptians were fixated on cleanliness, often bathing up to 4 times a day. To clean themselves while bathing, the Egyptians used natron - a soda ash that when blended with oil made soap. The rich had bathing facilities in their places of residence while everyone else bathed in the Nile. The homes of the wealthy were airy and roomy. There were bedrooms, servant's quarters, halls, dining rooms - and BATHROOMS! [2]

Actually, a “bathroom” was usually a small recessed room with a square slab of limestone in the corner. There the master of the house stood or sat while his servants liberally doused him with water. However, there is evidence from excavating that there were wonderful large public bath houses with showers, stone basins and stoves to heat the hot water [2].



FIGURE -1. THE EGYPTIAN BATH

<https://www.thebathtubdiva.com/history-of-bath-tubs-bathing-part-3/> dated 29/10/2018

Egyptians loved bathing with essential oils and flower oils because they understood the power of aromatherapy!

Cleopatra, the last pharaoh of Ancient Egypt was renowned throughout history for her radiant skin and her stunning beauty. To keep her skin soft and beautiful she was said to bathe in milk [2].

The above paragraphs helped me to understand - how Egyptians treated bathing as daily deed to add quality to their life & how they explored the ways of enhancing the same.

BATHING IN GREEK AND ROMAN TIMES

Greek mythology specified that certain natural springs or tidal pools were blessed by the Gods to cure disease. Around these sacred pools, Greeks established bathing facilities for those desiring healing. Supplicants left offerings to the Gods for healing at these sites and bathed themselves in hopes of a cure [3].

Some of the earliest descriptions of western bathing practices came from Greece. The Greeks began bathing regimens that formed the foundation for modern spa procedures. These Aegean people utilized small bathtubs, wash basins, and foot baths for personal cleanliness as shown in figure 2. They established public baths and showers within their gymnasium complexes for relaxation and personal hygiene [3].

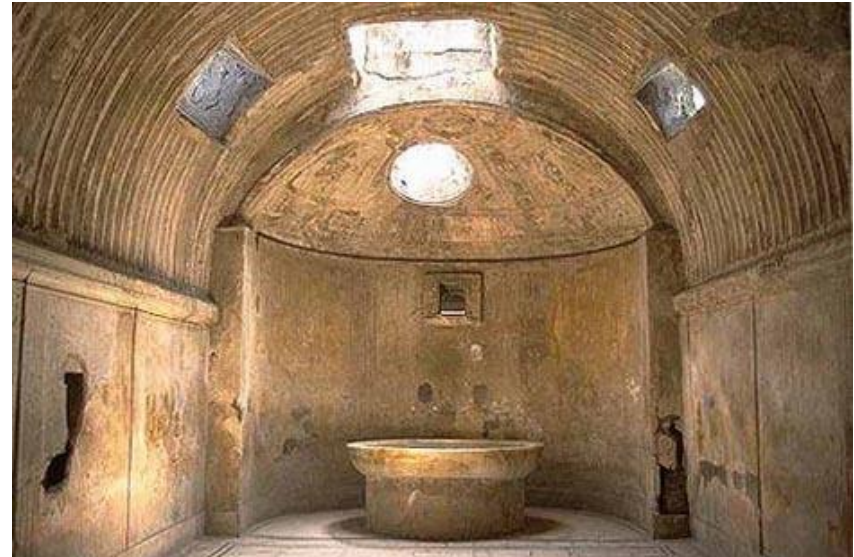


FIGURE-2. THE ANCIENT GREEK BATH TUB

<https://www.thebathtubdiva.com/history-of-bath-tubs-bathing-part-3/> dated 29/10/2018

Bathing played a major part in ancient Roman culture and society. Bathing was one of the most common daily activities in Roman culture, and was practiced across a wide variety of social classes. Though many contemporary cultures see bathing as a very private activity conducted in the home, bathing in Rome was a communal activity [2].

The above paragraphs helped me to understand -how , other than just bathing, showers and leisurely rituals progressed as a part of daily routine cleanliness in human history.

ANCIENT ROMAN BATHS

The Romans emulated many of the Greeks bathing practices, Romans surpassed the Greeks in the size of their baths. As in Greece, the Roman bath became a focal center for social and recreational activity. These Roman baths varied from simple to exceedingly elaborate structures, and they varied in size, arrangement, and decoration. One of the most popular is the bath of Trajan as shown in figure 3. In taking a Roman bath, the bather induced sweating by gradually exposing himself to increasing temperatures [3].

To accommodate this ritual, all Roman bathhouses contained a series of rooms which got progressively hotter. Most contained an apodyterium - a room just inside the entrance where the bather stored his clothes. Next, the bather progressed into the frigidarium (cold room) with its tank of cold water, the tepidarium (warm room), and finally the caldarium (hot room). The caldarium, heated by a brazier underneath the hollow floor, contained cold-water basins which the bather could use for cooling. After taking this series of sweat and/or immersion baths, the bather returned to the cooler tepidarium for a massage with oils and final scraping with metal implements. Some baths also contained a laconism (a dry, resting room) where the bather completed the process by resting and sweating [3].



FIGURE-3. BATHS OF TRAJAN, 104

www.crystalinks.com/romebaths.html dated 29/10/2018

The various parts of the bathing ritual, (undressing, bathing, sweating, receiving a massage, and resting), required separated rooms which the Romans built to accommodate those functions. The segregation of the sexes and the additions of diversions not directly related to bathing had direct impacts on the shape and form of bathhouses[3].

The above paragraphs helped me to draw inspiration from how the architecture then was changing with the change in the quality of functions in life to connect it in the present time.

PSYCHE OF BATH

In the busy modern age, bathing has become an increasingly functional part of our day to day lives, with many people opting for a quick shower to start the day, rather than a long drawn-out bath or extra relaxing shower. Of course there's nothing wrong with this, and as many of us spend our days rushing to simply get out of the door on time in the morning, it's not really any surprise [5].

But does bathing - whether it's a bath or a shower - offer us more than simply a functional way to clean? According to recent research, it may well do. Let's take baths for example, according to Neil Morris, a psychologist at the University of Wolverhampton, taking a bath may offer more than a way of just getting clean.

Talking about his recent research into the psychological effects of bathing, he said:

"I found that bathing improved general psychological wellness radically. There was a significant drop in feelings of pessimism about the future and increases in hedonic tone - the internal feeling of pleasurability ... and I believe that the results could be even more impressive over a longer period of time. Baths give you the chance to stop the day for a few minutes, in a way that showers can't. There is a wonderful combination of isolation, quiet and comfort [5]."

The above paragraphs helped me to understand the why bathing, practically, is more than just a daily habit of washing your body and the significant consequences of the same.

COLOUR

Colors in shower as emotional design

With the application of colour in the interior decoration for our homes, our home has become more habitable, more of a healing place and it has cosier spaces too. But all of us also spend a part of our day inside the washrooms and we cannot afford to miss on them when it comes to maintain a space regular personal use [6].

The application of the colour therapy in the bathroom design, by implementing the shower heads and the showers with colour led in the shower space are trending these days. Not only homes but luxurious Spas are also adopting such products to enhance the ambience for better customer service and user experience[6].

The above paragraphs helped me to understand the importance of colours in creating an ambience in the space like bathroom and their psychological impact on user experience.

Colors and their psychological impact

Orange

It relieves tiredness and enhances your mood against depression.

Yellow

It is a colour full of energy, which stimulates enthusiasm, and improves your mind and muscular tone.

Green

The benefits of what is natural. Both calming and encouraging, it provides serenity and helps you relax.

Blue

It evokes Tranquility. It produces a feeling of serenity and peace. It helps ease your muscle tension.

Purple

It is a colour which activates your imagination.

Indigo

It is the colour of creativity and inspiration.

Magenta

It increases blood pressure, regulates vitality and gets you going[6]

SHOWER

Research has shown that hot showers have multiple positive effects on the body, including the stimulation of a certain growth hormone that can help to rebuild damaged cells and speed recovery. On top of this, the steam from showers can have a detoxifying effect, helping you to sweat out unwanted substances. There is also research suggesting that hot showers can increase the level of oxytocin in your system, which can help ease feelings of stress and anxiety. The normal or cold showers can increase alertness, refine hair and skin, stimulate weight loss, improve immunity and speed muscle recovery, particularly after exercise[7].

Aroma

The change of smell and temperature simulates the perturbations of the nature. Aroma has a remarkable positive effect on our body and mind like it relieves physical strain, acts as antidepressant, boost memory, increases energy levels, speeds up healing, reduces headaches, strengthens immune system, regulates sleep, relieves pain, improves digestion[8]

Music

Music has the power to inspire and entertain, but it also has powerful psychological effects that can not only heal one's emotional state but also can improve your health and well-being. Some of the major mental benefits of incorporating music into your everyday life are- you feel more motivated, happy, and relaxed as a result[8].

Lighting

The colored lighting has ability to create or induce a temporary state of mind or feeling. The use of soft, calm and soothing qualities of color let your mind and body calm as one dips into the bathing.

The above paragraphs helped me to understand the importance of the combined effect of lighting, aroma and music along with the shower in changing the personality of water & how beneficial it can be.

DIRECTION OF LIGHT

The direction of a light source can transform spaces and impact the way people feel in the spaces. Lighting positioned above eye level can create a feeling of restraint, creating a more formal atmosphere. On the other side, lighting positioned below eye level can provoke a feeling of individual importance, creating a more informal atmosphere[6]. The table 1 below from the Illuminating Engineering Society (IES) shows various lighting effects and how they can impact a space:

PSYCHOLOGICAL IMPACT	LIGHTING EFFECT	LIGHT DISTRIBUTION
TENSE	Intense direct light from above.	Non-uniform
RELAXED	Lower overhead lighting with some lighting at room perimeter, warm color tones.	Non-uniform
WORK/VISUAL CLARITY	Bright light with lighting on walls and possibly ceiling.	Uniform
SPACIOUSNESS	Low light level at activity space with a little perimeter lighting and dark areas in rest of space.	Uniform
PRIVACY OR INTIMACY	Bright light on workplace with less light at the perimeter, wall lighting, cooler color tones.	Non-uniform

TABLE -1. EFFECT OF DIRECTION OF LIGHT

<https://www.tcpi.com/wp-content/uploads/2017/12/Psychological-Impact-of-Light-and-Color.pdf> dated 27/10/2018

The above paragraphs helped me deciding the lighting location and the illumination fashion for the design context of this project.

2

PROJECT DEFINITION

PRESENT SCENARIO

Generally people spends a lifetime buying their dream house. It's a huge individuals' investment. Same way they spends fraction of the amount invested on the interior also. Normally the interior is a one time finest investment and is very well thought from the owner's point of view. Hence any kind of even minor remoulding can create a big mess in the house leading to a halt in the repair area. For example concealed bathroom shower units. Any kind of minor repair can take around months occupying the area unused and adding discomfort indoors. On the other hand, we have boiler units installed inside the bathroom which are wall mounted. These unit are some time accessible for cleaning and to interact with if required, but mostly seen as space occupying, scaring or unpleasant sometimes. At heights, cleaning such units has always been an issue.



Image 2.1
Immersion
Heater
Rods

Cost:
Rs. 500



Image 2.2
Instant
water
heater
(1-3
Litres)

Cost:
Rs. 6000



Image 2.3
Storage
water heater
(6 Litres and
above)

Cost:
Rs. 15000

Target Gap

Image 2.4
Shower Head

Cost:
Rs. 20000



Image 2.5
High end
Shower Head

Cost:
Rs. 3 lakhs

FIGURE-4. THE TARGET GAP

On the one hand, we have products that are functional, affordable and are serving the purpose and, on the other are the products that are expensive, functional but create a sort of experience for the user. It's a huge gap between the two- wall mounted affordable just functional design and wall concealed luxuries emotional design as shown in figure above. With present pace of growing technology day by day, the time by which the most consumers are handed one is very small. So the collage of images above is indicating the same gap where this project is intended to intervene and come up with an emotional-functional design affordable over the high end products and yet User experience wise ahead of them.

EMERGING TECHNOLOGIES

Of smart phones & home appliances

These days, most electronic applications are also controlled by the smart phones. Let it be an indoor appliance or a portable speakers or a car chair, almost ever single service/product is being intervened the smart phone application for better ease and adding quality to our day to day life. The figure 6 shows how smart phones have managed to control almost all home appliance in present time.



FIGURE-5. THE CONTROLLING ABILITY OF A SMART PHONE
<https://www.bdshop.com/wireless-switch-for-smart-home-control-sonoff-basic> dated 5/11/2018

SMART PHONE WITH PROJECTOR

Lenovo smart cast is a smart phone that is under testing and yet not launched in the market. It projects screen on any surface as shown in figure 8. It has an interactive projection to operate the screen through projection. The small projecting facility is at the bottom of the phone as shown in figure 7.



