Lifestyle and Lighting

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May 2005

Acknowledgment

I would like to thank my guides Prof. Suresh Sethi and Prof. Ravi Pooviah for their support, guidance and above all the freedom to explore and make this endeavor an enjoyable experience. These last few months would not have been possible without either of you, my sincerest gratitude for your help, encouragement and strength.

I would like to thank my friends anup, deepa and vichu for their constant help and support during the course of the project.

My heartfelt thanks to the workshop staff- kini, patils (both Ceramic and CNC), krishna, george, singh and everyone else for their help.

Thank you mum, pap, jeecko and lubna for your patience.

Approval Sheet

Industrial Design Project III Titled ‘Lifestyle and Lighting’ by Thomas George is approved for the partial fulfillment of the requirements for the postgraduate degree Master of Design in Industrial Design.

Guide:

Chairperson:

Internal Examiner:

External Examiner:

Content

Intent

understanding the qualities of light both natural and man made

study the aspects of light that are linked to our well being

exploring the possibilities of creating a synergy between the light and various other sensory stimuli

experiencing light through an intimate interaction

creating an ambience that enhances both personal reflection and social togetherness

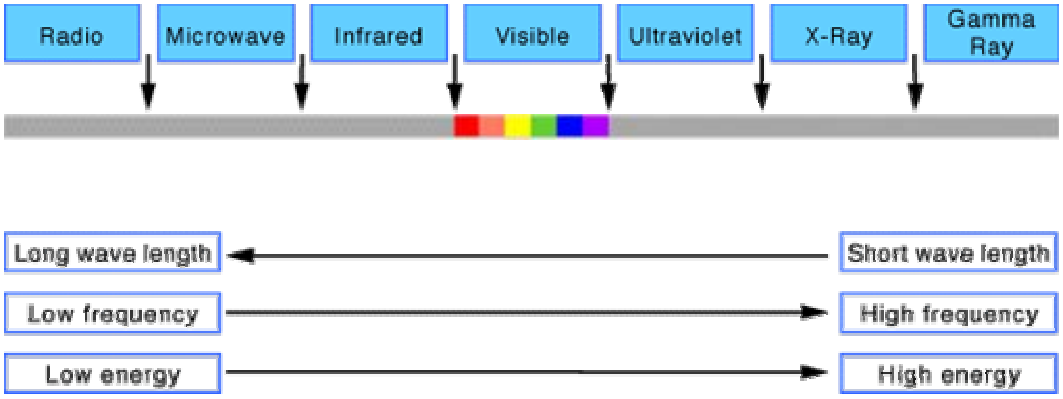
Abstract

Light is fundamental to life. At the simplest level, light enables us to enjoy the world around us and carry out a myriad of visual tasks. It can create a psychological mood of delight or melancholy, or one that is stimulating or soporific. Lighting may affect our performance. It is also believed to affect our health, although the link is not yet well established. However, it is felt that by providing a visual amenity, people's feeling of 'well-being' will be enhanced and their performance increased.

1. Study of Light and Lighting

1.1 Science of Light

The wavelengths of the light we can see range from 400 to 700 billionths of a meter. But the full range of wavelengths included in the definition of electromagnetic radiation extends from one billionth of a meter, as in gamma rays, to centimeters and meters, as in radio waves. Light is one small part of the spectrum.



1.2 Classification

The main source of naturally occurring light is the one we are most familiar with - the Sun. However this is only available for an average of 12 hours a day. To provide light at other times, as well as deep within the caves they inhabited, early man had to look to other sources.

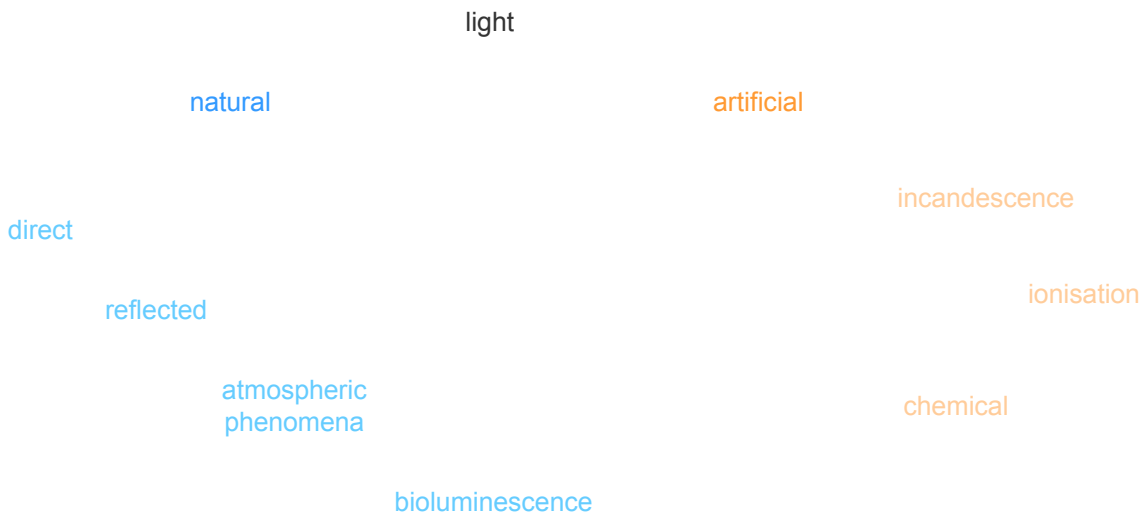
There are a wide range of naturally occurring light sources in nature other than sunlight and daylight. These include lightning, the occasional Aurora Borealis display, bioluminescence and pyroluminescence. Early man turned to the only one of these sources that was readily controllable, pyroluminescence or the light produced during combustion. Up until the mid-nineteenth century this was the only significant source of man-made night light available, produced in a variety of ways ranging from campfires and oil lanterns to the much brighter and more recent gas lamps.

With the development of electricity came the development of electric lighting. One of the first attempts to produce electric light was by Warren de la Rue in 1820, however it wasn't until 1880 that the first commercial installation of an electrically powered lighting system occurred on the steamship Columbia, with land-based businesses finally taking to Edison's new invention in 1881. Since then there has been significant scientific development in the field of artificial light. Whilst by far the majority are based on electricity, there has also been developments in chemical, thermal and radioactivity based systems.

Light sources come in countless forms but conveniently divide into two main categories: natural and artificial light sources.

Natural light sources are the Sun, the power plant of the entire solar system, and plants and animals that produce light in an equally natural and efficient way.

Artificial light splits into two categories: light produced by incandescence, whether by carbon particles in a candle flame or a white-hot filament in a light bulb, and light generated directly by photons as a result of ionization or chemical activity.



1.2.1 Natural Light

The Sun is the power plant of our solar system and a fairly typical star compared with other stars in the Galaxy. The energy, thus the light emitted by the Sun is generated by fusing hydrogen atoms to form helium. In so doing, energy is released in immense quantities. The Sun radiates to Earth 10,000 times the amount of energy the world population consumes.

The Moon produces no light of its own, because it has no source of energy unlike the Sun. Moonlight is all secondary light generated by reflected sunlight. Reflecting only about 7% of the sunlight that strikes its surface, the Moon is not a very efficient light source either.

Stars, like the Sun, produce light by nuclear fusion. Almost 80% of the stars weigh only a tenth of the Sun's mass and have less than one hundredth of the Sun's luminosity. But a lot of stars are much more luminous than the Sun, and most of them can be seen with the naked eye although they are light years away.

The ever-changing light pattern associated with the variation in daylight throughout the day creates a stimulating visual effect.

1.2.2 Bioluminescence

On an infinitely smaller scale, an interesting phenomenon of natural light is bioluminescence, light produced by a living organism. There are bioluminescent plants as well as animals, the most well known example being the firefly. But in the deep ocean many species also have glowing spots on their bodies. In the rainforests too, there are species of glowworms and earthworms, and even plants such as mushrooms that are bioluminescent.

Bioluminescence is caused when a highly fluorescent substance, called luciferin, is mixed with an enzyme, luciferase, in the presence of oxygen.

In the presence of oxygen, luciferaces convert the activated luciferin to a higher energy level. As the excited electrons quickly return to a lower level, they release energy as faintly green fluorescent light. This way of producing 'cold' light - a flight of fireflies produces no more light than a candle - is nevertheless very efficient. Almost 100% of the energy produced is converted into light.

1.2.3 Artificial Light

Early artificial light was always produced by incandescence of carbon particles in an open flame. The earliest forms of artificial lighting were the open fires. The first lamp - invented around 70,000 BC - was a dish of stone containing moss dipped in vegetable or animal oil.

Wicks were later added to control the rate of burning, a primitive way to control the service lifetime of the light source. Torches too - wooden sticks dipped in oil or covered with cloth dipped in a similar fuel were used as 'handy' light sources.

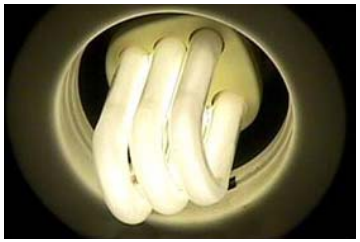
Around the 7th century BC, terra cotta oil lamps started to replace handheld torches. All types of vegetable oil or byproduct greases and other animal fat oils were used as fuel. A major problem was to obtain a sufficiently liquid fuel to be wicked.

These primitive oil lamps were succeeded by the wax candle. To increase the light output and protect the flame, the lantern - equipped with a primitive reflector protected by a front glass - was invented.

All by all, the efficiency of a candle, oil lamp or lantern remained low. The luminous intensity of a candle as a point source being but a 1 cd.

Oil lamps

Incandescent bulb



Fluorescent lamp

To boost the efficiency and control the light output of the oil lamp, in the 18th century the central burner was invented, a major improvement. The fuel source was now enclosed in a metal container, and an adjustable metal tube was used to control both the rate of the fuel burning and the intensity of the light.

Incandescent lighting

The principle of the incandescent electric lamp was developed by the American electrician Moses G. Farmer in 1858–59 but his design was not practicable. Sir Joseph Swan in England and Thomas Edison in the United States, working independently, developed lamps of this kind; the lamp patented by Edison in 1879 was the first widely marketed incandescent lamp and was the forerunner of the modern incandescent lamp that utilizes a tungsten filament sealed in a glass envelope that is either evacuated or filled with inert gas.

Fluorescent lighting

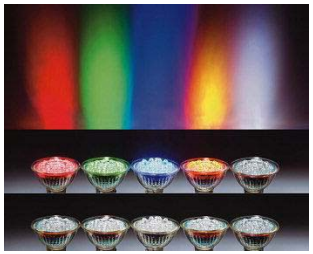
Next to the incandescent lamps, the fluorescent lamp is one of the most widely used types of lamp. Unlike the filament lamp, in which as much as 95% of the energy consumed is converted into unwanted heat, the photonic operation of the fluorescent lamp generates very little heat. Consequently, it is extremely efficient at converting electrical energy into light, the principal reason of its worldwide success.

HID Lighting

High Intensity Discharge lamps (HID)

High-intensity discharge lamps work on the same basic principle as discharge lamps that photons of light are released by an electric current flowing through a metallic vapor. The process is very efficient in terms of light output against power consumed. Light photons are produced at precise wavelengths that are dependent on the metal present. Lamp manufacturers use a mix of metals to obtain the required light color and characteristics for a given lamp type. HID lamps produce an extremely high light output; they are efficient and have a high luminous intensity and excellent lumen maintenance.

LEDs



Light Emitting Diodes (LED)

LEDs (Light-Emitting Diodes) are solid-state semi-conductor devices that convert electrical energy directly into light. Light is generated inside a solid crystal material, when current flows across the junctions of different materials. The composition of the crystal material determines the wavelength and therefore the color of light. LED ‘cold’ generation of light leads to high efficacy because most of the energy radiates within the visible spectrum. LEDs can be extremely small and they also have a longer lamp life than other electrical light sources. The major benefit of LEDs is their long service life of up to 100,000 hours.

Halogen lamp

Halogen lamp

Tungsten-halogen is an expensive incandescent lamp that has a very compactenvelope which makes it an excellent lamp where optical control is important. It still has all of the negative aspects of the standard incandescent which are a relatively short life and a low efficacy which makes the tungstenhalogen expensive to operate and maintain. Color rendition is good. The normal voltage (120/240 V) lamp requires no auxiliary equipment (no ballast) which results in a slightly lower initial cost, but generated more heat. The low voltage tungsten-halogen lamps require a step down transformer to reduce the line voltage from 120/240 V to 12 V. The transformer adds to the initial cost
of the system and introduces a device that may require additional maintenance. Tungsten-halogen lamps are also dimmable.

Laser

Laser

Multi colored laser lights used in conjunction with ambient lighting can be used to create 3d patterns and visuals. These are widely used at concerts, lounges and clubs to enhance the dynamic experience of light.

1.3 Effect of light on human beings

Light is responsible for our moods, emotions and memories and is closely connected with our inner well being.

It is known that adequate light is vital to many aspects of healthy living. For example, light is needed to maintain the body's circadian rhythms, or internal clock. These rhythms control numerous functions, from hormone levels to sleep and wake cycles. Studies show that the eye turns light into electrical impulses, which travel along the optical nerve to the brain, triggering the release of the mood-altering chemical, serotonin and other chemical messengers. Healthy levels of serotonin and other neurotransmitters are very much involved in one's emotional well-being.

Parameters such as intensity and color play a vital role in the overall quality of light. A color study undertaken by Artemide identifies certain mood associations with a particular color or color combinations. The color chart has been used as a benchmark in understanding the effect of lighting color on our moods.