FIGURE-7. LENOVO SMART CAST
https://1gr.cz/fotky/idnes/15/053/or g/JM5b8685_20150528_123855.jpg



FIGURE -8. LENOVO SMART CAST PROJECTING
<https://i.ytimg.com/vi/pRik7mAe4gM/maxresdefault.jpg>



FIGURE-6. VOICE CONTROLLED BLUETOOTH SPEAKER
<https://img.purch.com/dot-vs-googhome-cov-jpg/w/755/aHR0cDovL21lZGhhLmJlc3RvZm1pY3JvLmNvbS9DL0lvODAzOTYzL29yaWdpbmFsL2RvdF92c19nb29naG9tZV9DT1YuanBn>

VOICE CONTROL

Voice controlled UI is no more restricted to smartphones, rather it used in many applications like driving and monitoring automobiles, lamps, smart watches, smart TV , screens and PCs. Latest, Alexa built-in devices are being designed, in which user can control the device by calling or talking to Alexa. One of the example such application is **Alexa Echo Dot & Google Home Mini**, as shown in figure 6. Both are voice controlled smart speakers [13].



FIGURE-9. THE VEIL

<https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcRpERmrJoweJ9mCjM2LV5FUXBwFt6oFJBNH6jxDbfZOGVtLG430>

SMART WATCH PROJECTOR

A new prototype of the Lumi-Watch basically turns anyone's arm or hand into a touchscreen. The device was developed by researchers at the Carnegie Mellon University. The Lumi-Watch has 15-lumen projection modules and a touch sensor to give you a touchscreen interface that can be projected on your body [14].

INTELLIGENT TOILETS BY KOHLER - THE VEIL

It has following functions:

- UV lighting to sterilize and maintain hygiene.
- Adjustable temperature setting during extreme cold winter.
- Self-deodorization
- Heated seat with adjustable temperature settings
- Gesture based closing and opening of lid
- Noiseless shutting of lid
- Illumination for dark spaces
- Touch screen remote control

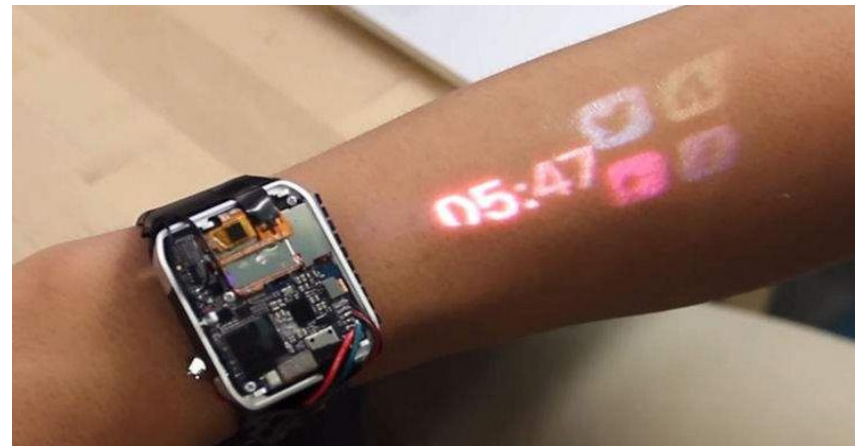


FIGURE-10. PROJECTING WATCH

<https://media0.mensxp.com/media/content/2018/Apr/this-smartwatch-can-turn-your-arm-into-a-touch-screen2-1525072574.jpg>

3

DESIGN CONTEXT

DESIGN CONTEXT

As the time flows, the world of humans is also progressing toward lots of changes and the world of these social animals soon to witness a distinct distributive change in their social life on societal grounds. An individualistic society is gaining inertia. They have small nuclei family. Now humans are adapting to fast automated life.

Days are no more spent setting, putting, getting things together directly but indirectly and in a smart, efficient and in a more reliable way with the help of Technological advances.

PERSONA

Mr & Mrs Desai

He is a general surgeon at Global hospital, Bangalore and she is a Deputy Bank manager at SBI Bangalore.

They have been married since last three years & are settled in Bangalore.

They are always with all their zeal and ambitious nature at work place.

Being very particular in nature, they always plan their day well to cope up with their work load.

They strongly believe in “professionalism” and do not discuss their work at home.

They are particularly very attentive and cautious of their mental and physical well being in all busy walks of their life.

They leave very early in the morning to reach work by time and are back to home late in the evening.

Many a times he returns home after performing the surgery and directly prefers to take bath and spend some time under quick rejuvenating shower.

They being a conservative kind like to spend sometime under shower, draining all his tiredness and anxiety. Water has healing powers they believe, adding to that its fun, relaxing, rejuvenating to body and distressing to mind.

And they are ready with all their zeal and fun-loving mood back at home.

But they, being a choosy and demanding professionals, are not happy with their latest shower-head system they have at home.

They feel it has something missing and demands a lot of attention to interact with.

They often discuss of what they thought of a mood freshening smart shower with all mystical lights and mesmerising sprays accompanied with some soothing and delightful music adding to their pleasure of water shower bath.

They expect that shower-head would understand & recognise them for their personal preferences and can work as ones body feels and the mind thinks.

They do follow some of the best modern faucet design brands hoping to get something like they discussed of.

Something that may not require the remodelling of their bathroom but can be displayed out to appreciate the presence of their dream product for an all-over exhilarating experience !

6

DESIGN OBJECTIVE & BRIEF

DESIGN OBJECTIVE

Next generation device for Bathing experience

DESIGN BRIEF

Operating Conditional Locations

- Urban sites/locations with ample of water supply is available for domestic usage
- People preferably having stored water in their housing/apartments

Target Users

- Transient young urban people who are working
- Modern parents and grand parents
- Nuclei urban families

Housing Pattern

- In apartments and individual houses where the bathrooms are modern or luxurious

Usage Pattern

- Regularly -twice a day for at least two family member

Maintenance

- Once in 6 months or an year

Configuration

- Instant water heating (Max. 3 l)
- Orientation - H, V or Both
- Customisable to music , graphics, looks and function
- Smart control

USP

- Emotional design with sense of comfort out of better product utility and interaction

Major Subsystems

- Heating system
- Piping system
- Shower unit

Micro Environment Of Use

- To be located inside the bathroom in an accessible manner

Income group

- Upper Economy Segment and Lower High Class

4

USER STUDY

USERS' PERSPECTIVE

The user perspective on what is missing on their experience part, adds to the design context thought of this project. Some of the key insight shared by users are mentioned below.

USER 1

Old father, who is retired now and spends a lot of time with his family,

Says-
Me and my wife would also prefer to use it but, I would like to gift one to my son.
These young generation is all in love with these automatic stuff.

USER 2

Amal, 22, who is a student,

Says-
I feel like controlling my boiler in a way it gives me hot water as I reach home so that I need not wait all tired for taking bath.

USER 3

Young Keerti, 24, who is an UPSC aspirant,

Says-
It bothers me to monitor heating water with immersion rod every time I have to bath. It is time consuming.

USER 4

Nilesh, 32, who runs a business,

Says-
Who would miss a chance to take shower in leisure and peace ... in my demanding life that's a time when I can feel relaxed and be less attentive.

USER 5

Vijaya, who is an assistant professor,

Says-
Its always an issue for my parents to operate one.
I want to control my boiler seating in my cabin from college itself.

USER 6

Sameer, 29, who is a software engineer,

Says-
I daily travel by local trains & it adds to my fatigue. Daily after coming home I prefer a ritualistic healing Shower. ..It adds a lot to my energy.

Following figures are indicative of the difference in bathroom planning with respect to wall mounted devices. Most piping layout are, by default, provided by builder to people in urban infrastructures, which sometimes pose an issue of mounting any appliance which needs an input or an outlet through piping or may differ from what user is in need of.



FIGURE-11
Water heater mounted at top corner of bathroom with almost not accessible to operator for people with shorter height.



FIGURE-12
Water heater mounted inside the bathroom in the corner at high height of 8.5 feet.



FIGURE-13
Switch of the wall concealed unit gets dirty in as it is located inside the bathroom.



FIGURE-14
Water heater mounted inside the bathroom in the corner at with all pipes obstructing space of users to access.

The above data helped me to understand the state of facility of shower and heating water at users' places and how it differs with the locality and building fashion in present.

A Survey conducted for identifying the Users' preference over formal expression, design approach, their expectations from the present facility of shower and heating at their homes and kind of product interface they are looking for, resulted in following ranking of the given alternatives.

**PARAMETER:
FORMAL EXPRESSION**

1. Innovative
2. Sleek
3. Minimal
4. Modern
5. Radical
6. Distinct

**PARAMETER:
DESIGN APPROACH**

1. Longish -like a sound bar
2. Flat - not protruding higher from wall
3. Triangular -that occupies the corner

**PARAMETER:
INTERFACE**

1. Audio controlled
2. Touch screen
3. Digital display
4. Analog controls
5. Only light indicators

**PARAMETER:
EXPECTATIONS**

1. Smart
2. App controlled
3. Combined shower
4. Music player or radio
5. Dancing lights
6. Backlight
7. Bathroom illumination

PROBLEM FACED BY USER

'I faced issue related to heated water temperature, sometimes it was too high as it caused redness on skin and sometimes it was too cold as gives me feelings that I was bathing in ice water. Only because of improperly mixing of hot and cold water'

'Fittings are difficult to clean at higher heights'

'It's like dabba...and collect a lot of webs on fittings in the corner'

'Carrying it while travelling is an issue'

'Uncontrolled temperature of shower'

'High electricity consumption'

'Space occupied is more and dominates the bathroom space'

'Feels very heavy'

'Cleaning the product is an issue'

'It hardly predicts the water supply failure'

The data obtained from the survey and the User interviews helped me to identify closely on what users' need & deciding my design directions.

5

FORM ANALYSIS

SYNCHRONIC ANALYSIS

Understanding 'wallmountedness' of wall mounted products

GROUP- General appliances

IMAGE COLLAGE-1

PHYSICAL FEATURES

FORMAL EXPRESSION

Clean edges

Strong

Continuity of surface

static

Confined space

Stable



GROUP- Kitchen appliances

IMAGE COLLAGE-2

PHYSICAL FEATURES

Clean edges

Continuity of surface

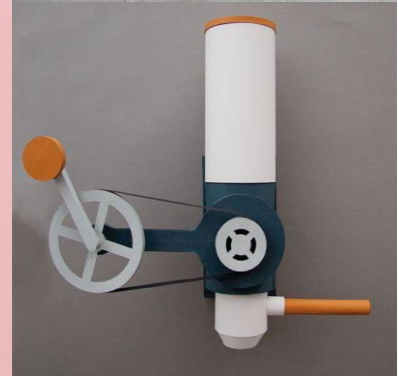
Slender body

FORMAL QUALITY

Precise

Delicate

Dynamic





GROUP- Bathroom/washroom appliances

PHYSICAL FEATURES

FORMAL QUALITY

Defined edges

Strong

Continuity of surface

Soft and gross

Less contact with wall

Delicate

IMAGE COLLAGE-3

GROUP- Living-room appliances

PHYSICAL FEATURES

Defined edges

Continuity of surface

Fillets and curvatures

Defined Surface

Contact

FORMAL QUALITY

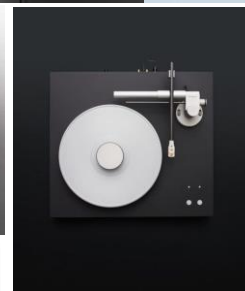
Strong

Stable and Strong

Soft and Dynamic

Stable and Reliable

IMAGE COLLAGE-4



DIACHRONIC ANALYSIS

Understanding 'wallmountedness'
of Inside-bathroom wall-mounted appliance.

Group : Cylindrical Body

PHYSICAL FEATURES

Uniform surface

Small and large fillets

Colour contrast

FORMAL EXPRESSION

Strong, soft and reliable

Adds to the integrity of body

Makes it look safe



IMAGE COLLAGE-5

Group : Compact Boxy Body

PHYSICAL FEATURES

Non-Uniform surface

Uneven fillets

Frontal seamlessness

FORMAL
EXPRESSION

Edgy

Soft and Stable

Strong

IMAGE COLLAGE-6

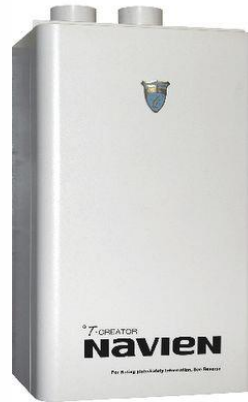
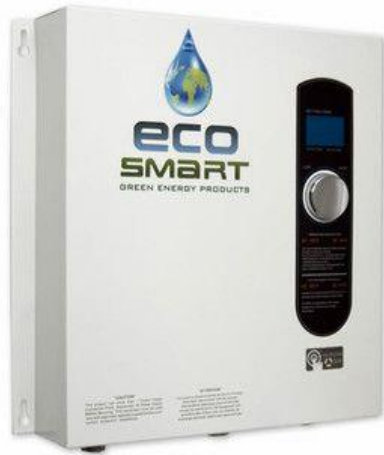


Group : Squared Body

PHYSICAL FEATURES FORMAL EXPRESSION

Uniform flat surface hard and reliable
Bends and fillets Makes it clean and modern
Defined edges Strong

IMAGE COLLAGE-7



Group : Distinct Spheroidal Body

PHYSICAL FEATURES

FORMAL EXPRESSION

Uniform surface

soft and reliable

Curvatures

Adds to the integrity of body and makes it appeal neat.

Tint

calm



IMAGE COLLAGE-8



KEY INSIGHTS FORM ANALYSIS

The desired device can be multi-orientable.

The desired device need not be boxy and confined.

Good interaction creates a sense of relief and comfort.

Well thought graphics can compliment the form and product interface.

Seamless bodies with balanced form and graphics are more visually pleasant and approachable.

CONCEPTUAL MAPPING

Conceptual mapping on various electric water heater form was done to understand the formal trends in electric water heater and to initiate with an approach for form development in respective expressions of chosen group.

Group:

Distinct-Innovative

Formal Expressions:

Sleek,
Innovative,
Minimal,
Modern,
Radical.



FIGURE-12 CONCEPTUAL MAPPING

10

IDEATIONS

Brainstorming

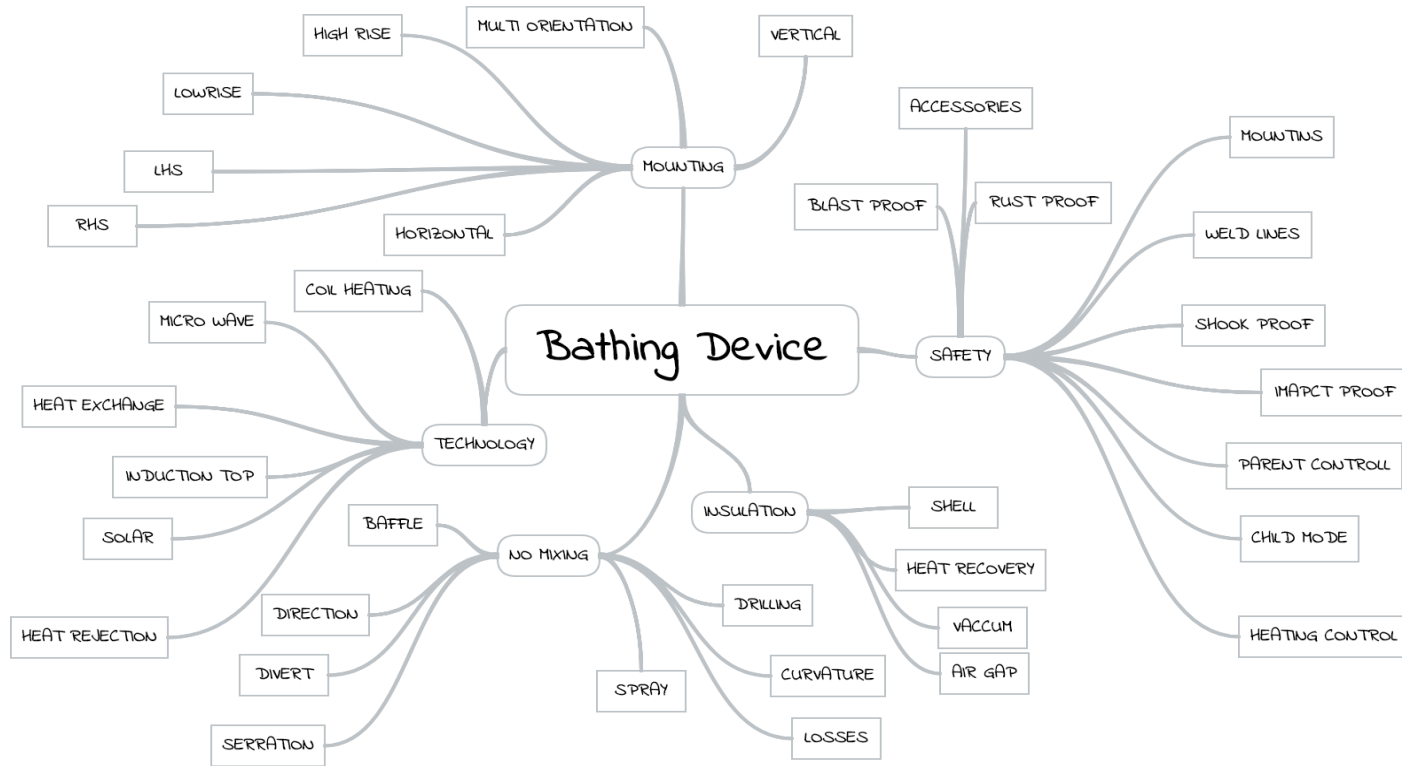


FIGURE-12 BRAIN STORMING PART 1

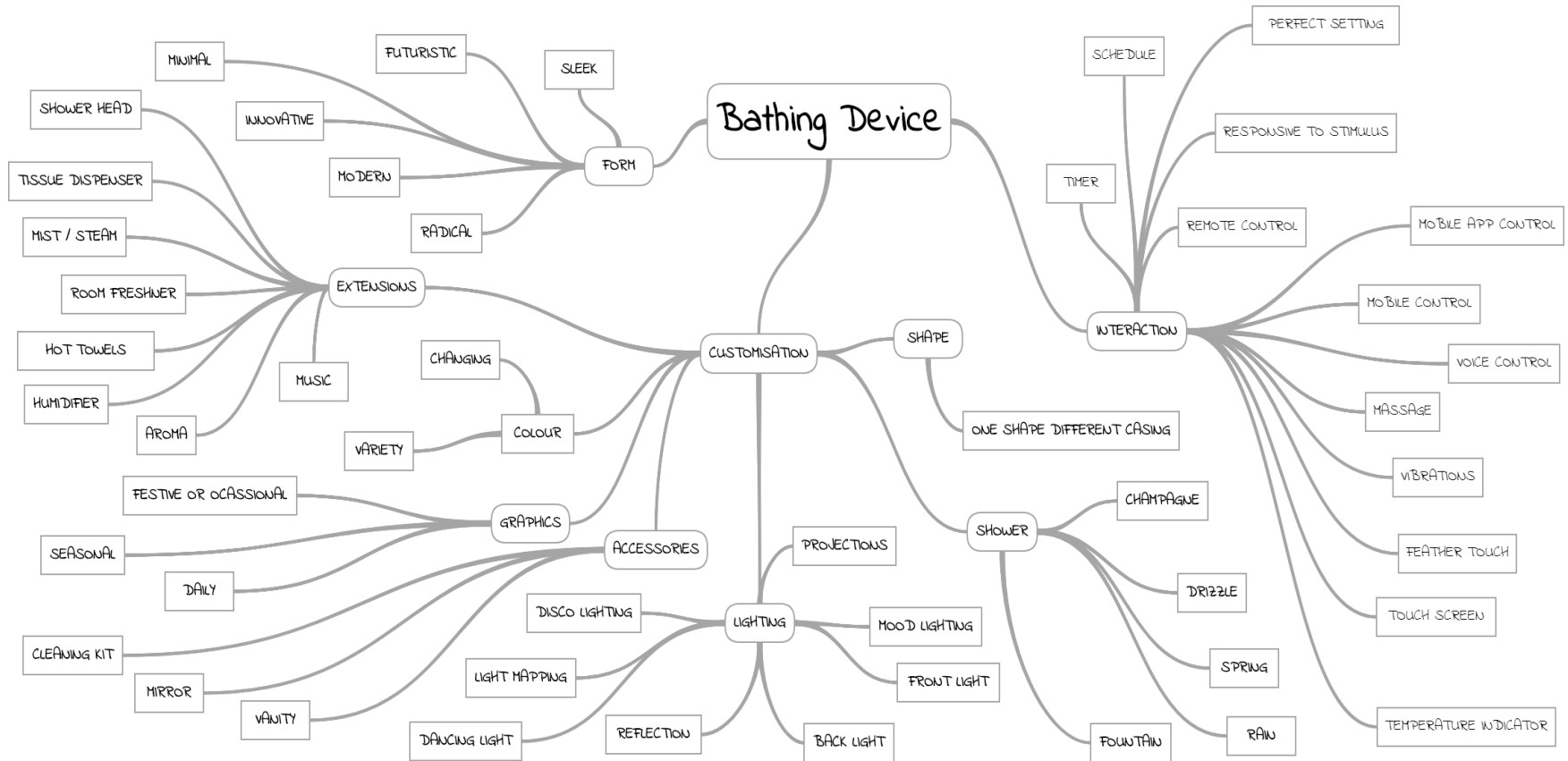


FIGURE-13 BRAIN STORMING PART 2

MOOD BOARDS & IDEATIONS



FIGURE-14

Fine surface finish



FIGURE-15

Smooth transition in cross-section

FIGURE-16



Fluid & Glossy surface



FIGURE-17

Strong continuous reflections



FIGURE-18

Seamless regular surface

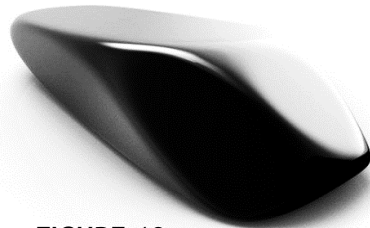
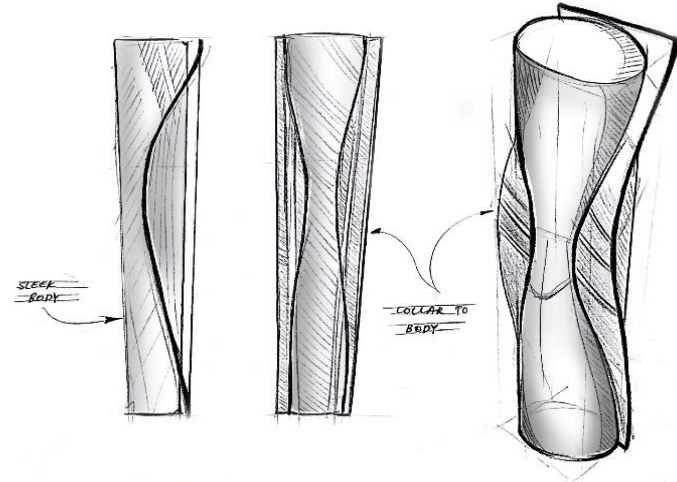
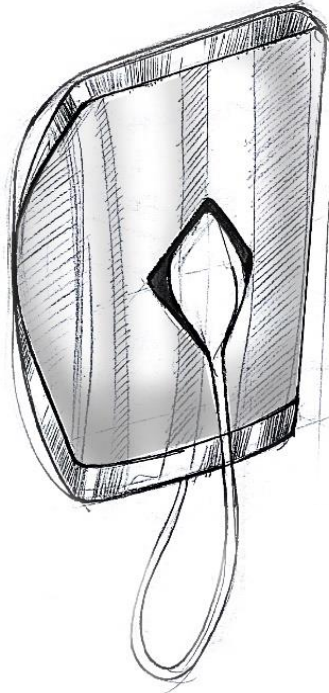
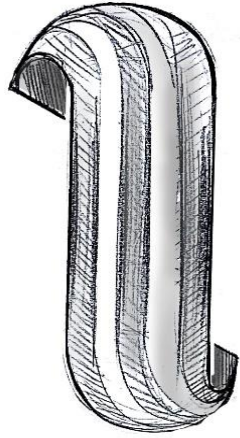


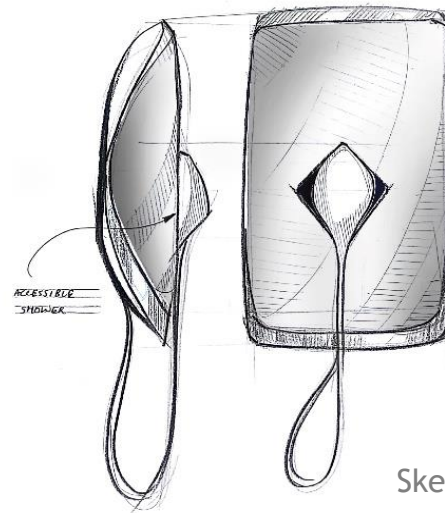
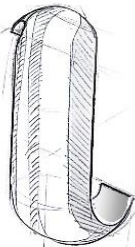
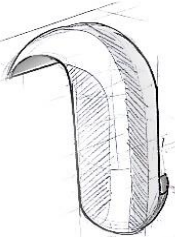
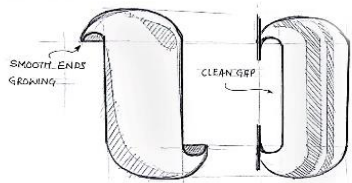
FIGURE-19