GOOD MORNING	: the homogeneity of white to resemble natural light. R99 G99 B99
RELAX	: blue and pink for looking after yourself, starting with psychological and physical renewal. R20 G50 B80
ENERGY	: red and orange to impart energy and dynamism. R99 G40 B0
WORKING	: a balance of colors to stimulate attention and efficiency of work. R60 G50 B50
IDEA	: green and pink to encourage creativity and concentration. R40 G60 B0
BALANCE	: light blue and indigo to restore harmony and balance of energy. R40 G0 B99
REALTION	: green to encourage meeting and sharing. R40 G99 B50
PLAY	: pink and yellow, an imaginative and amusing light to give free rein to play and fantasy. R99 G0 B99
LOVE	: the intensity of red alone to stimulate pleasure and produce adrenalin. R99 G0 B0
DREAM	: blue and pink for rest as the main form of well being. R0 G0 B99

1.4 Lighting and Design

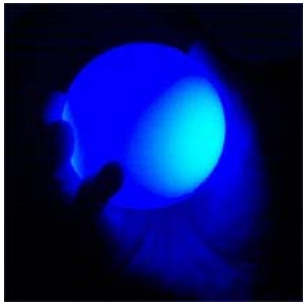
A data collection of lighting objects and installations was carried out to gain insight into the international trends in contemporary urban mood lighting.

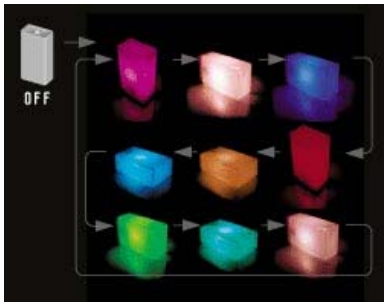
Theses designs are put forward in varying categories such as scale, space, interaction and materials in order to better understand the implications of lighting with the several parameters that go hand in hand when designing lighting.

1.4.1 Light + Scale

Mood Lighting Objects

A series of small objects such as vases or bowls and hand held forms that are colour changing and remote controlled. They have rechargeable batteries and are cordless. The bowls are made of high quality glass, which is hand-blown to give the them their matte frosted finish.





Mood Lighting Panels

Mood-Light panels are a line of programmable, color changing, architectural panels. Based on RGB colors, the panels pulse in infinite colors and bring a dramatic new dimension to ambience lighting.

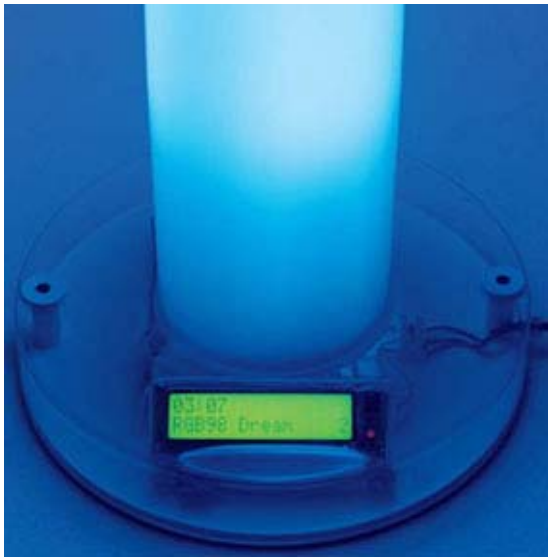
1.4.2 Light + Space

Artemide – Metamorfosi Collection

Yang

Tapping the total spectrum of light, the lighting incorporates all the wavelengths of natural light to create a more healthier environment.

Artemide - metacolor



Phillips

The glowing seats have sensors which detect when people are seated and dim the glow over a period of time to create a more intimate ambience.

Opti Ball light stool

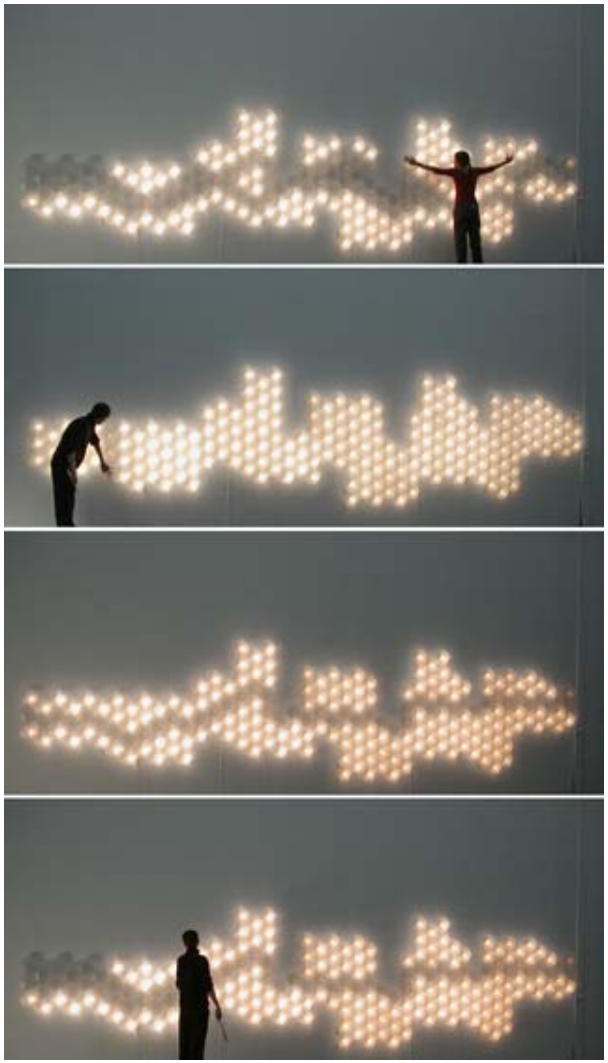
Each ball changes colour depending on its orientation.

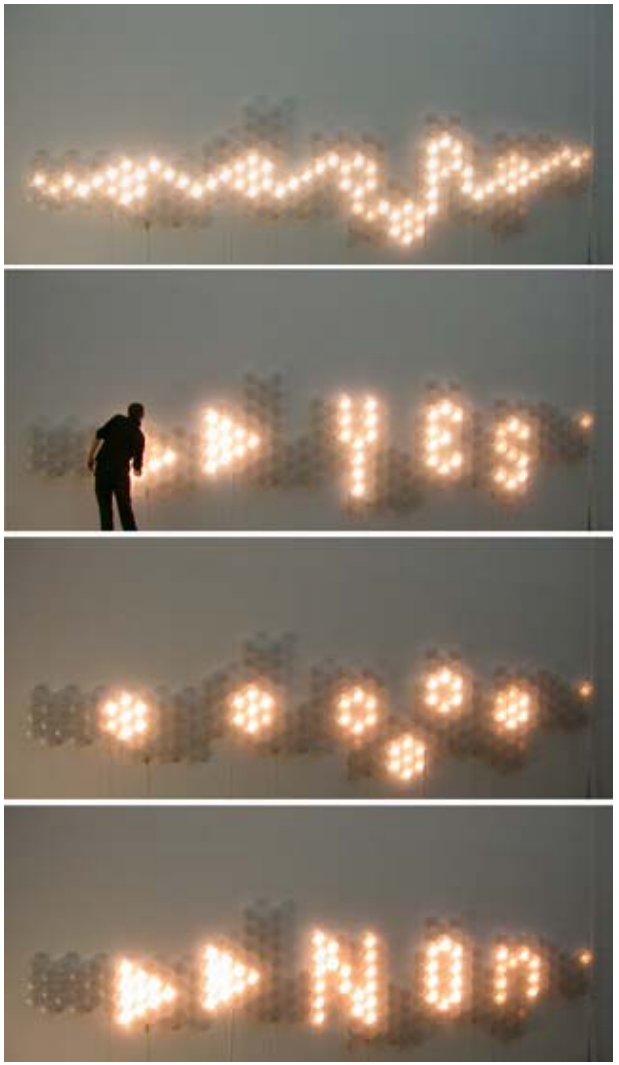
1.4.3 Light + Interaction

Light Brix

interactive cells that together form a tactile

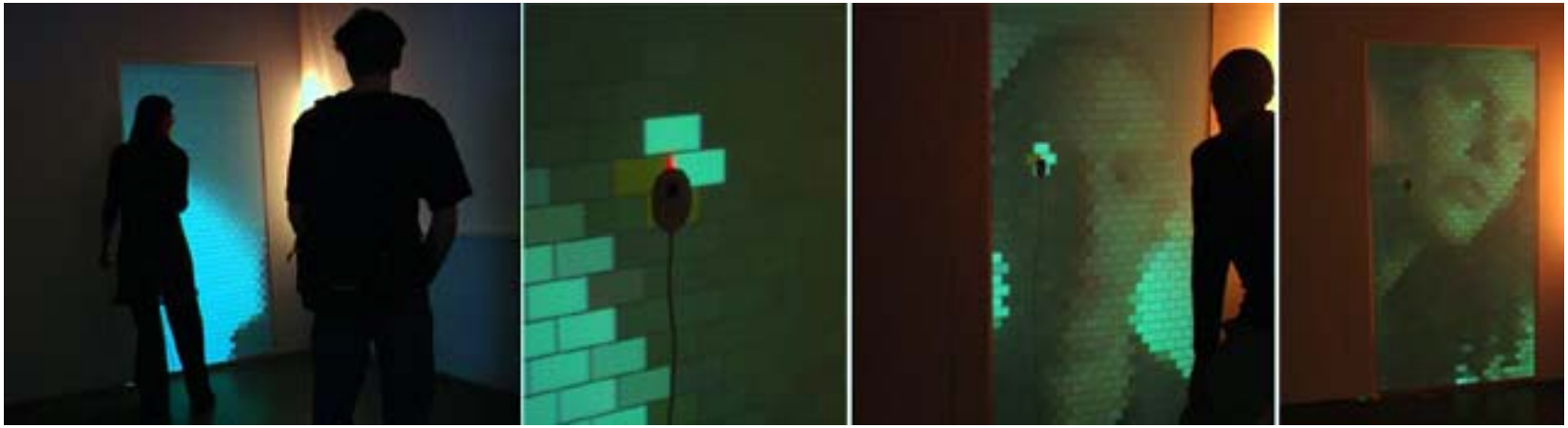
surface each cell lights up or down when touched




yes
non

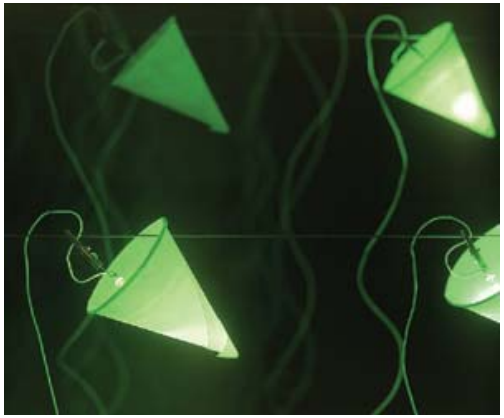
Clever Brix

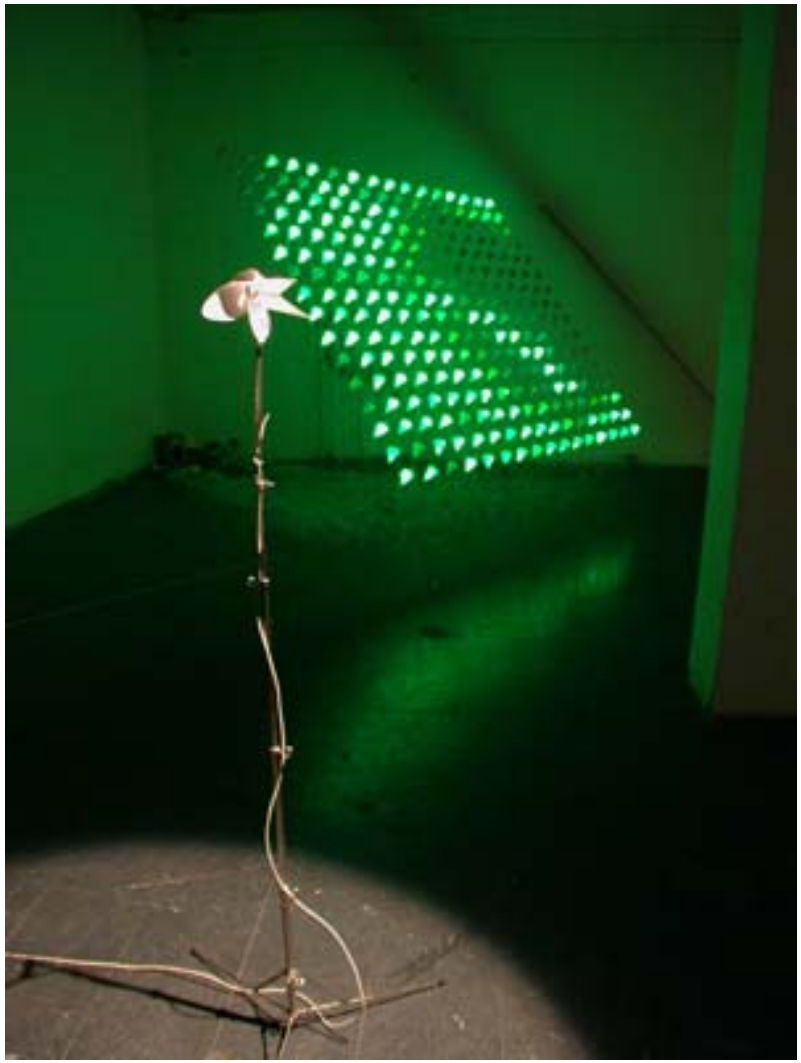
The unit has two sensors on each side of the wall which are connected to two cameras that detect a person approaching and displays a pixelated image on the opposite side This allows for direct interaction between individuals so that two people separated by a wall can touch each other through light.