SLEEK

Sketch 1



Sketch 2



Sketch 3

INNOVATIVE

Unconventional



Integrity in structure



Regular but novel

FIGURE-23

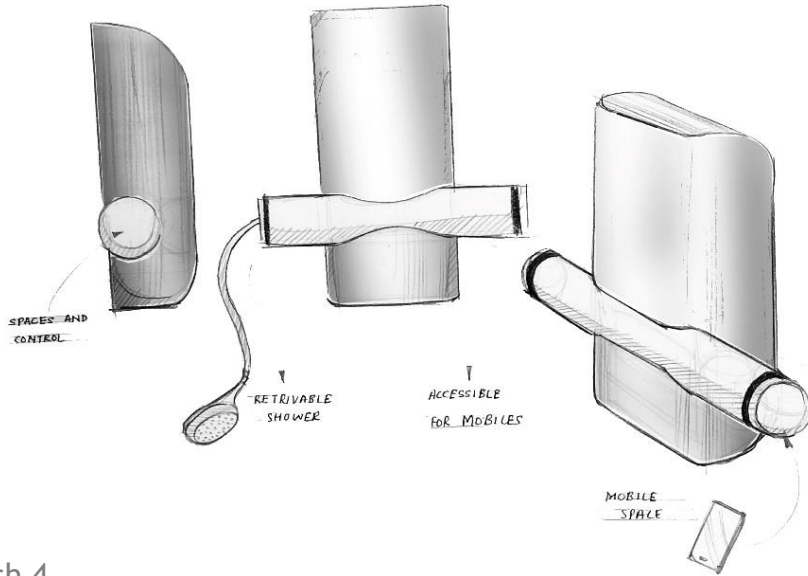


Smooth transition in cross-section

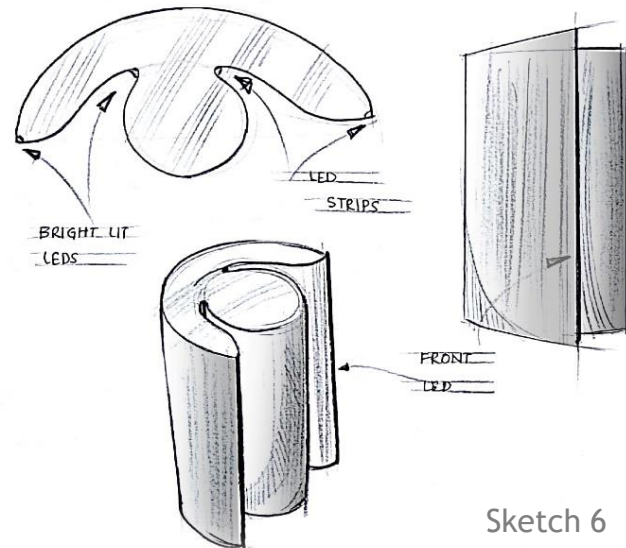
FIGURE-24



Defined continuity in transitions



Sketch 4



Sketch 6

Sketch 5

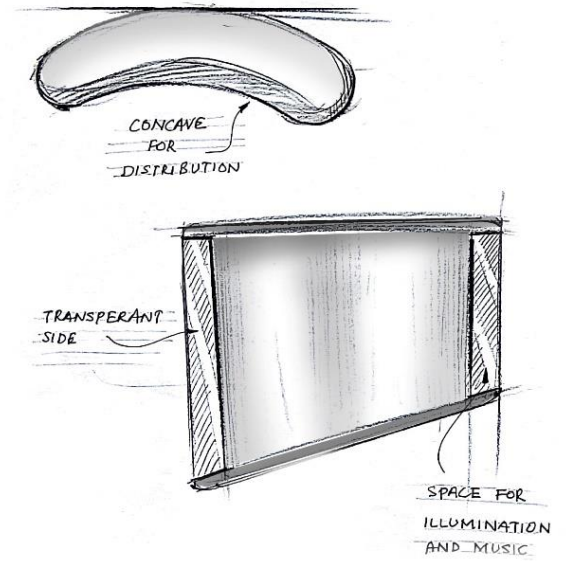




FIGURE-25

Exploration in use of different materials



FIGURE-26
Clean and dynamic



FIGURE-30



FIGURE-27

Hints manufacturability



FIGURE-28

Colour tones achieved by edges, bends or curvatures are prominent



FIGURE-29

Retro features with balanced simplicity

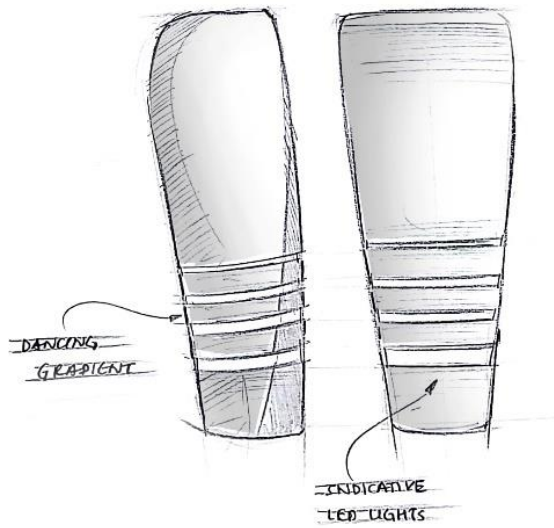


FIGURE-31

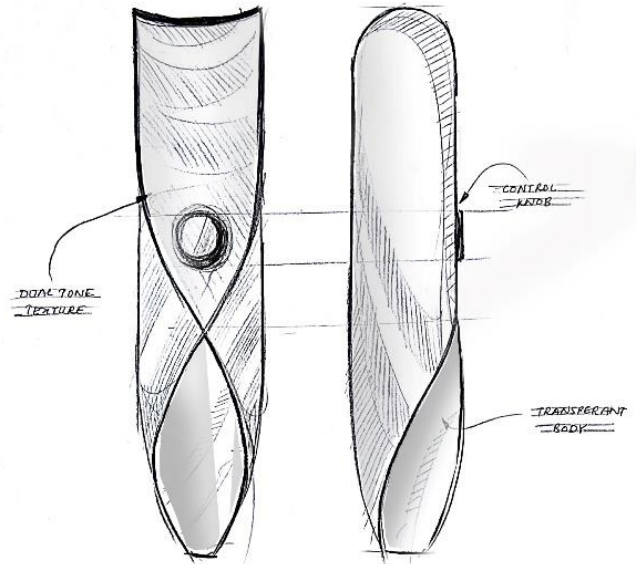
Metallic elemental making a statement

Defined strong edges

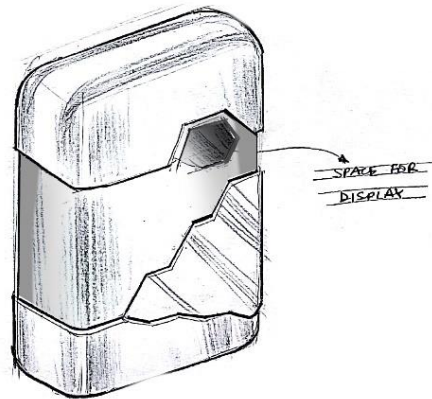
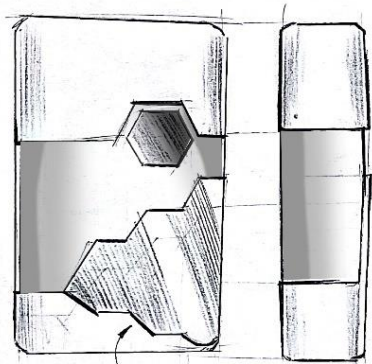
MODERN



Sketch 7



Sketch 8



Sketch 9

Subtle transitions in volumes

FIGURE-33



Matt finish



FIGURE-32

FIGURE-34



Basic forms

Clean joints

MINIMAL

FIGURE-35



Transparency

FIGURE-36

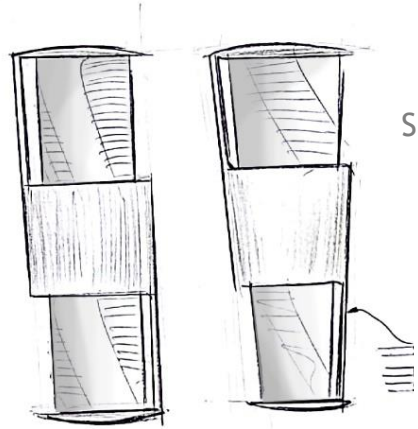


Pastel colors

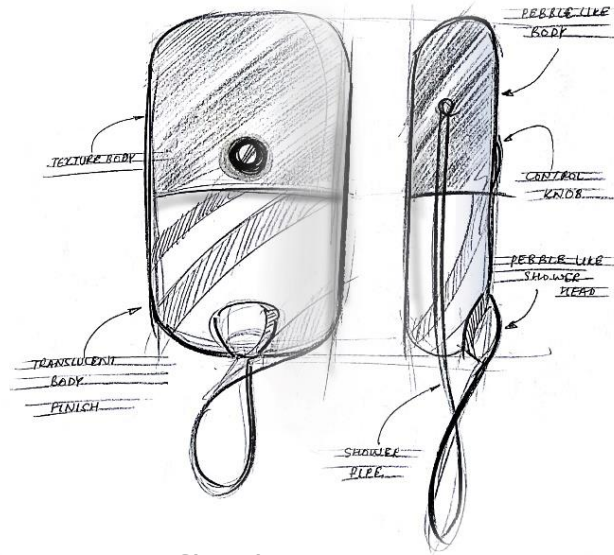
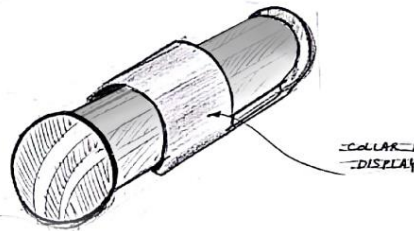
Smooth surface and least colour combinations

FIGURE-37

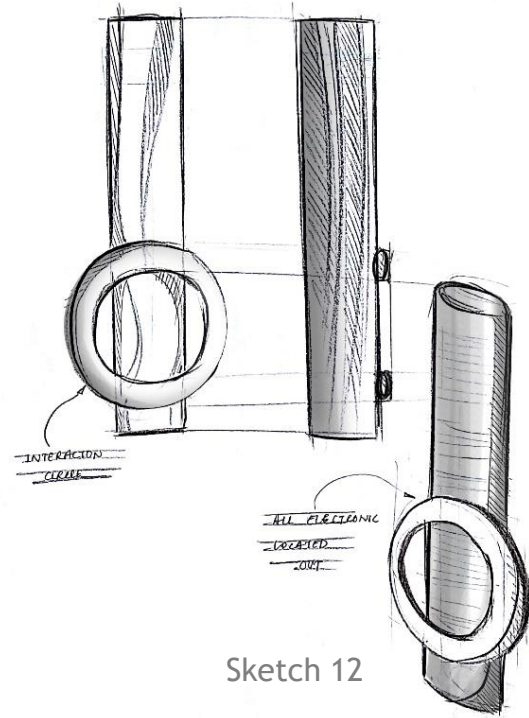




Sketch 10



Sketch 11



Sketch 12

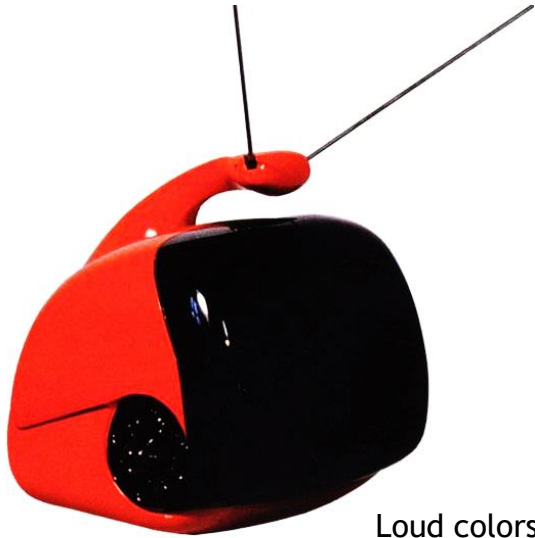


FIGURE-38

Loud colors

FIGURE-40

Funky



FIGURE-42

Gross Crude and raw



Humor with semantics

RADICAL



FIGURE-39



FIGURE-41

Precisely missed

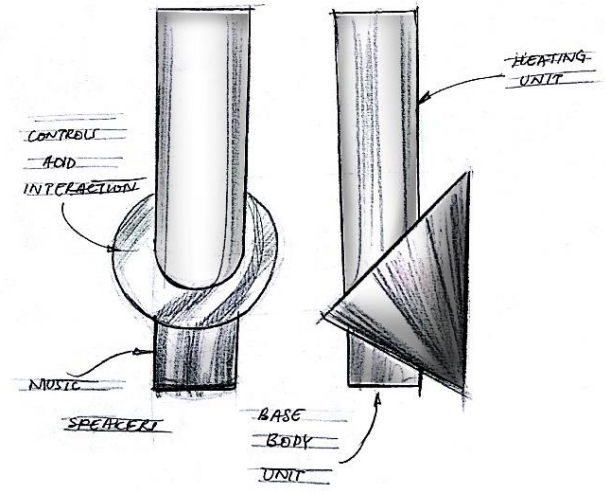


FIGURE-43

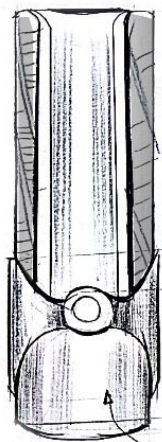
Personification



SLICK
BODY WITH
CONTROLS



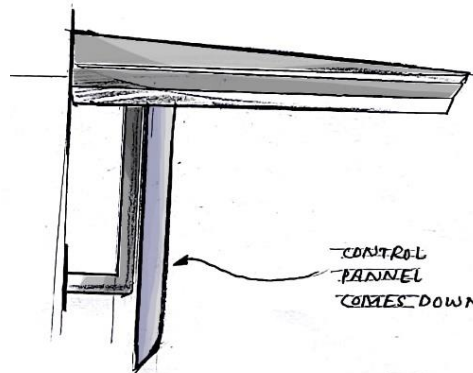
Sketch 13



METALLIC
BASE
BODY



TRANSPARENT
BODY
ENLARGED
KNOB



CONTROL
PANEL
COMES DOWN

Sketch 15

Sketch 14

8

CONCEPTS

Concept I

Inspired from Cantilever Beam

The idea was to create a openable and a cantilever —like mounted system, that would open to user's proximity and operate if required.

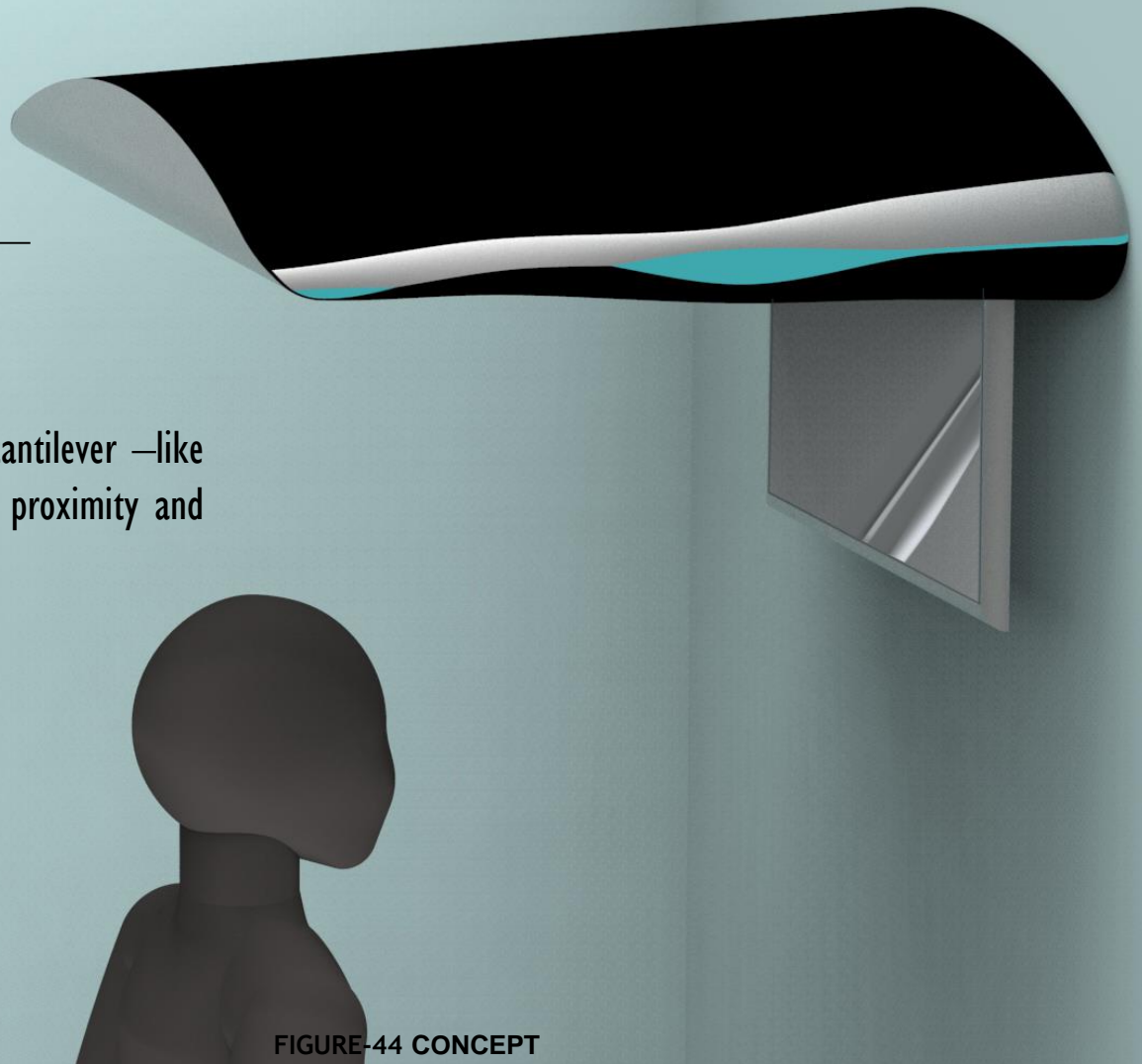
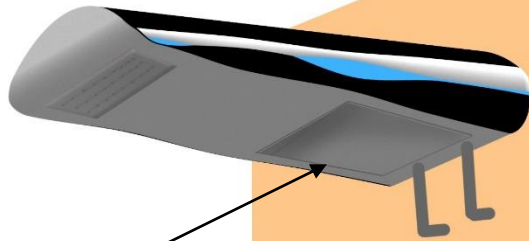


FIGURE-44 CONCEPT

FIGURE-45

The screen panels is closed confined in the body



LEDs

The screen panels opens up and the LEDs are lit.

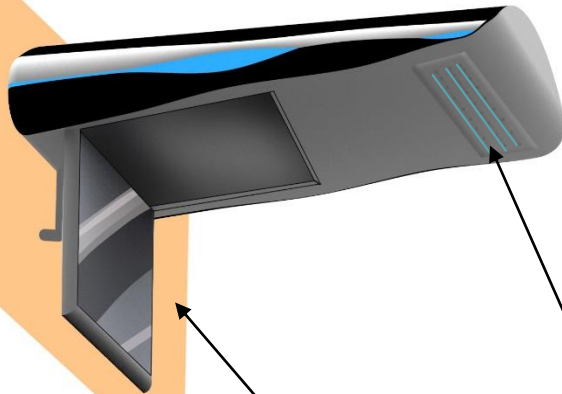
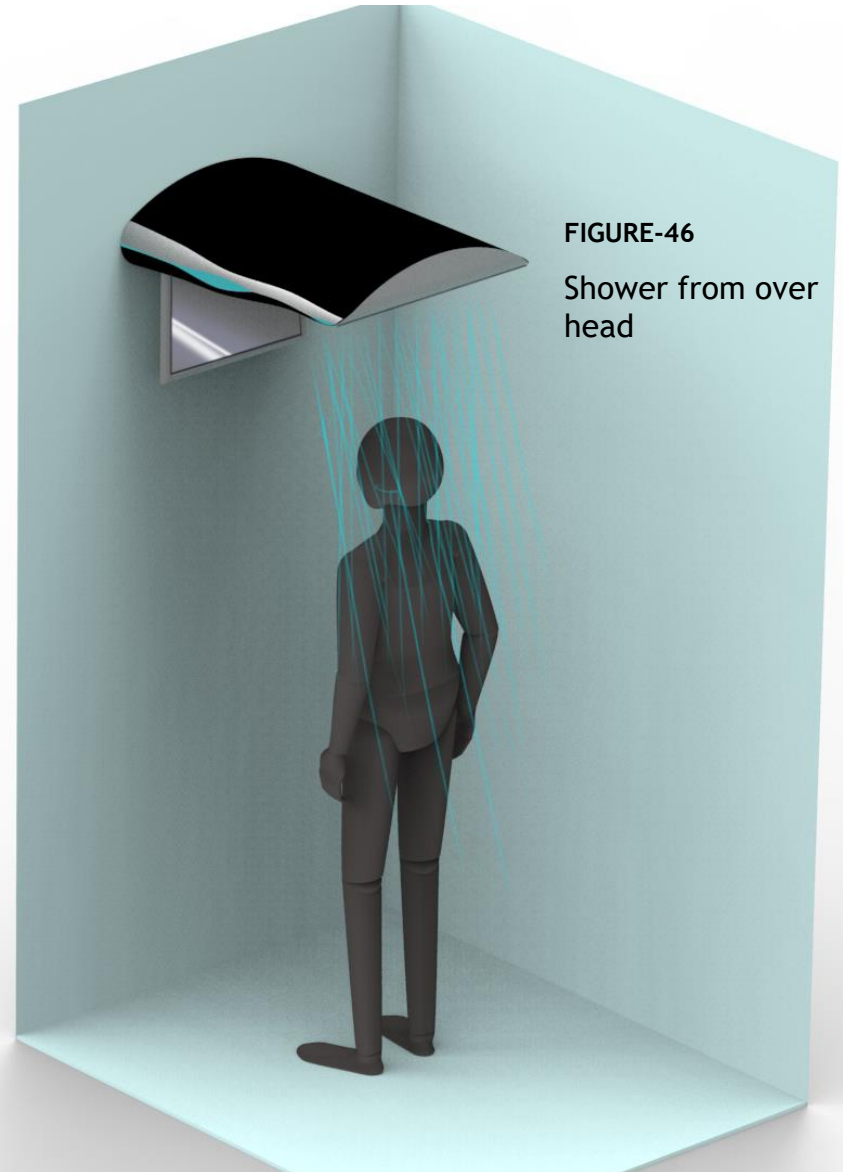


FIGURE-47

FIGURE-46

Shower from over head



Concept 2

Inspired from Steering wheel

The idea was to create a minimal design with simple forms and novel appeal.