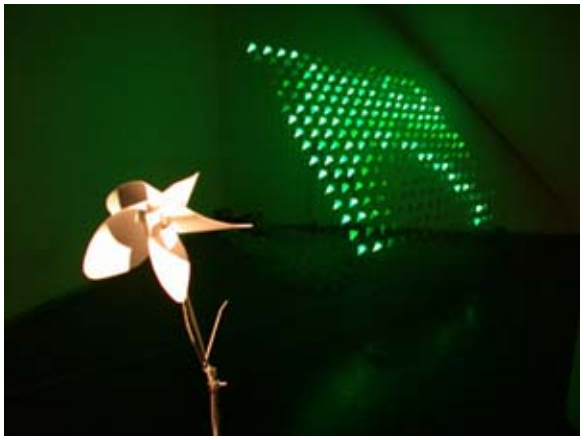


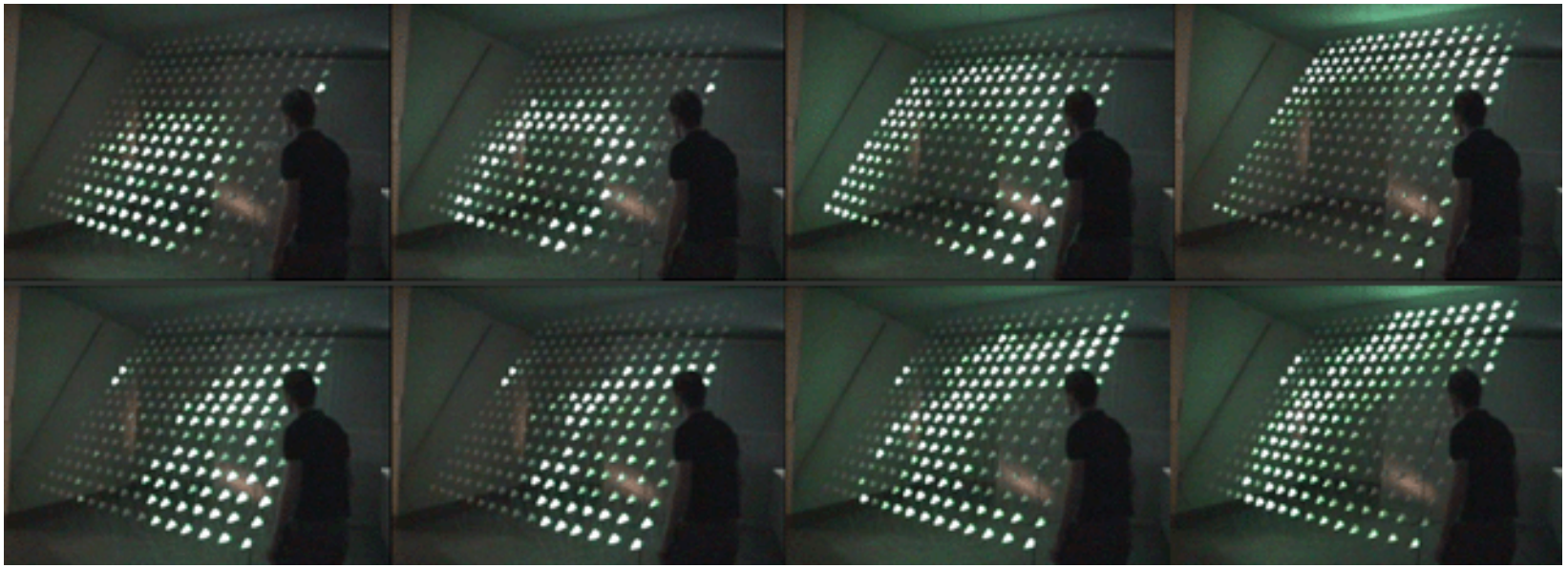
Twilight

Audio visual matrix of light, suspended in mid-air. The installation reacts depending on how hard you blow onto a paper windmill









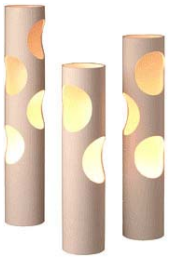
Bruit Rose

street noise converted into images

1.4.4 Light + Materials

Paper

Earthenware/ceramic



Acrylic/polycarbonate

Natural fibers

Fabric

Metal

Wood

2. User Study

2.1 User Survey

A survey of few upper middle class homes was done to observe various lighting objects and to gain insight into what the user looks for when purchasing such objects.. The study gave an understanding of the kind of environment it is placed in and the way they are used.

young couple (early 30's)

IT professionals

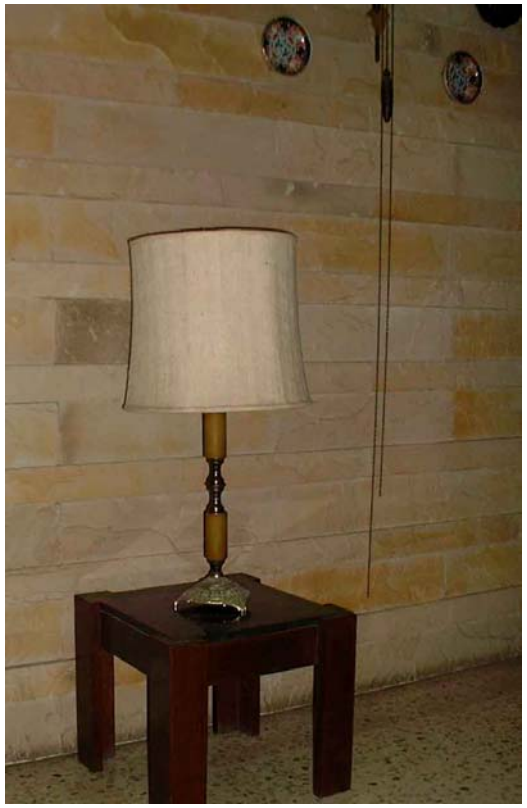
double income and no children, the couple were looking out for something that creates a warm cosy ambience ideal for get-togethers with friends and family

a feeling of warmth resulting from the fire like glow that emanates from within the urn

a crystal vase with dried flowers placed on top which produces varied effects as the light refracts through the glass.

government official (late 50's)

peach coloured raw silk lamp shade the compliments the colours of the interiors



ornate bronze and onyx stone lamp stand with beige fabric shade

young single woman (27yrs)

corporate manager

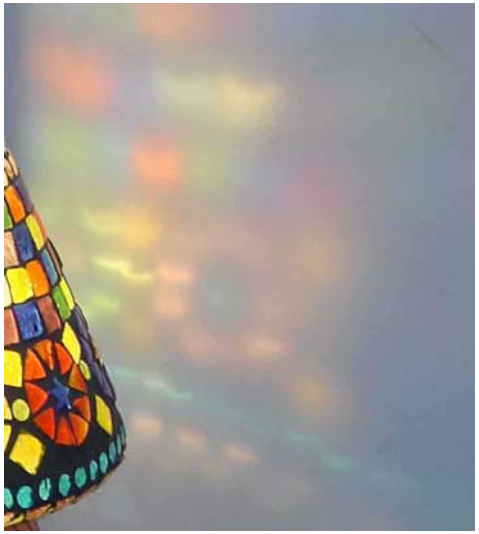
wrought iron lamp stand with a pastel blue fabric shade placed along bed-side

the blue hanging fixture was chosen by this young woman because of its cool ambient glow

the room had a pale orange shade which complimented the light

businessman and artist wife (late 40's)

beautiful multi coloured reflections from the lamp projected onto the walls gave a certain sense of vibrancy to the environment which was appealing and the primary reason for the purchase of the lamp.



the multi coloured glass mosaic lamps also had the added benefit of allowing colour coordination within the interiors

retired elderly couple (mid 60's)

cream coloured lamp placed on the piano provides ambience for musical entertainment during much cherished family reunions

brass lamp stand embellished with coloured stones, placed along bedside provides enough light for a little end of the day reading

leather exporter (mid 50's)

highly ornamental fixtures which convey a sense of old world richness and sophistication

large earthen lamp with brass rings convey a rustic feel that contrasts with the more contemporary wall fixture which is frosted glass and minimalist

2.2 Inferences

appreciate the need of having a lighting object that has an aesthetic character and creates a relaxing ambience.

widely exposed to the international arena through mass media and also frequently travel abroad and hence are knowledgeable and discerning about current trends .

natural elements such as water and plants are being used in combination with the lighting object.

there is a naturally prevalent fear of handling electrical objects, this anxiety prevents people from having overly physical interaction with such objects.

most of the time the lighting objects bought are used as display pieces as well, when not in use.

From the preceding user survey it was found that the younger users were more enthusiastic when it came to exploring and experimenting with the lighting. They are on the cusp of setting up new homes and families and are hence quite eager to go that extra mile to find things that are ‘just right’ for their homes.

2.3 User Profile

25-35 yrs

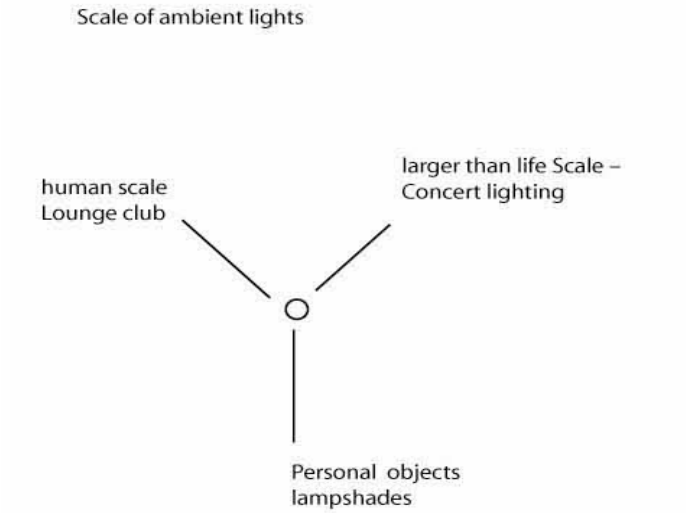
Urban

Middle income to upper income

Double income couples, single, married with young children

2.4 Scale, space and activity analysis

In order to better understand the target user group, a breakdown of the kind of environments and activities that take place within these confines was done. This aided in establishing the scale of lighting, the kind of environment and the activities that might be associated with such ambient lighting.



Scale

The scale of lighting selected based on user feedback was more towards that of human proportions. It was found that small lighting objects (hand held) were not desirable as they could be potentially dangerous. Attempts on larger installation scale design were deemed to be out of the scope of the project.

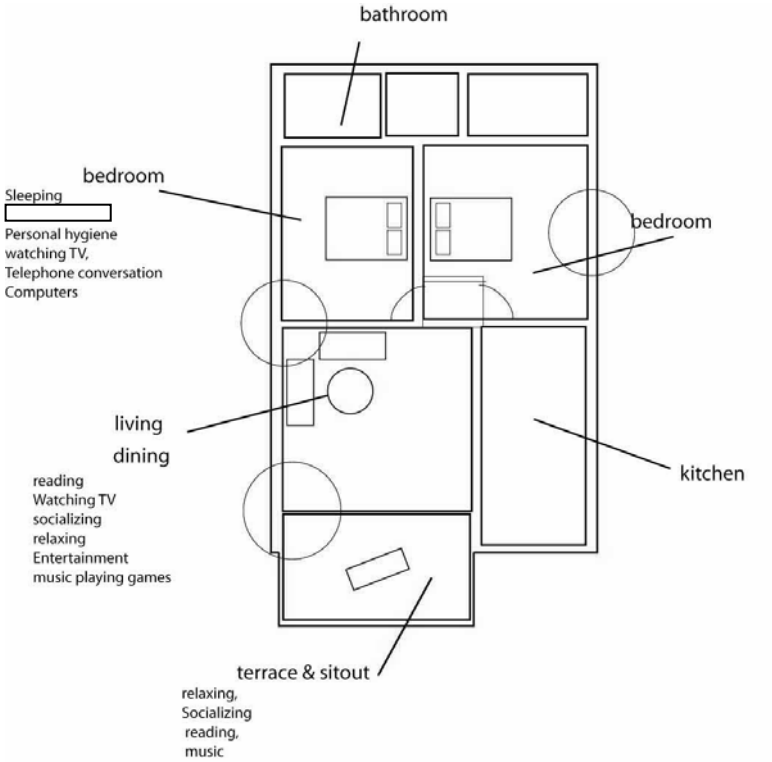
Space

The home was taken as the target environment as the users have most affinity to their personal spaces when it comes to the subject of creating the ‘right’ kind of ambience. The users spends much time in deciding what it is exactly they are looking for in a lighting object and the kind of effect it will create in their living space.

The home environment was then further broken down into its constituent spaces, such as the living/dining room, bedroom, kitchen, sit out/balcony, toilet/bathroom, corridors and landings. An activity analysis of each of the spaces was done to understand the lighting requirements and to draw insights.

Activity analysis

Waking up, reading, socializing, working, looking after yourself, thinking, these are only some of the daily activities for which each of us requires a particular kind of light to satisfy our own personal need to “feel good”.



Living room

Lighting a living room is a unique challenge, since most living rooms serve multiple functions from relaxing in front of the TV to formal entertaining. Unlike most other rooms, where their use dictates the position of the lighting fixtures, the living room will benefit from a flexible lighting plan. Lifestyles change over time, and so does the choice and arrangement of the furniture.