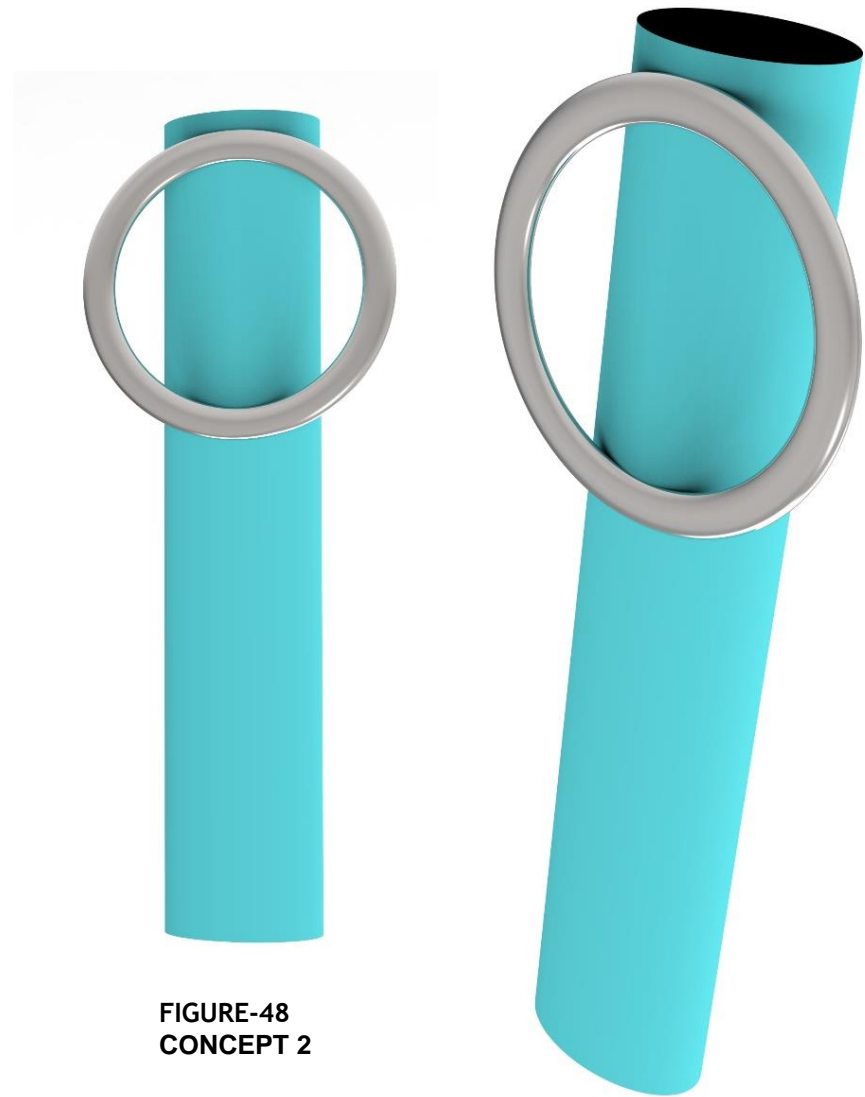


FIGURE-48
CONCEPT 2

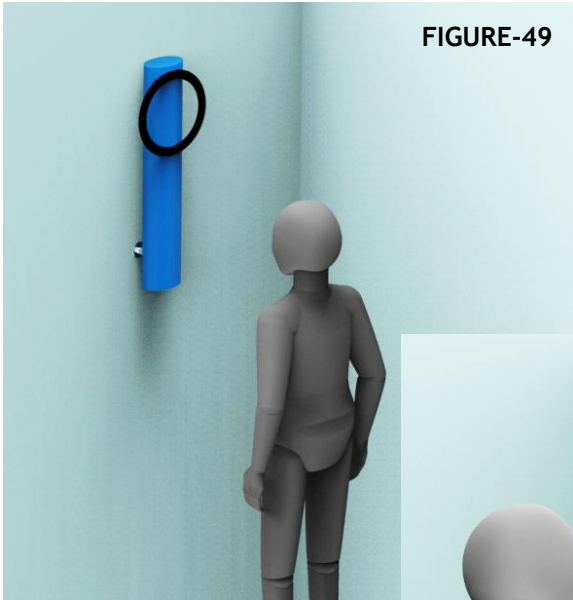


FIGURE-49 Senses the presence of user

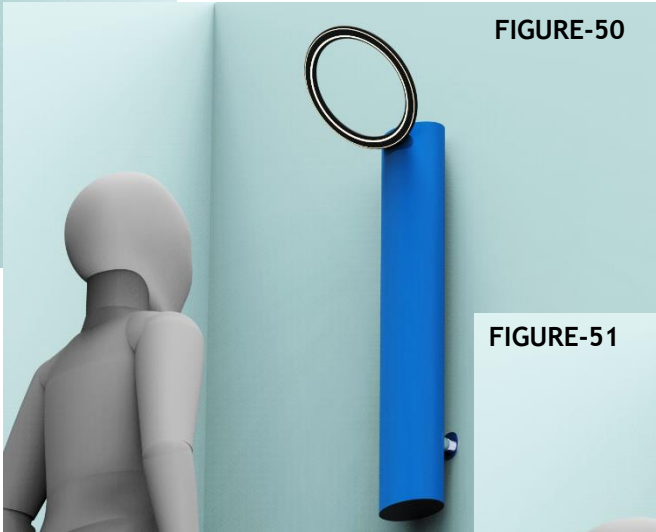


FIGURE-50 Opens up to indicate the shower head



User can operate with the screen



FIGURE-52
CONCEPT 3

Concept 3

Inspired from Geometric Intersection

The idea was to create a design that would make a loud statement by form inspired from primitive geometric volumes and intersections.

FIGURE-53

Touch sensitive smart screen

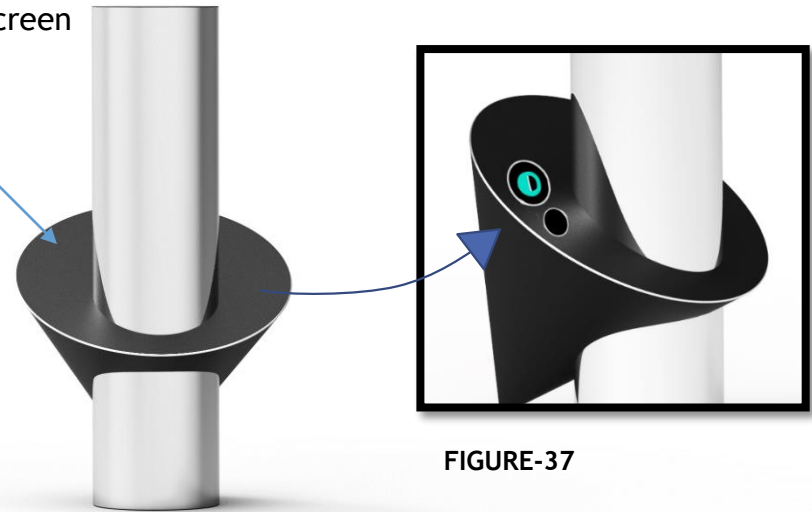


FIGURE-54

Observable elevation

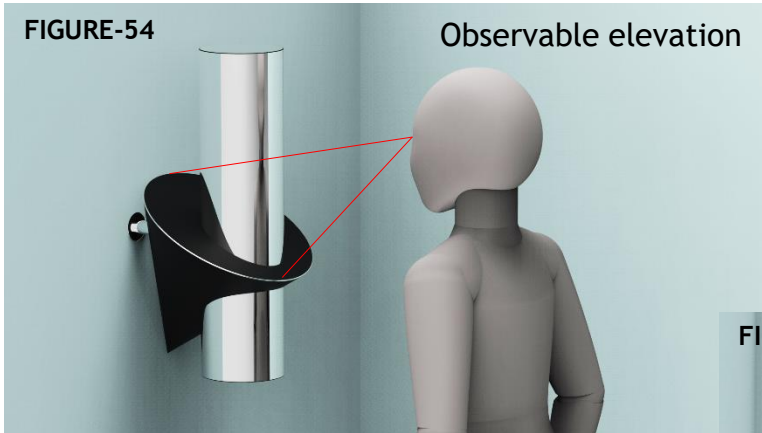
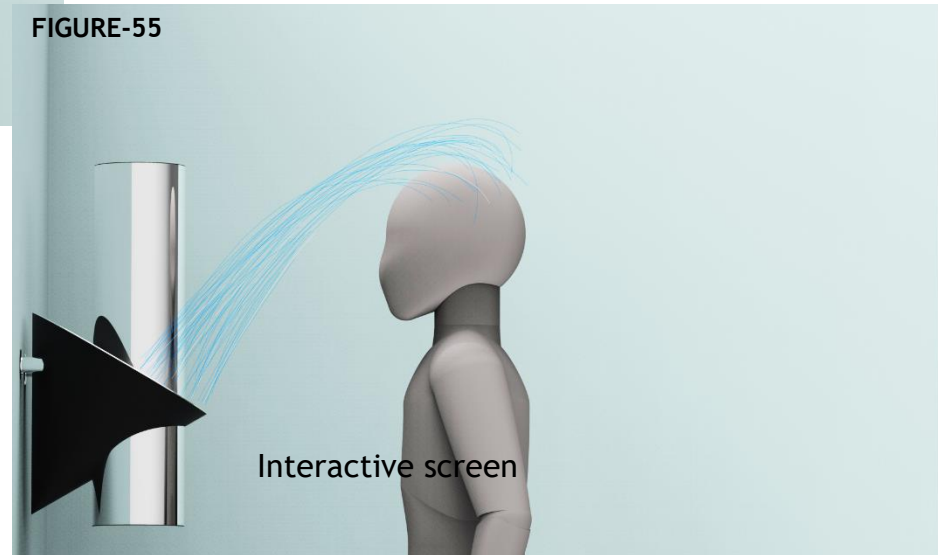


FIGURE-37

FIGURE-55

Interactive screen



Concept 4

Inspired from CNC controls

The idea was to make use of dedicated space by the structure of the form. The form is inspired from the CNC controls that are big enough to comfortably grip.

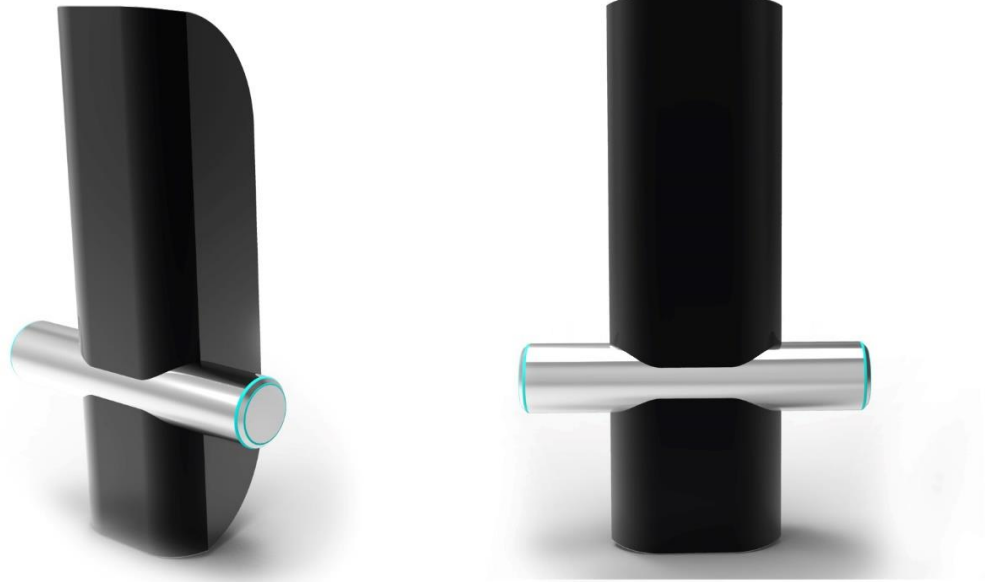


FIGURE-56. CONCEPT 4

FIGURE-57

Light
glows to
sense
user
presence

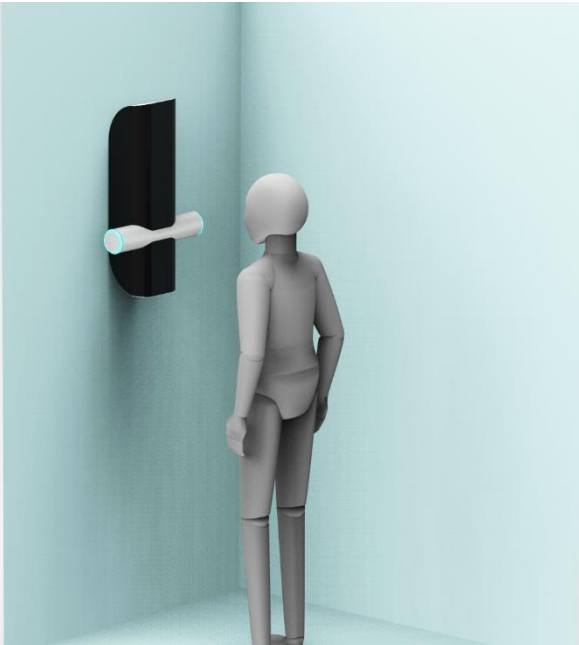


FIGURE-58

Interactive screen

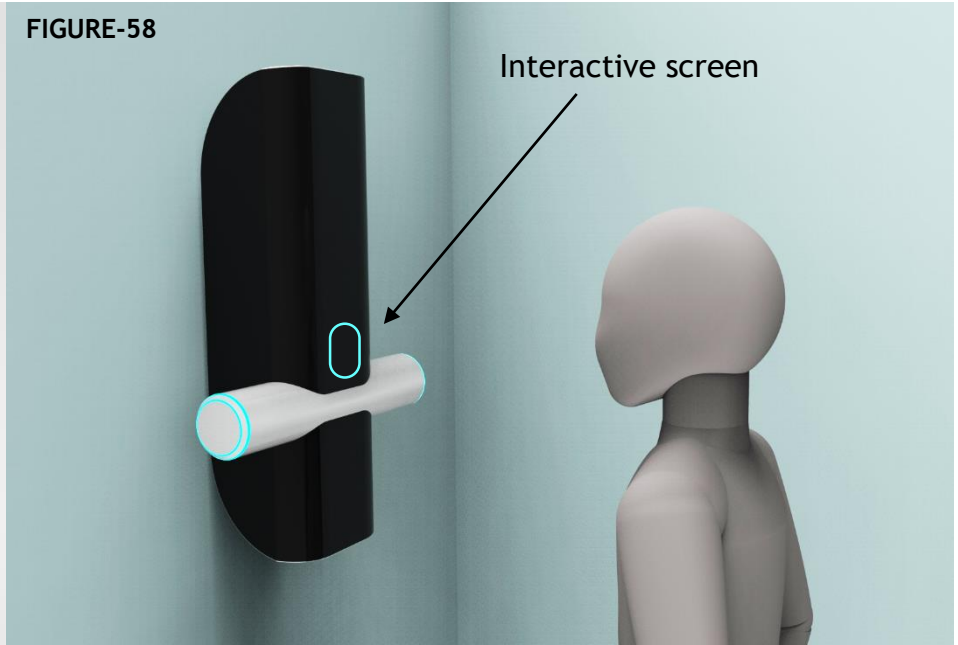
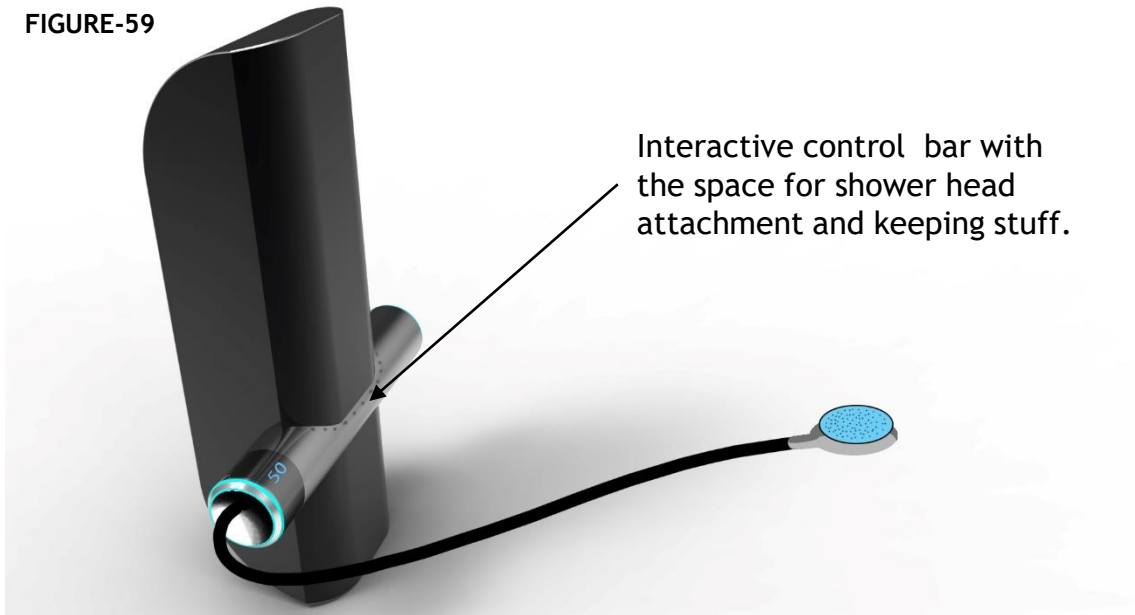


FIGURE-59

Interactive control bar with
the space for shower head
attachment and keeping stuff.