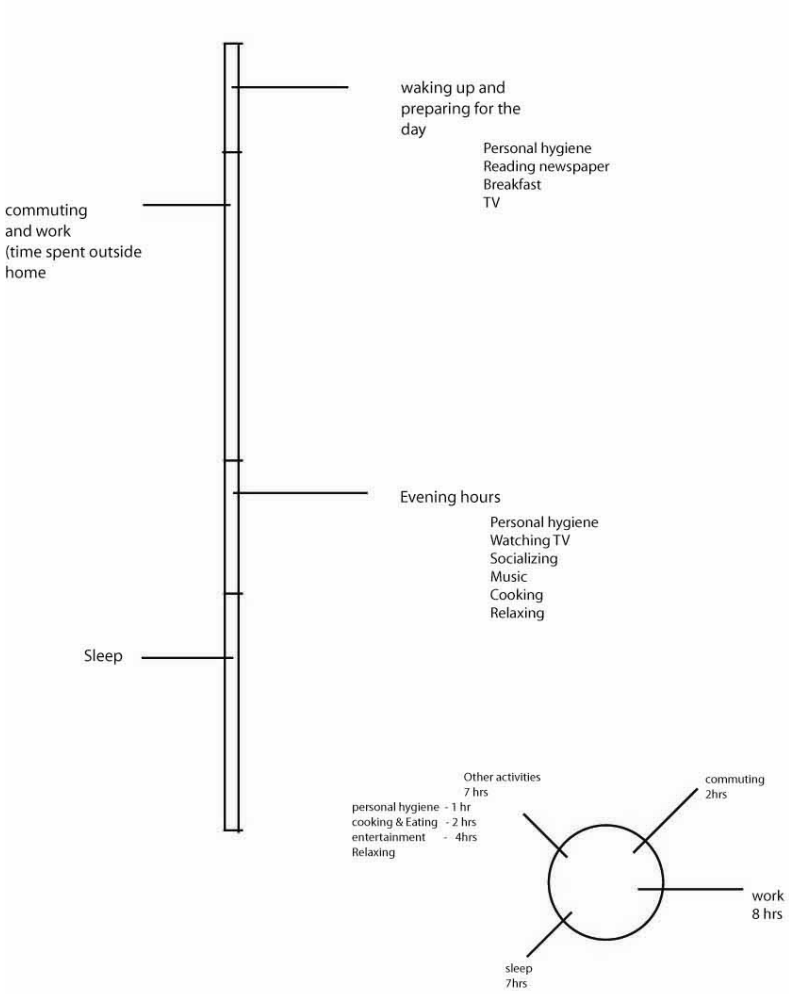
Bedroom

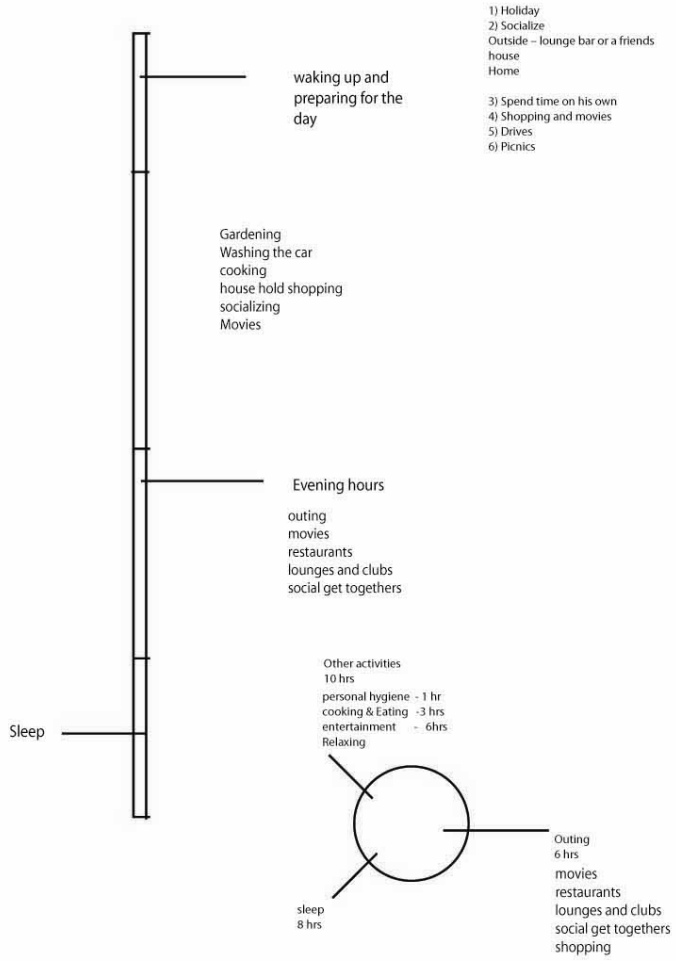
Most bedrooms serve multiple functions that call for layers of light and a variety of ambient and task lighting. Bedroom lighting must be good for reading in bed, relaxing, maybe watching TV or working out.

Sit out and balcony

People enjoy relaxing out on the balcony as this offers them a closer proximity to the outside environment. It is an ideal place to spend time when there's not much on the mind. The kind of lighting would need to be very subtle and pleasing.

A analysis of the activities over a period of a typical weekday and weekend was made in order to establish the amount of time the user spends at home. The activities associated with various times of day and also the day of week gave better understanding of the scenarios in which the lighting object would be placed in.





2.5 Scenarios

1) back from work, after a shower, unwinding time
2) weekend get together with friends
3) romantic evening
4) listening to music and relaxing

3. Market Study

3.1 Market Survey

Few lighting retailers such as Kapur Lamps, Light and Craft and other smaller businesses were visited to get an idea of the kind of market that exists in India. These visits coupled with the user survey and study aided in trying to establish certain areas which could be focussed at during the concept generation phase.

table lamps

ceiling fixtures











wall fixtures

3.2 Inferences

The majority of the designs serve only as lighting object, there is scope in broadening the kind of interaction between product and user.

Floor based design prove to be more flexible at adapting to changing environments. They can be moved around within a space.

The form of the lighting fixtures or luminaries tend to dominate over the actual lighting effect/ambience.

The space analysis revealed that there are surfaces and geometries within the space such as corners, skirting, around pillars and curved walls, bay-windows etc that can treated specifically with lighting.

4. Technology and Cost

The technology is chosen based on

1) The heat generated
2) the kind of lighting effect produced (color/intensity/fade)
3) Overall dimensions were an important factor as smaller units give more flexibility in design and packaging.
4) The initial cost vs. maintenance cost is also an important factor for the selection of light sources. A lamp which is not used very frequently can have incandescent sources, which would make the initial investment less.
5) Variability in the kind of bulbs that can be used would be an added benefit.

Electricals
Switches ,Wire, Dimmer, timer etc.
Standard ones available in the market could be used. But they need to be customized depending on the design of the lamp.

Technology	Bulb	Holder	Extra	Total
Filament	12	6		18
Fluorescent	35 - 175	6		150
12 volt Halogen	12	5	40- 100	120
LED	20/piece		200	300

5. Design Brief

Develop a lighting object/system primarily for use in the home environment

Specifically catering to the ambient lighting requirements of the user

Explore possibilities of incorporating other sensory perceptions such as sound, touch and smell.

The user-object interaction should impart a sense of character to the product along with the lighting effect it produces.

6. Explorations

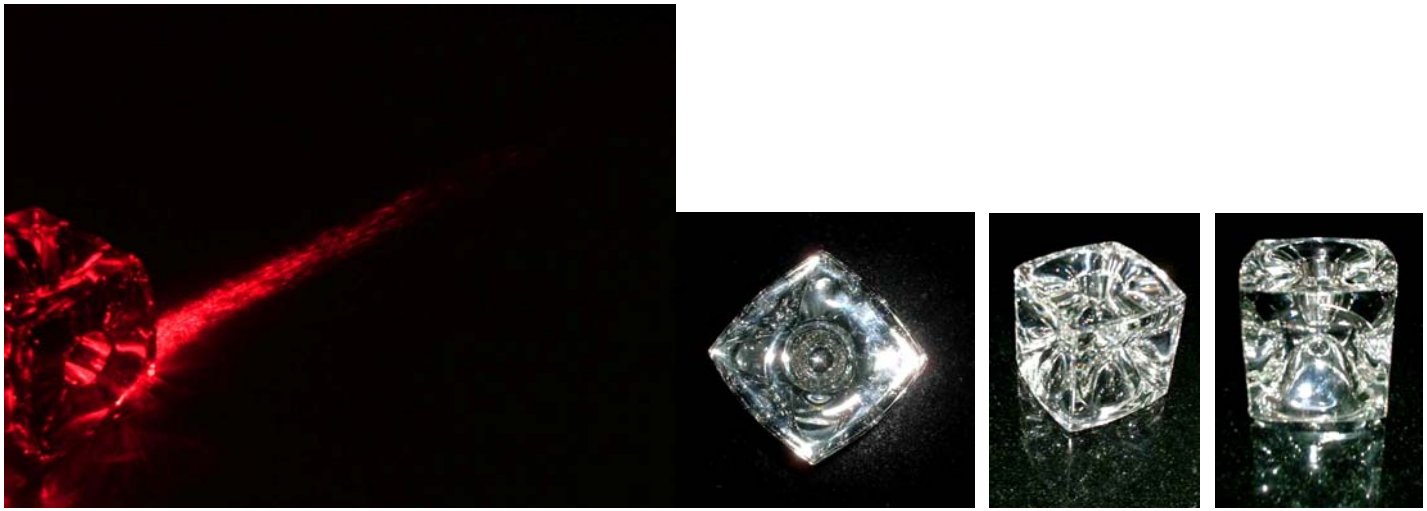
A few explorations using various light sources and materials were done in the beginning to gain insight into the qualities of light both direct and reflected and also the optical qualities of materials.

Material used : Glass

Light source : Laser and blue UV light

Effect produced was towards a more techno digital kind of lighting. The highly refractive cube creates sharp streaks of intense light

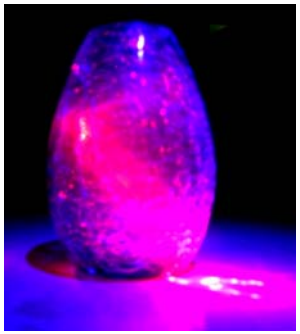
Myriad organic patterns formed as a result of reflections falling on adjacent surfaces.

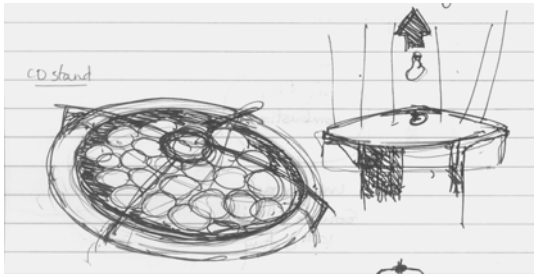








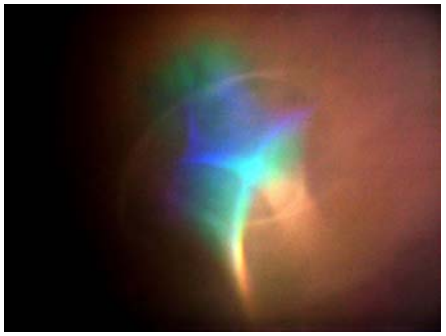


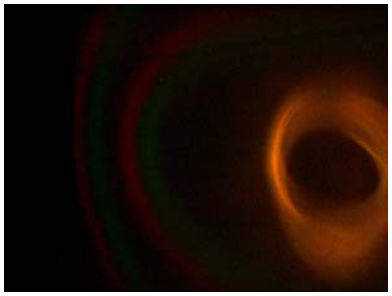
Material used : Old CD's

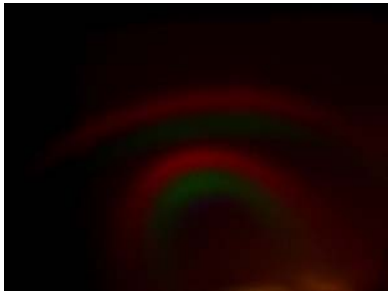
Light source : Incandescent bulb

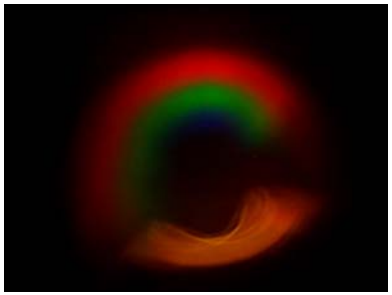
The CD's were arranged in a concave parabolic array. The light source was hung over the top of the array and the light reflected of the ceiling were photographed.

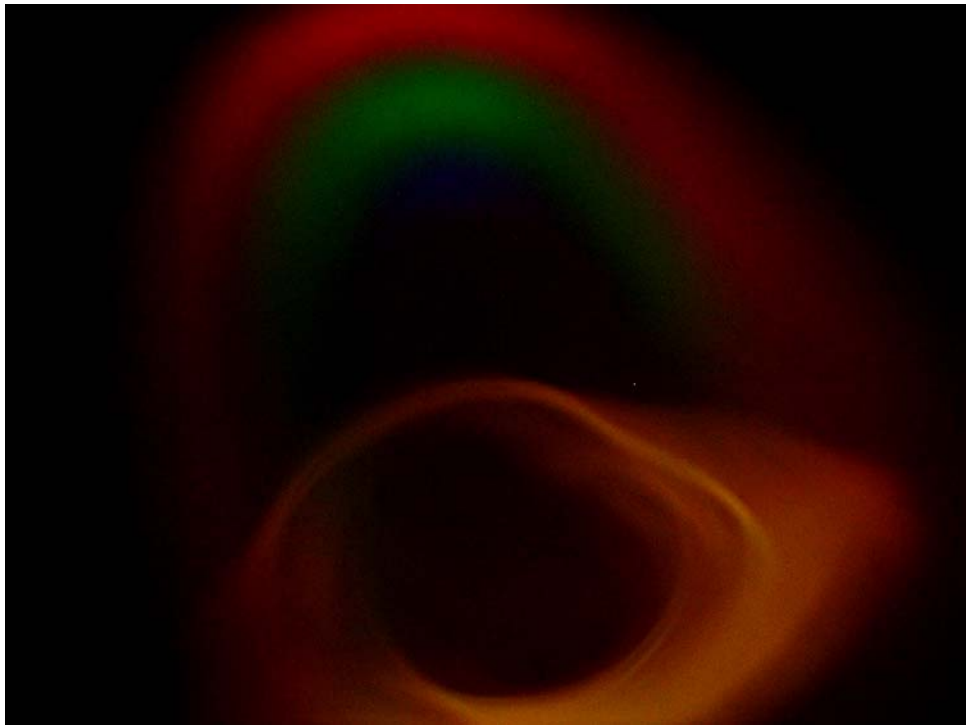
The soft rainbow colours create a very organic star shaped form that appears to float on the ceiling.