Concept 5

Inspired from Sea Cucumber

The idea was to through some mass out of boring confined volumes and the fluid collar was inspired from the sea cucumber gills to enhance the form.

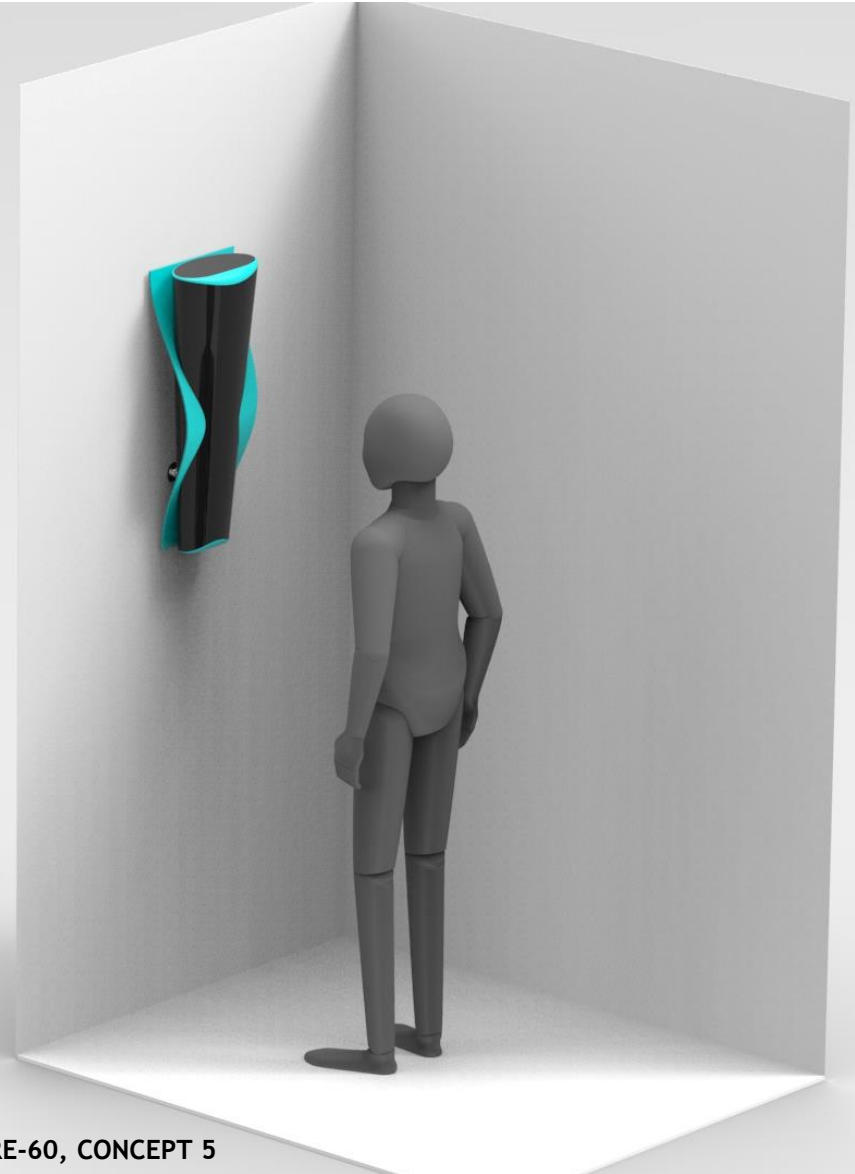


FIGURE-60, CONCEPT 5

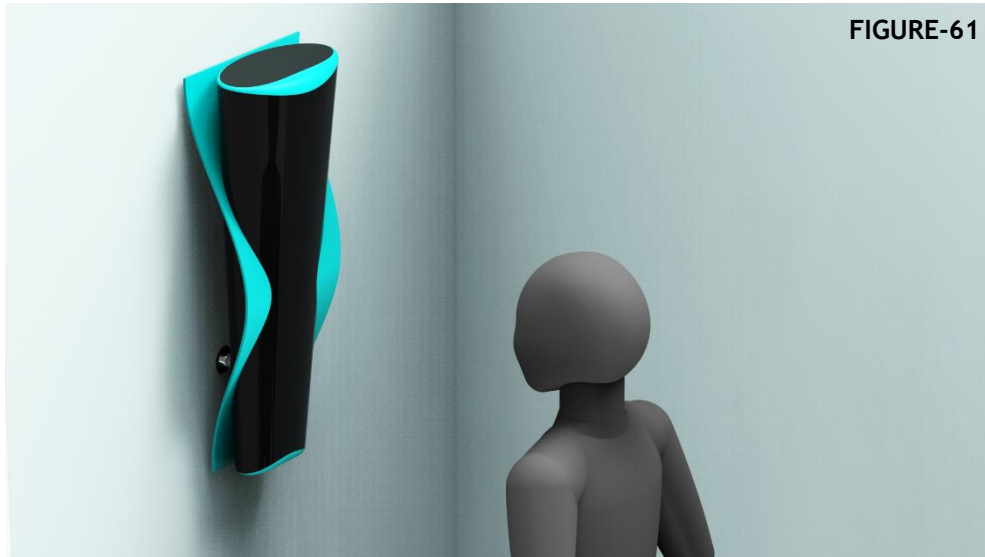
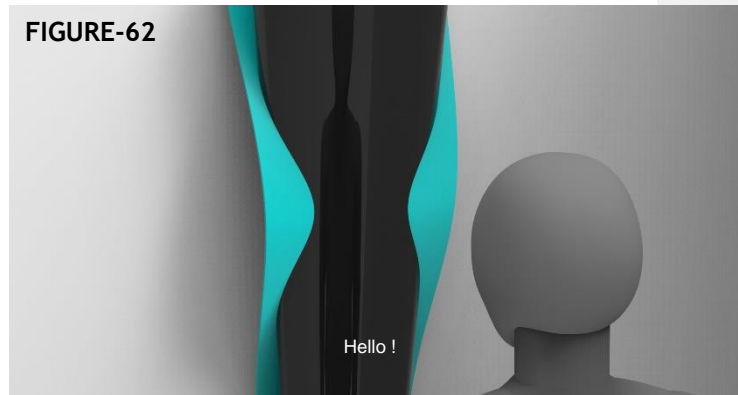
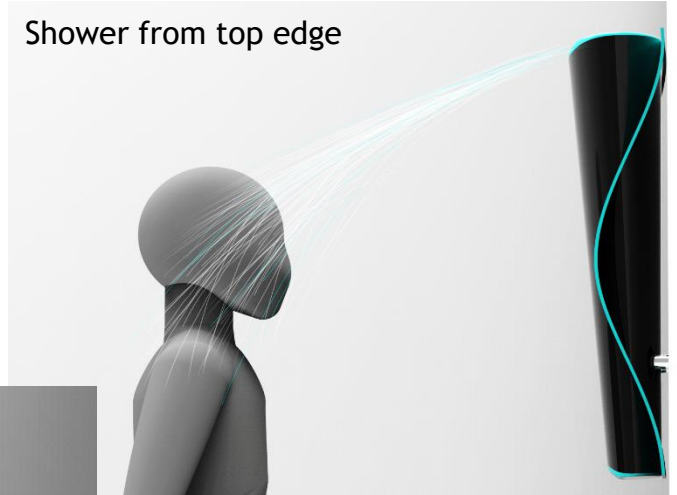


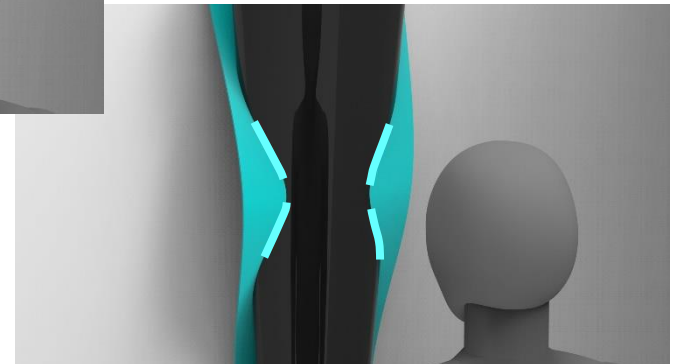
FIGURE-64



Interactive screen

FIGURE-63

Dancing LEDs



9

CONCEPT EVALUATION

SWOT ANALYSIS

SWOT analysis was done for understanding the strengths and weaknesses of each concept before giving them a score as shown in table 2.

PARAMETERS	STRENGHT	WEAKNESS	OPPORTUNITY	THREAT
Concept 1	Unique way of space consumption	Mounting factor and exposed screen	Illumination out of huge surface area	Lacks visual security
Concept 2	Minimal and clean form	Looks too slender for vertical orientation	Good distribution of interface is possible	Cleaning accessibility is lacking
Concept 3	Breathing space around the body makes it comfortable visual	Only vertical orientation is possible	Good surface available for projections and display	Sharp converging bottom
Concept 4	Sorted space for electronics is possible	Water exposed to control is most	Expanding and shrinking control bar	Display bar prone to damage
Concept 5	Unconventional formal appeal	Only vertical orientation is possible	Collar has a practical functional aspects to it	Screen in front can get damage if impacted

TABLE -2 SWOT ANALYSIS

CONCEPT EVALUATION

All the concept are rated, as shown in the table 3 below, on a linear scale of 5 being the highest rating and 1 being the least rating

Parameters	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5
Form	3	4	3	3	4
Customisability	3	3	3	4	4
Usability	3	4	3	4	4
Manufacturability	4	4	2	3	4
Total	13	15	11	14	16