7. Concepts

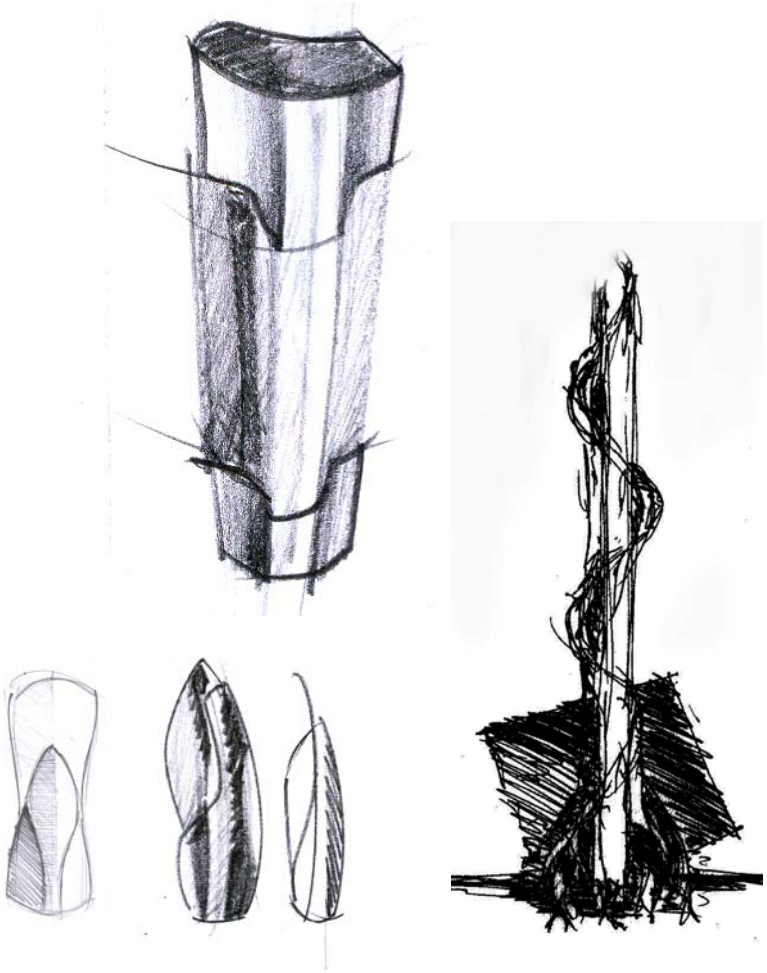
7. 1 Concept Generation

Concepts were generated along the course of explorations. The initial phase of concept generation involved looking into the formal aspects of light to derive product forms. The kind of interactions possible were also explored so as to create a level of engagement with the object.

Nature, specifically plants and flowers were used as an inspiration. The characteristics such as phototropism, blooming, growth and even the act of planting along with formal features such as leaf, stem, root, flower, bud, thorn, seed etc were examined.

Concept 1

Columns of Light



The linear quality of a beam of light was the starting point. I was keen on exploring ways by which we could maintain the purity of light, its truness and incredible velocity.

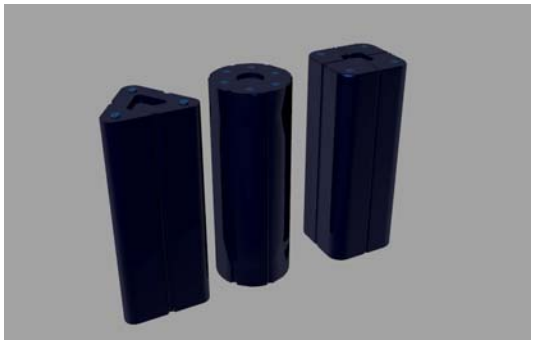
The need to integrate the formal qualities of light into a materialistic form was the next phase of ideation. Basic geometries have a sense of simple purity and at the same time appear complete.

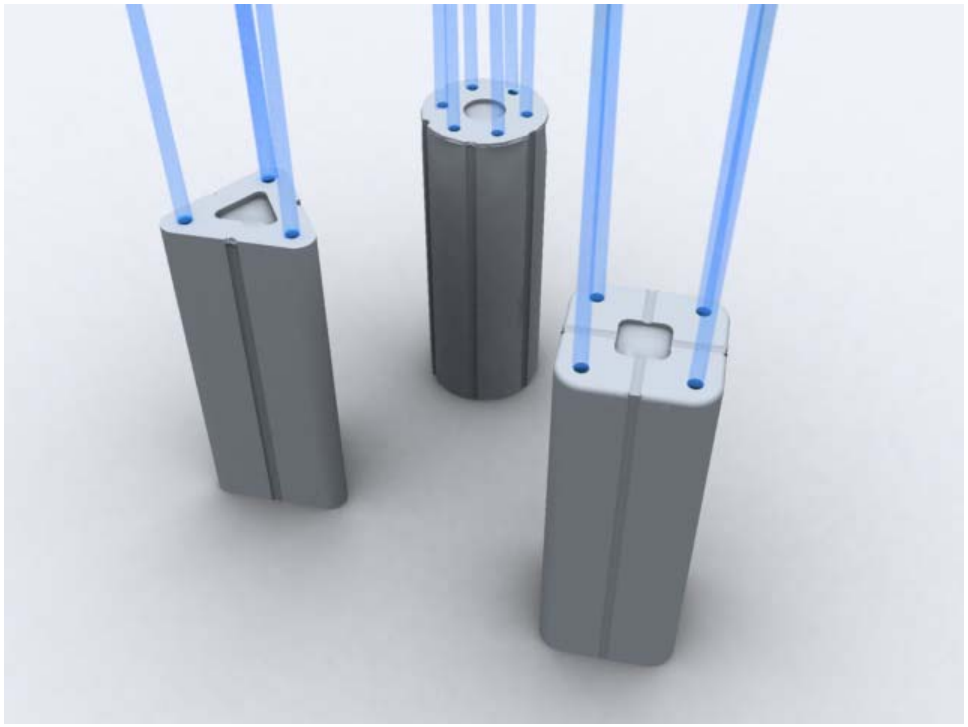
shafts of pure light entwined by sinewy vines

The need to involve other senses apart from just the visual were explored.

The scent of fragrance form an ‘agarbati’ (incense stick) is something all of us have experienced as Indians. The aspect of combining the formal qualities of light with a sense of smell in a product form was the goal.

The result were a series of geometric prisms that emit shafts of laser light. The prisms would serve as the base for the agarbati. The play of light and smoke would add an extra dimension to the visual effect of the light.

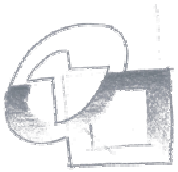


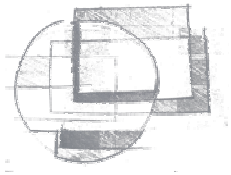


Object becomes an extension of the quality of light that it emits.

Concept 2

Containing light



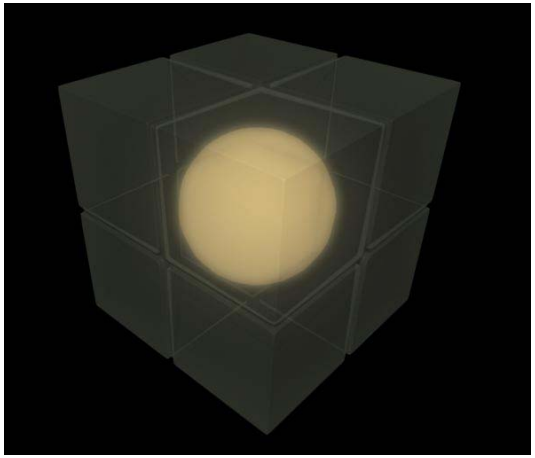


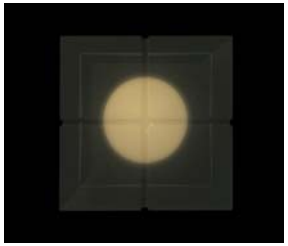
What would it feel like to hold light in the palm of your hand?

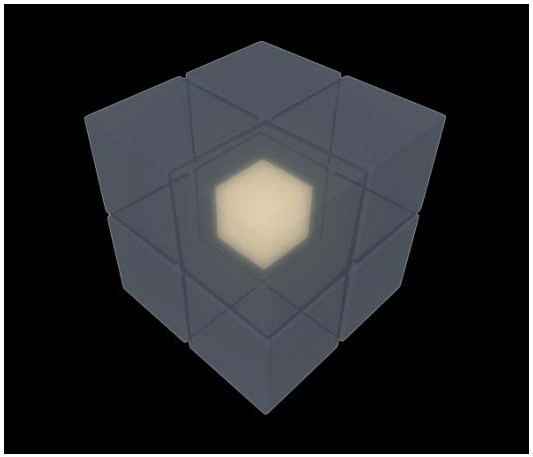
Can light be trapped or brought to stand still?

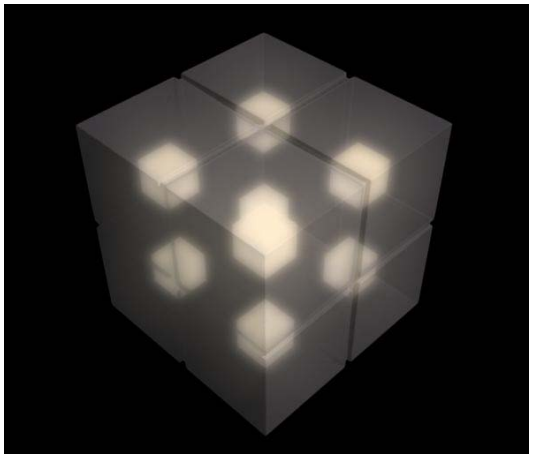
The need to create an object of interest that could encourage an intimate interaction were explored in this concept. The feeling of warmth resulting from the action of cupping one's palms together and blowing into it was the basis for the kind of interaction. The scale of the object would be small enough to fit into the palms.

The form explorations here also were towards minimalism in order to maintain the formal qualities of light. The cubic outer form gives a sense of stasis to the overall object which contrast with the spherical inside. The feeling of light being in a state of suspended animation is created.

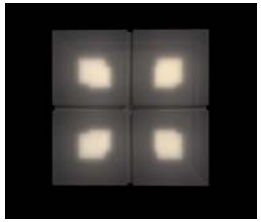


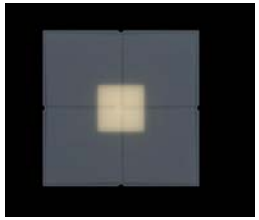






The result were a series of cubes which are could be made in transparent acrylic blocks. The form is that of a sphere inside a cube or a cube inside another cube. the inner voids house the LED's and battery unit.





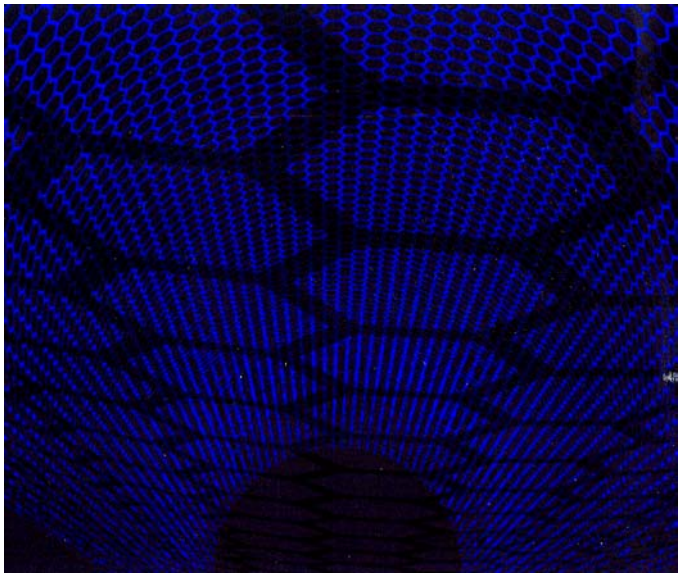
Concept 3

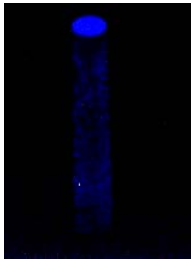
Layers of light

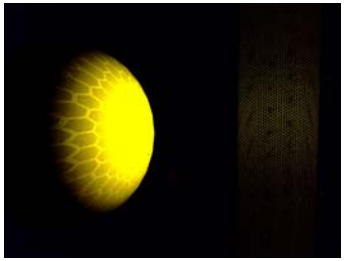
Taking inspiration from the bioluminescent creatures of the ocean depths, this concept tries to explore the possibilities of using light in multiple layers.

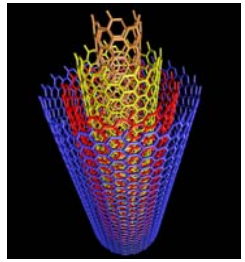
Using light as a structural unit, the form would consist of several cylindrical meshes that are concentric. Each cylinder would be made of acrylic or other suitable refractive material. Colour variations in the lighting for the different cylinders would create a visual pattern that is layered both in intensity and colour.

The dynamic quality of light could further be explored by imparting movement to the cylinders, so that they mesh over each other as the revolve.





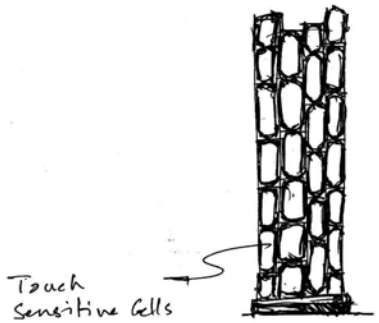


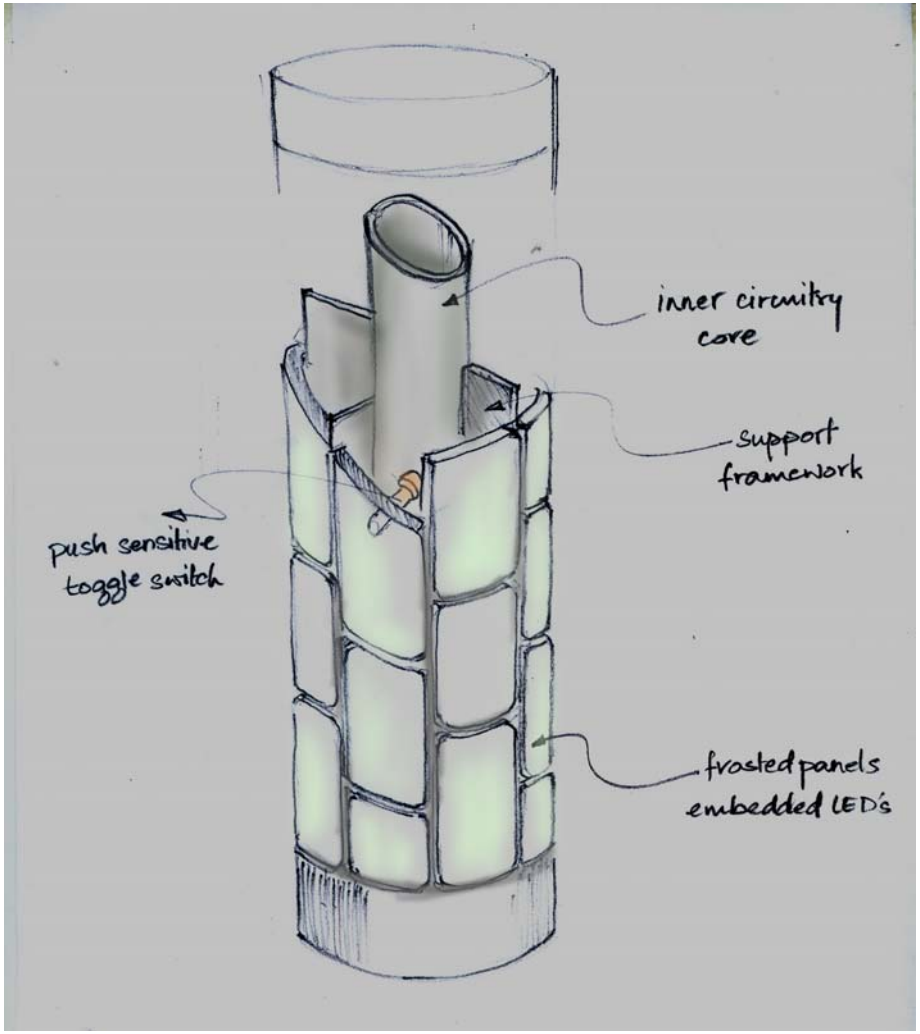


Concept 4

The sense of touch as a means to increase or decrease the amount of illumination was explored in this concept. Formal inspirations were derived from the bamboo stalks which have a smooth surface interrupted by abrupt junctions along it's length. The tactile experience of running the hand over the stalks gives a sense of delicacy but yet firm.

The lighting object is cylindrical in form and has a number of touch sensitive cells along the outer surface. The action of stroking one's hand over the rod and gently sqeezing illuminates the cells.

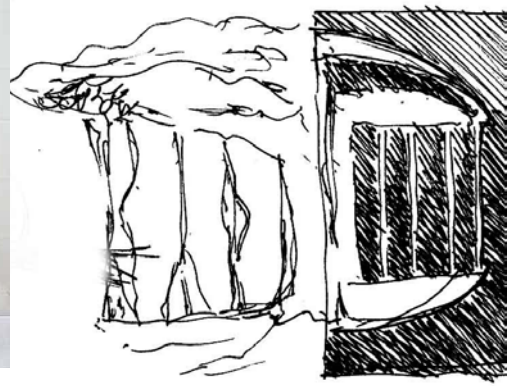




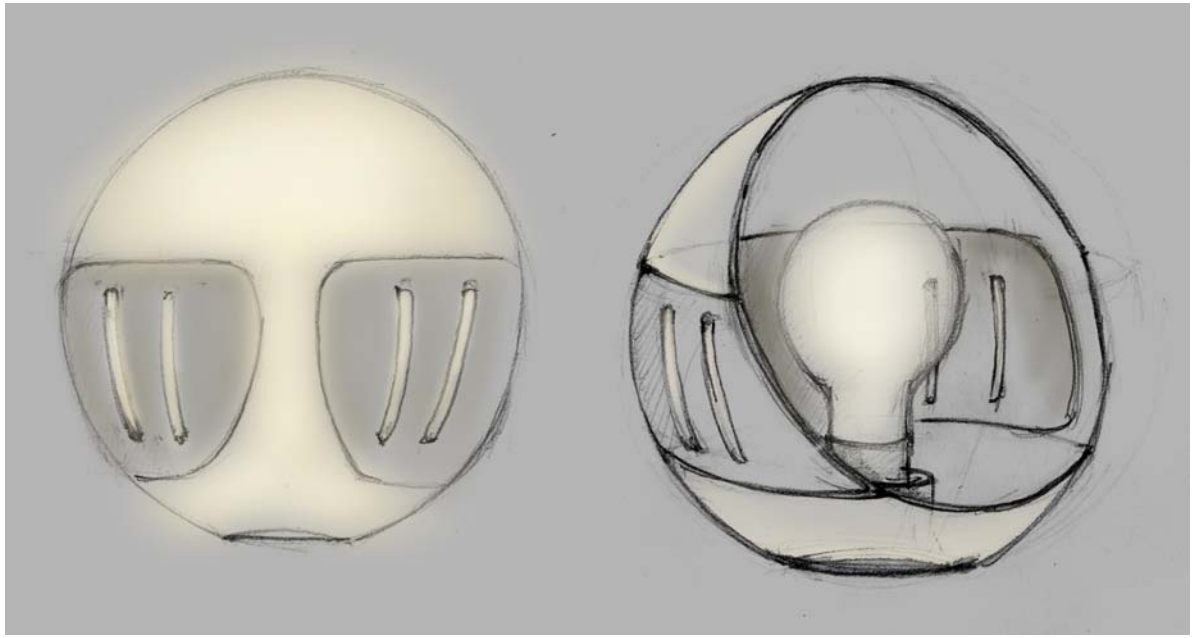
each cell can be lit up individually so the user can brighten or dim the lamp by pushing the requisite cells

Concept 5

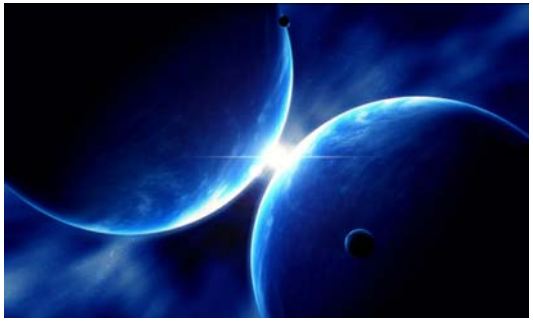
Banyan tree



abstraction of the banyan tree in the form of a spherical lamp



Concept 6



The sense of touch between two people through a material and its result were the starting point of this concept. The idea was to have a fairly large transparent screen (about 6ft by 4 ft) that 2 people could stand on either side of and see each other through it.

The screen would be a sandwich of 2 outer layers made of transparent acrylic/polycarbonate that house an inner layer which has the shape of a leaf cut out. The veins of the leaves are constructed using fibre optic strands that can be illuminated by a light source placed along the bottom of the stand.

The outer layers are touch sensitive screens that can locate point anywhere on its surface. Only when both people place the palms directly over one another on either side of the screen is the electrical contact created. The veins of the leaf light up in regions where the contact has been made.

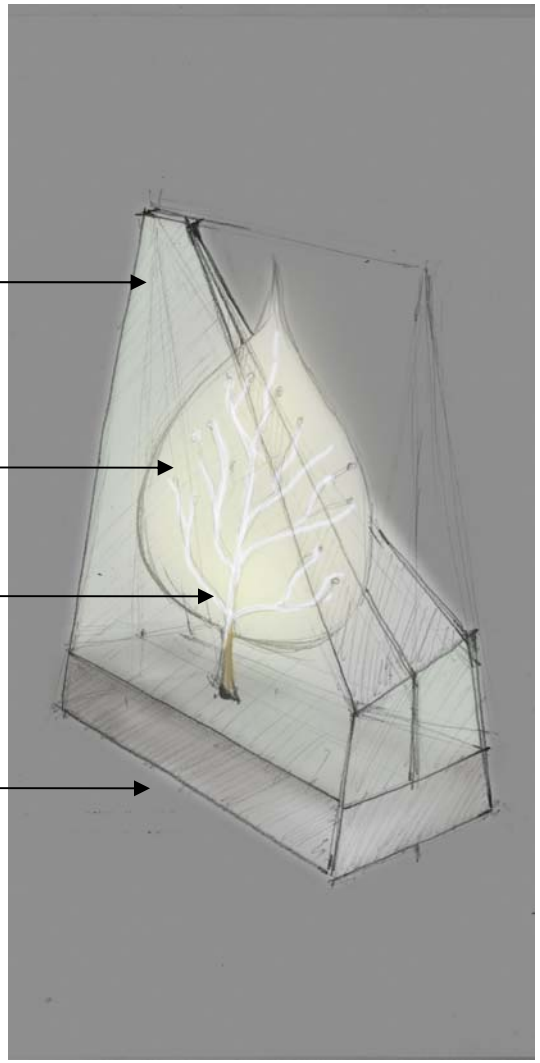
A further exploration of this idea was to have ripples generated where the two palms meet.

Touch sensitive screen with leaf cut-out in the middle

polycarbonate leaf cut-out inserted into slab in two halves

veins of the leaf are highlighted by fibre optic strands

light source for fibre optic strands

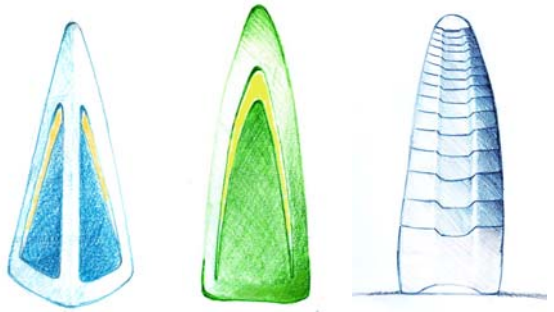


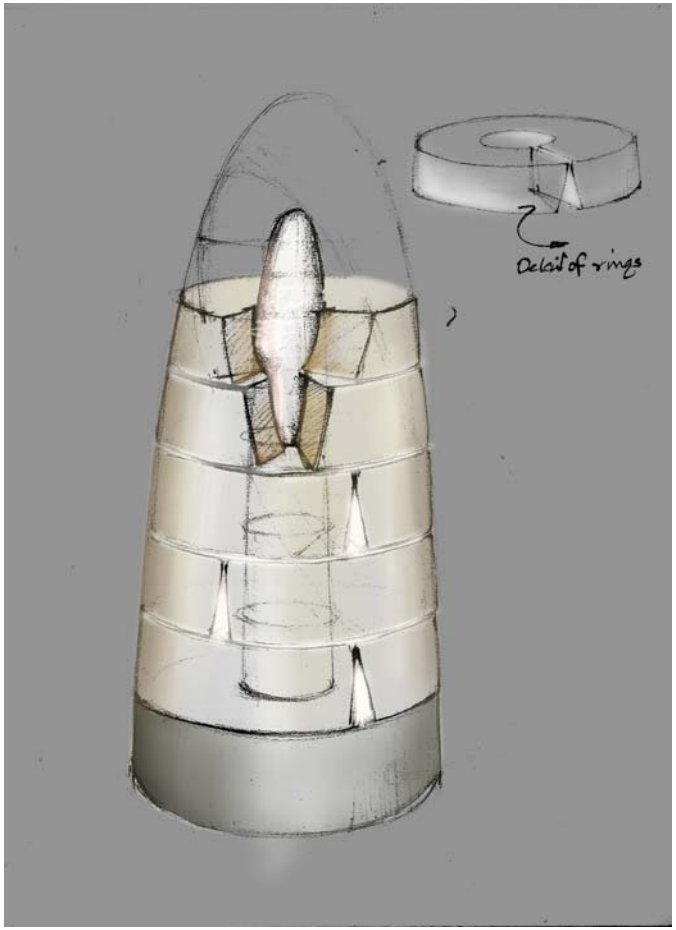
Concept 7

As children or young people we have all shone bright light into the eyes of someone else, Whether it be from a torch or from simply sunlight reflected off the surface of the watch dial.

As a lighting effect it can create quite an irritation but when suitable mellowed it may serve as a playful way of attracting somebody's attention.