TABLE -3 CONCEPT EVALUATION

10

FINAL CONCEPT

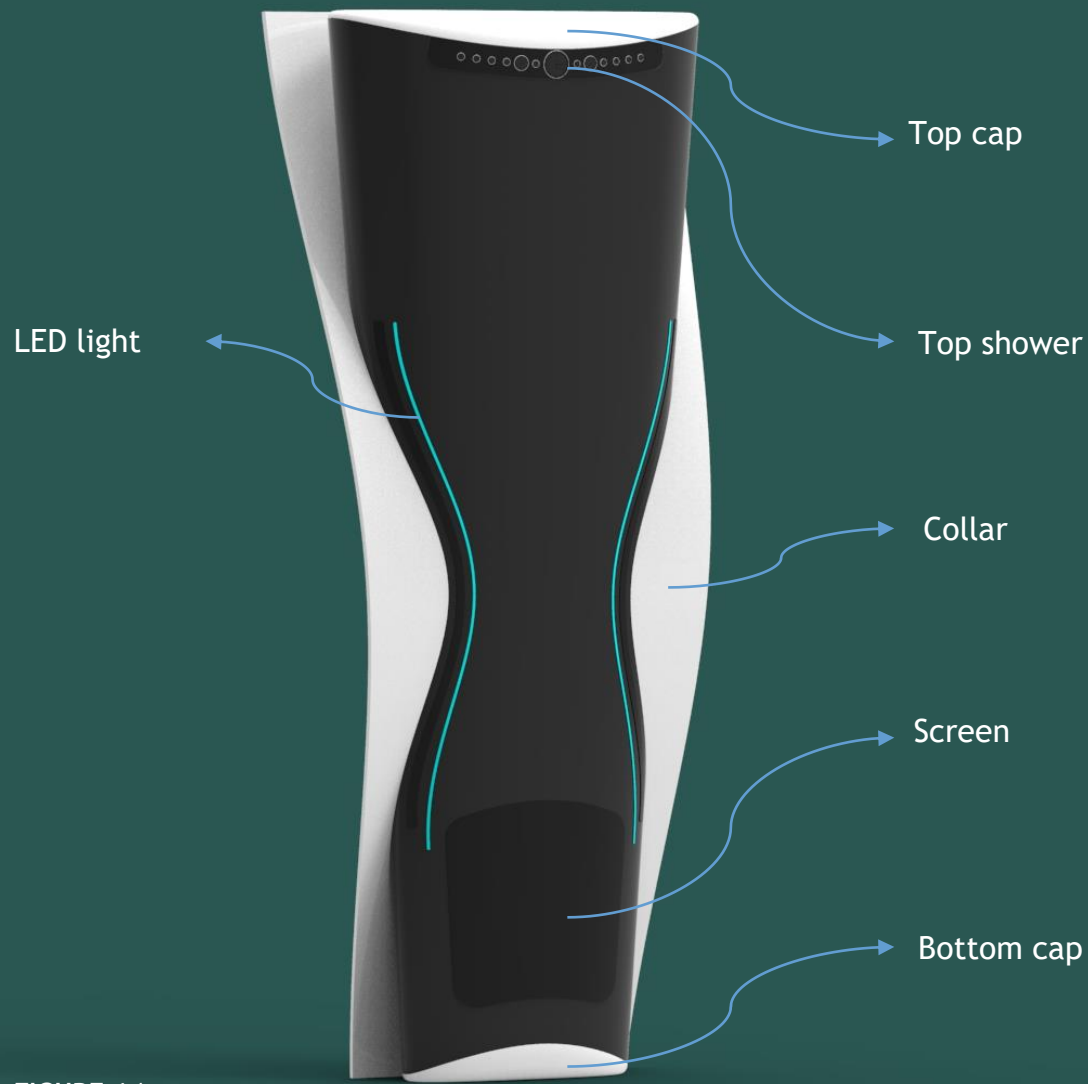


FIGURE-64

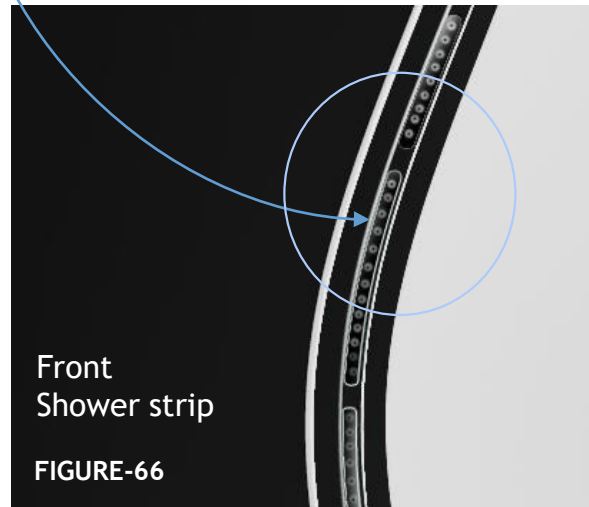
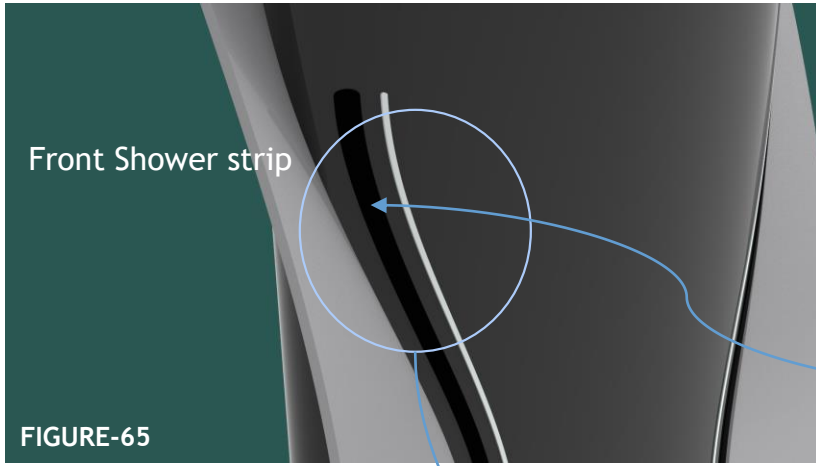


FIGURE-68

Music speaker

Aroma dispenser

LED strip illumination

FIGURE-69

Screen when off

FIGURE-70

Top shower nozzles

Front shower nozzles

FIGURE-71
Touch Screen control



Screen customisable to users, choice and smart enough to greet you

FIGURE-72 TOUCH SCREEN INTERACTIVE INDICATION



FIGURE-73 GREETINGS ON HOME SCREEN





FIGURE-74 ON/OFF STATE

The product would start gradually with the users proximity. For the closest proximity, it would show screen shown in figure 75 and would turn from dark to the lit state, as shown in above figure, as the user would gradually approach it.



FIGURE-75 BASIC HOME SCREEN

As shown in above figure, the basic home screen would greet the user and provide with for three following options:

- Finger print scan to activate user desired preferences. The preferences would be set through an mobile phone application where the user have to register himself/herself.
- A shower option to take bath. The interface regarding this option is shown in figure 76.
- A settings option to set the parameters as required on the spot.

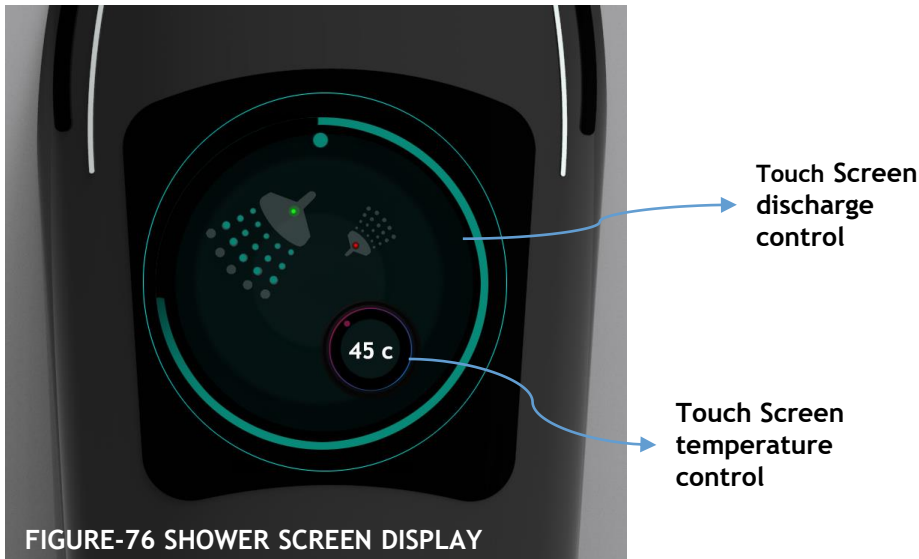


FIGURE-76 SHOWER SCREEN DISPLAY

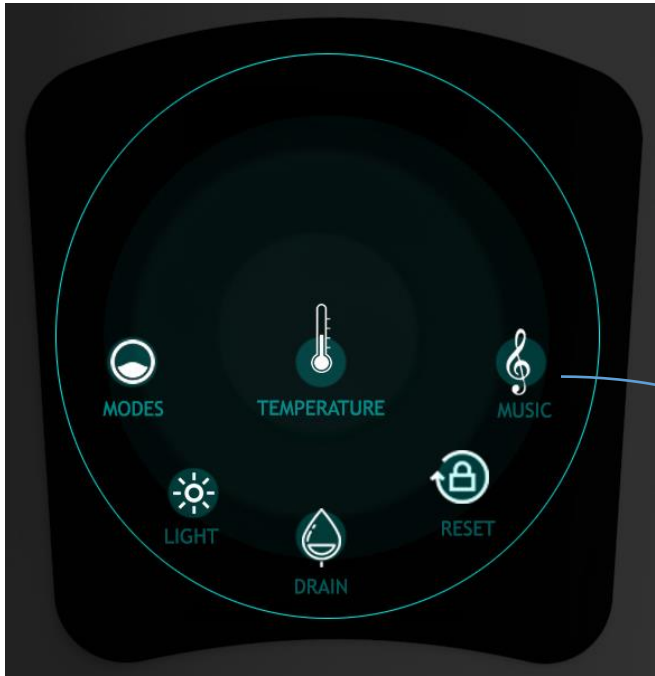


FIGURE-77 FURTHER OPTION UNDER SETTINGS MENU

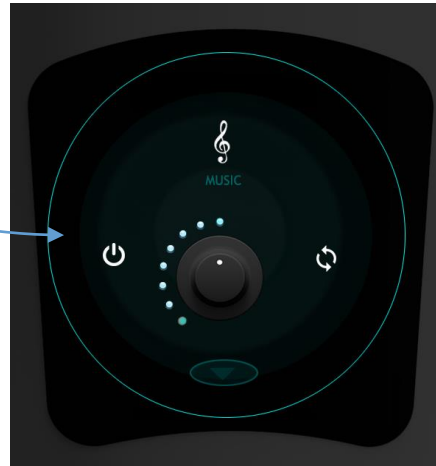


FIGURE-78 MUSIC MENU



FIGURE-79 LIGHT MENU

Figure 77 shows the options within the setting menu. It will allow users to change shower modes through MODES menu, illumination through LIGHT menu as shown in figure 79, control music through MUSIC menu as shown in figure 78 and the user can RESET or Drain the device with the respective options and password if required, as shown in figure 80.



FIGURE-80 DRAIN MENU



FIGURE-81 SCREEN DISPLAY MESSAGE AFTER USER IS LEAVING



FIGURE-82 TURNING OFF SCREEN

In the end, the user can turn off functions with voice command or manually through the screen. To device would then, display a message and turn off gradually as shown in above figures.



FIGURE-83 SCREEN TURNED OFF

BASIC DIMENSIONS

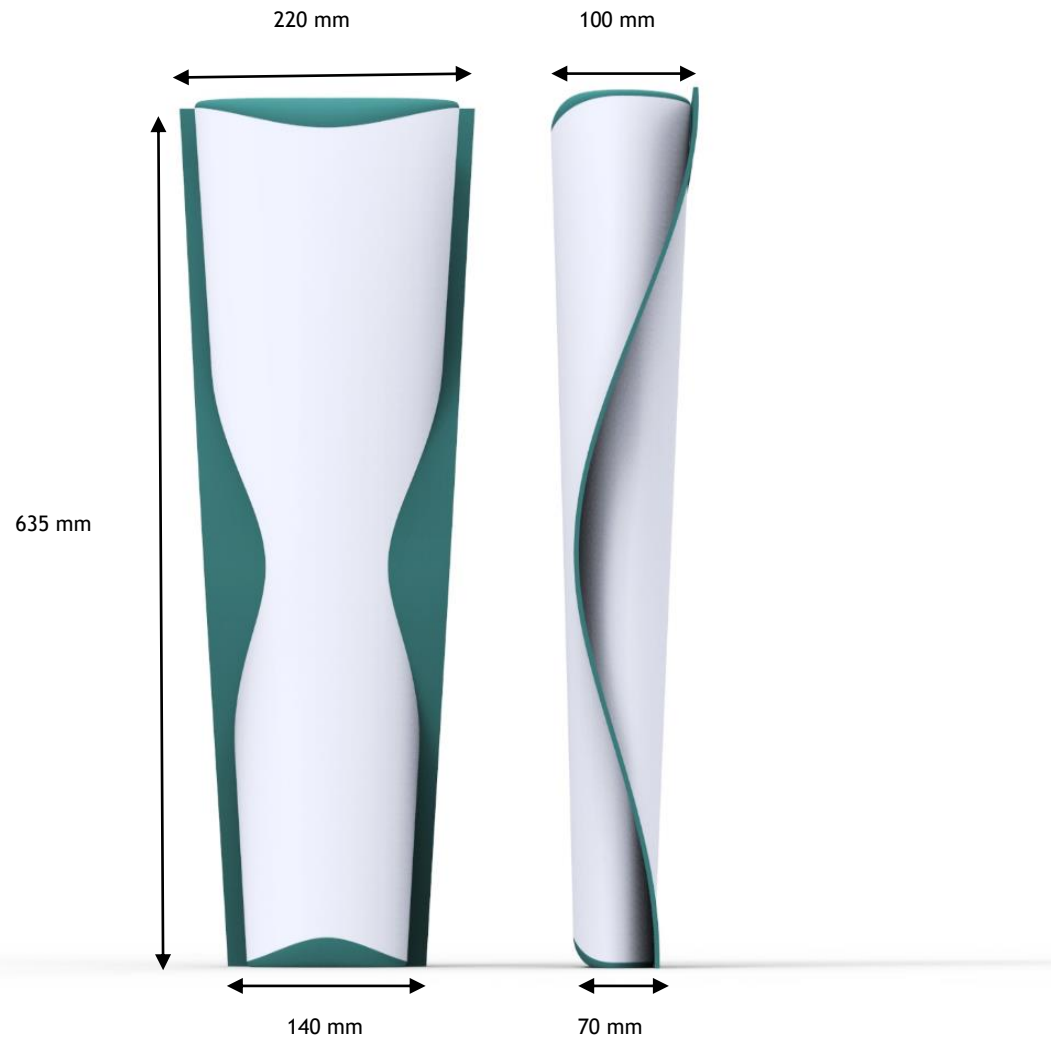


FIGURE-84 BASIC DIMENSIONS

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25. Human Dimensions And Interior Space by Julious Panero and Martin Zelnik
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