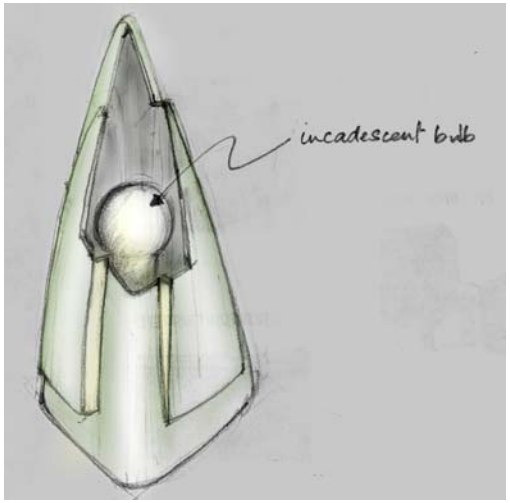
The concept was based on the form of the common cacti that people have in their homes. The conical shape of the object is actually comprised of a series of discs that are mounted one on top of the other. A central column of light is used to illuminate the object from within its core.





Each disc is rotatable about the central axis of the cone. The discs could be made of frosted glass or acrylic and have a slit cut into the edge of the profile so that it can emit a sharp ray of light. These rays of light emanating from the cone simulate the sharp thorns of the cactus plant.

By rotating any of the discs you could direct a ray of light within a certain distance.

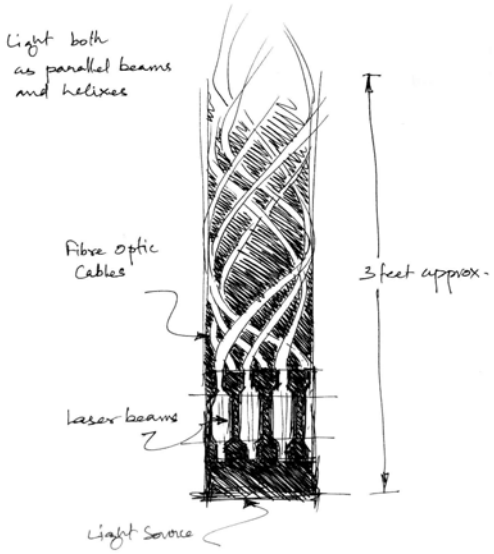


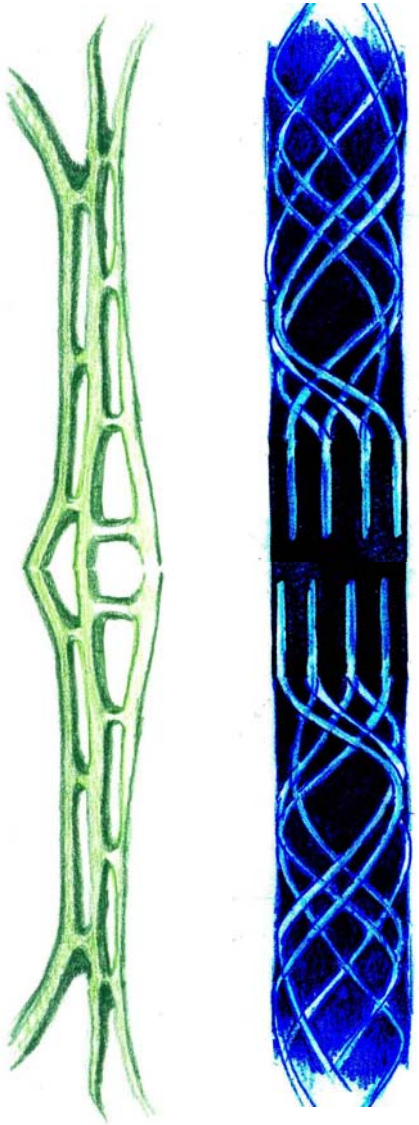
the streaks of light can be played with by rotating the discs, the slits create sharp rays of light simulating the thorns of the plant

Concept 8

The property of light to travel in a straight line and its contrast of making light take on curves was the basic approach for this concept. The ability of fibre optic cables to seemingly bend light was thought of as a material to explore the formal aspects.

the product was imagined as vines or creeper like strands of fibre optic cable that could be weaved or made into intricate shapes and hung from the ceiling.



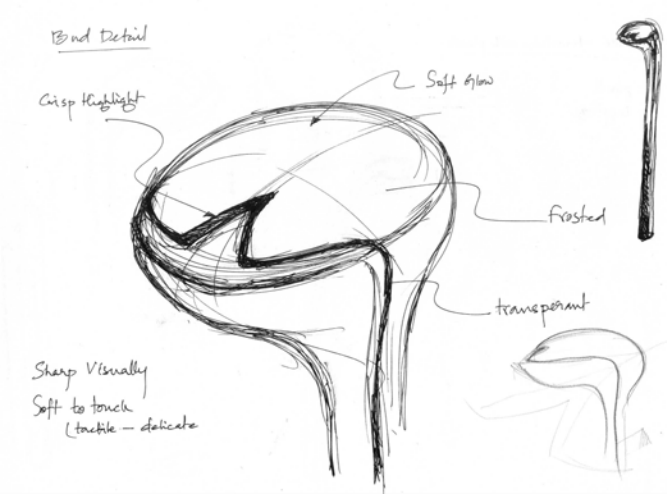


Concept 9

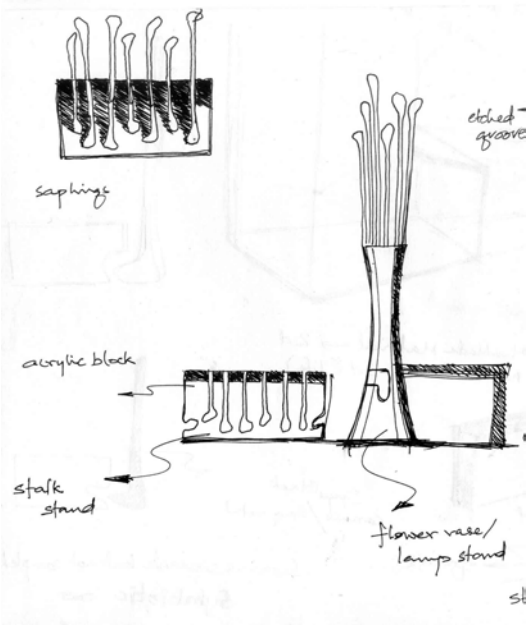
This concept was initiated with attempts in exploring ways in which to interact with the lighting product during the actual ‘switching on’ ‘switching off’ point.

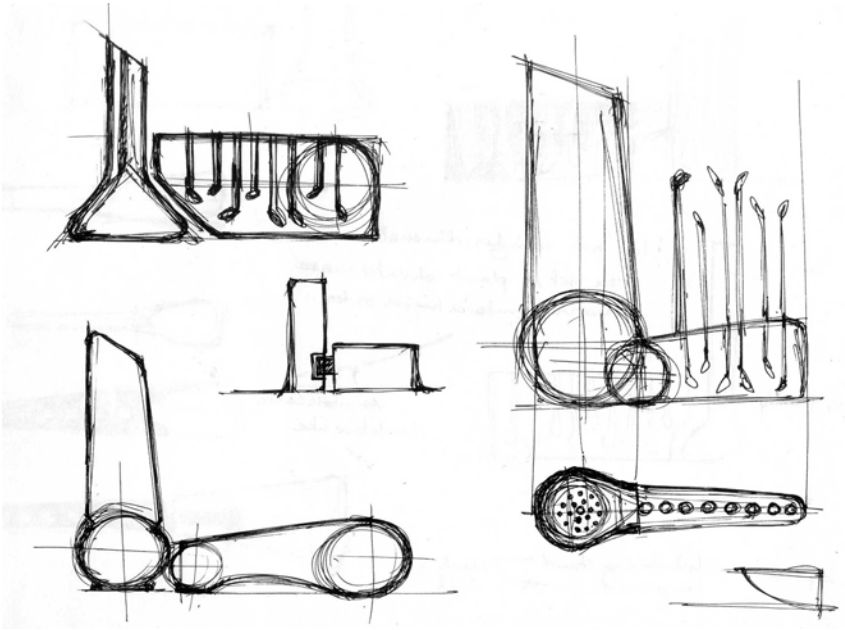
The act of planting the buds (similar to putting a flower stem in a vase) in the base, switches on the light.

The light is dispersed through these stems from the base. Form variations and surface etching patterns were explored, to create different characteristics not only in terms of aesthetics but also from the point of physical interaction and lighting effect. Heavier and more geometric forms give the user a more sturdy feel, while thin and sinewy stems were delicate and fragile.

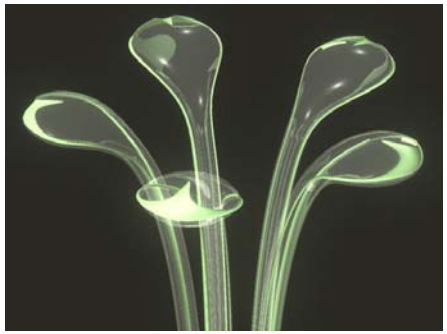


The product was explored both as a single piece unit which houses both the stems and the base unit or as two separate units. The stems have various shapes and are made of acrylic. The vertical orientation of the form gives it a feeling of being almost candle like, the user can decide how many pods of light need to be lit by putting only the requisite number into the base unit.

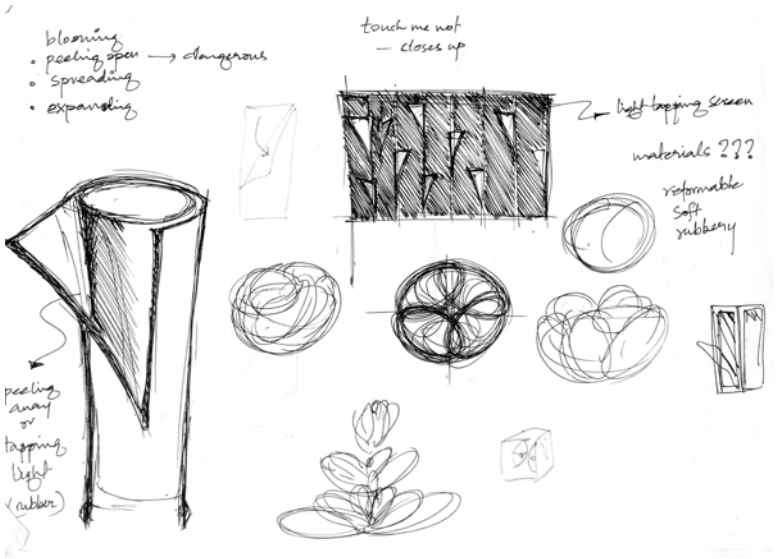




Lighting effect exploration was carried out to examine the quality of light. A set of acrylic rods were illuminated from below, the light passing up through the column. The light has a beautiful glow which gradually fades as you move further away from the base. The ends of the rods glow when seen from above. Surface etching create highlights on the surface of the rods which can be used to generate patterns of interest.



Concept 10



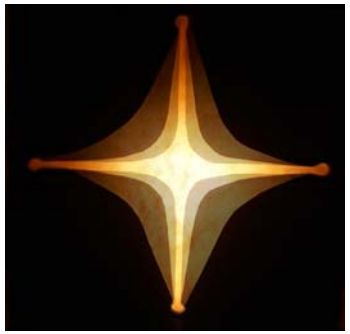
Inspiration

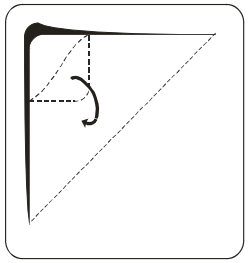
Peeling open the corn – as the outer leaves are peeled away beautiful golden corn are revealed one by one.
Array of LED's which light up as the flaps are peeled away.

Blooming of the flower – the face lights up as the petals spread open the light brightens as the flaps are peeled open

the basic inspiration for the concept was derived from the way corn or 'butta' is peeled open to slowly reveal ears of corn. The process of flowers blooming was also used as to draw inspiration metaphorically in form generation.

Allows the user to engage in an almost playful manner and control the amount of light to create the perfect ambience for himself.





Modules

There are 3 basic modules which are wall fixtures. These can be placed on various levels and can accommodate various geometries such as flat surfaces and corners.

Center unit – these are wall mounted fixtures which can be placed either as independent units or clusters. The flaps peel out radially away from the center of the fixture. the pattern and varying light intensity give the feeling of a flower blooming.

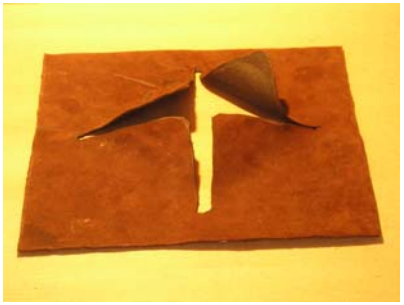
Corner unit – these units are place at the corners at right angles to each other. The units can be arranged either as single pieces or cluster that run up along the corner of the room.

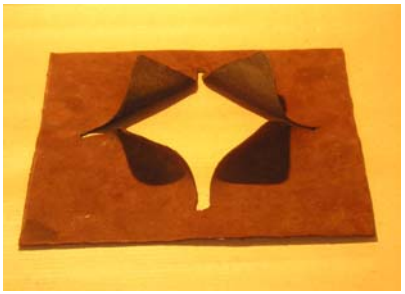
Bottom unit – these units are arranged linearly along the bottom of the wall near ground level. The flaps are positioned such that they're pulled upwards away from the ground to spread light to the floor.

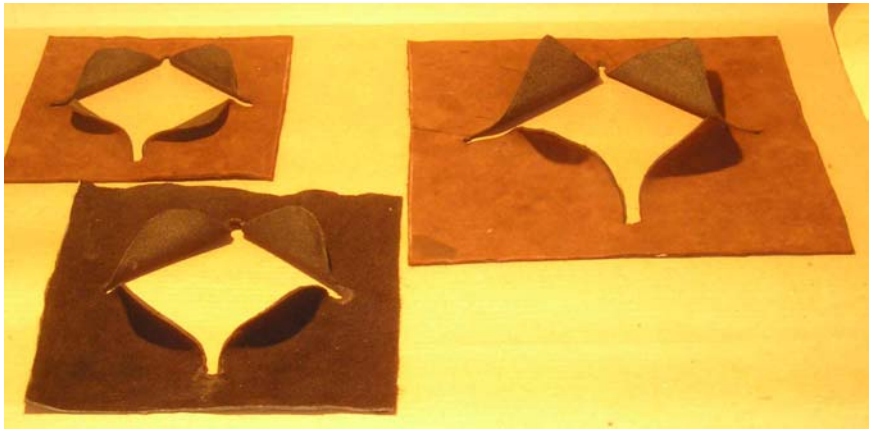
Operation

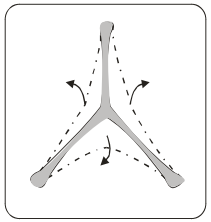
Operated by touch, the flaps are sensitive to touch so they can be lit individually or in clusters of more than 1. there are 2 states of lighting, either when its is fully closed or when it is peeled to reveal the inner lighting source.

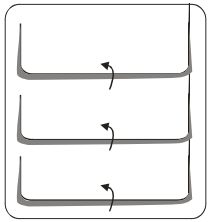
A few mock up models were made to examine the actual feel and tactile quality of the material along with the action. The material used here was leather in combination with tin for flexibility and a nylon backing material.

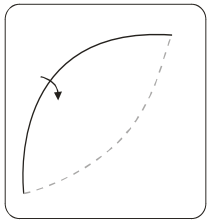












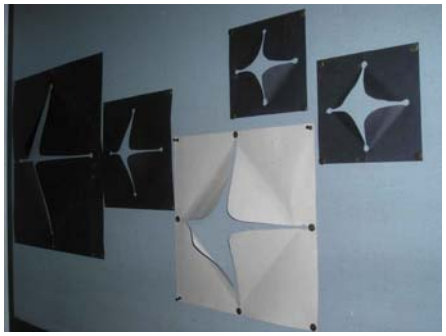
Scale

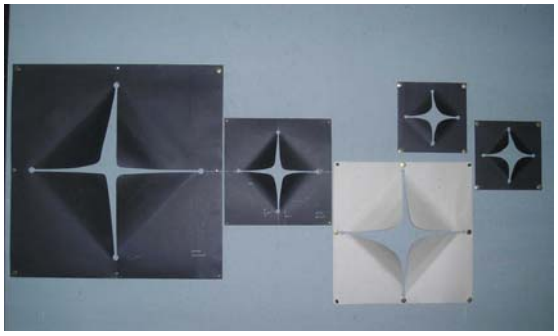
Variations in scale were explored to examine the kind of peeling action that can be induced.

Delicate action (feminine) – use of fingertips to carefully pry open the flaps.

Brawny action (masculine) – engages the whole palm to peel away the flaps.

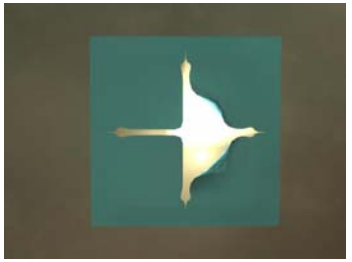
Mock up of varying scales were made to understand the kind of action and overall feel of the operation and look of the fixture. Square tiles of scales from 30cm, 40cm, 50cm upto 60cm were tried.





Colour, texture and opacity

The surface texture and colour can be made to match that of the wall so as to create an illusion of actually peeling away part of the wall. This also allows greater emphasis on the light and ambience and less on the fixture as such.



Exactly the opposite approach can also be employed, where in a stark contrast is created. This can be used in tandem with similar modules to create interesting patterns, both with colours and the variations in the quality of light.

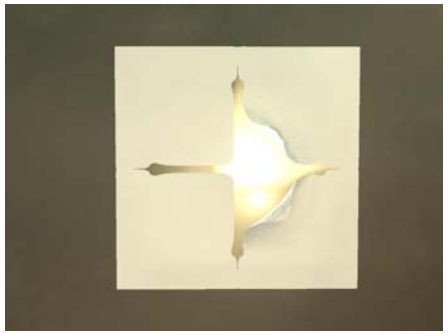
Material

The material used for manufacture of the flaps could be synthetic rubberized foam which is in the form of flat flexible sheets (similar to the material and quality of the flexi curve scale) which can be folded over repeatedly and can retain their shape once folded over.

The surface could be textured to provide tactile feedback and the flap should have an optimal thickness of around 2-4 mm to ensure that there is a certain degree of engagement with the surface.

Alternative materials such as synthetic leather or rexines and fabrics need also to be explored.

The materials can be either translucent or opaque



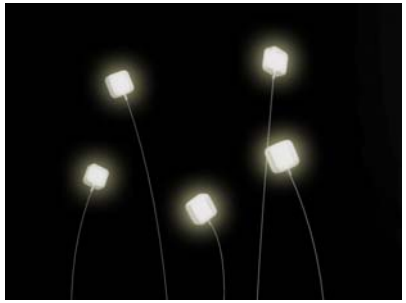
Opaque

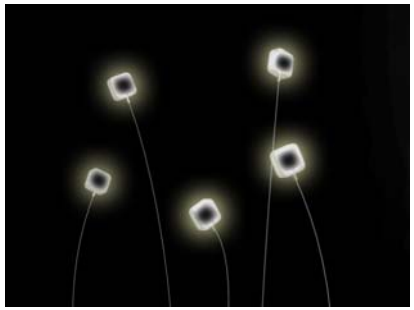
Opaque – slits of light are seen when the flaps are totally closed and the light is on.

Translucent

Translucent – soft glows (diffused) of light embedded in the walls. Gives the appearance of little light pods planted just under the surface of the wall.

Concept 11





Inspiration

Do we really perceive time in any sense or is duration just a measure of events?

Can we actually see the sun or the moon traverse the celestial arc as day passes by?

We become aware of the passing of time through several means shadows become longer, the sound of birds at dawn or crows at dusk, color of the sky, seasons.

Plants exhibit the property of phototrophism - which is the growth of the organism towards or away from a source of light.

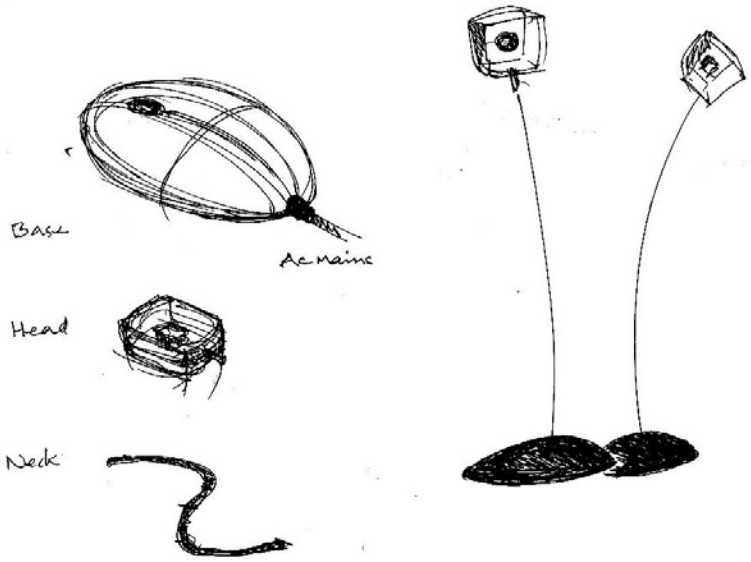
Sunflowers orient themselves towards the sun, the face of the flowers bloom at dawn and close at dusk. The flower also tilts its face continuously so as to follow the trajectory of the sun as it arcs across the sky from sunrise to sunset.
There are several such plants that respond to the changing lighting environment as the day passes or even as seasons go by.

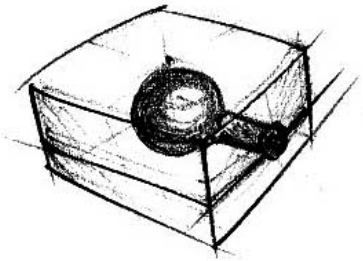
The concept tries to explore the sense of duration felt with movement of natural light over a certain period.

The lighting object is a series of reed like strands that are mounted to a stable base. The lamp consists of a head unit, a neck portion and a base unit. The head unit is the source of the light and comprises of a flattened cubical or cylindrical flower shaped head piece.

The lamp is switched on when a person approaches it. A motion sensor activated circuitry can be used to produce this operation.

Floor based arrangement gives the flexibility of rearranging within the space easily.

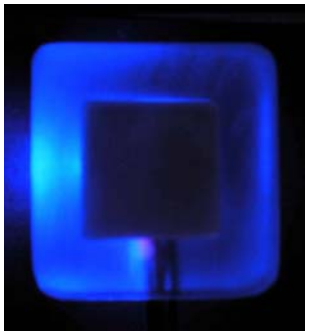




The head unit is split internally into 2 halves which are illuminated independently. The lighting effect produced is such that it appears that there are two distinct faces, one that is bright and the other dull. Over a period of time the lighting effect changes to interchange the bright side with the dim side. This change in orientation of the light is akin to the flower moving its face along with movement of the sun.

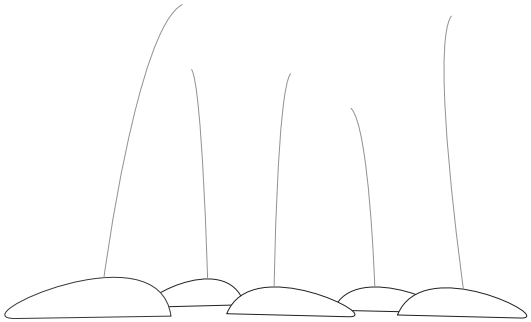
Bright face

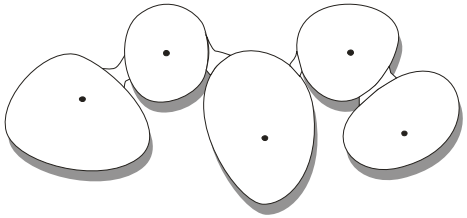
Dim face

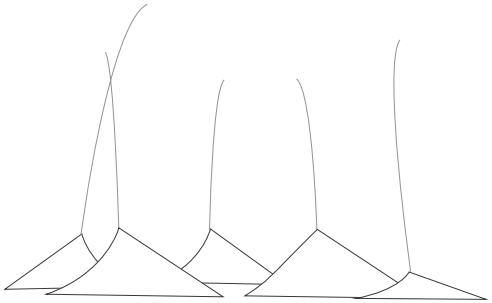


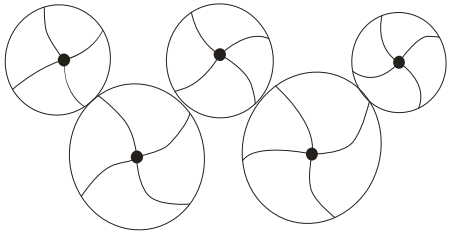
Prototypes of the acrylic cubes were made and the lighting effect was tried out.

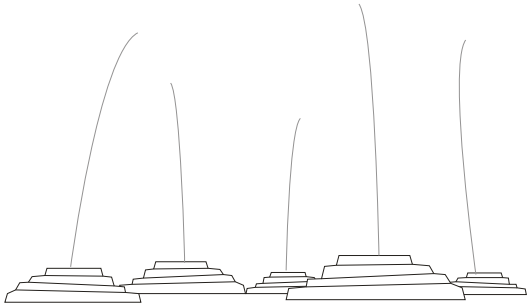
Form variations of the base unit

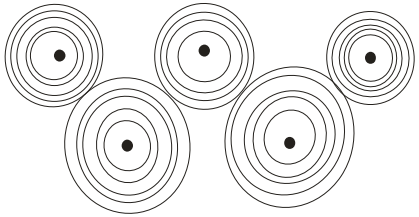


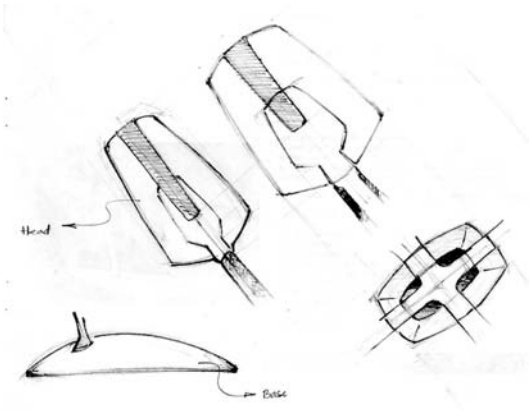


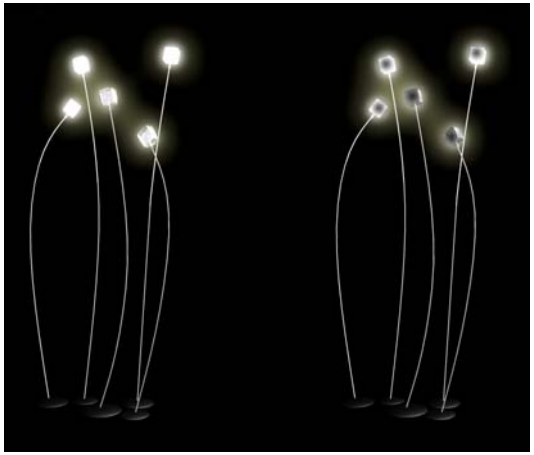






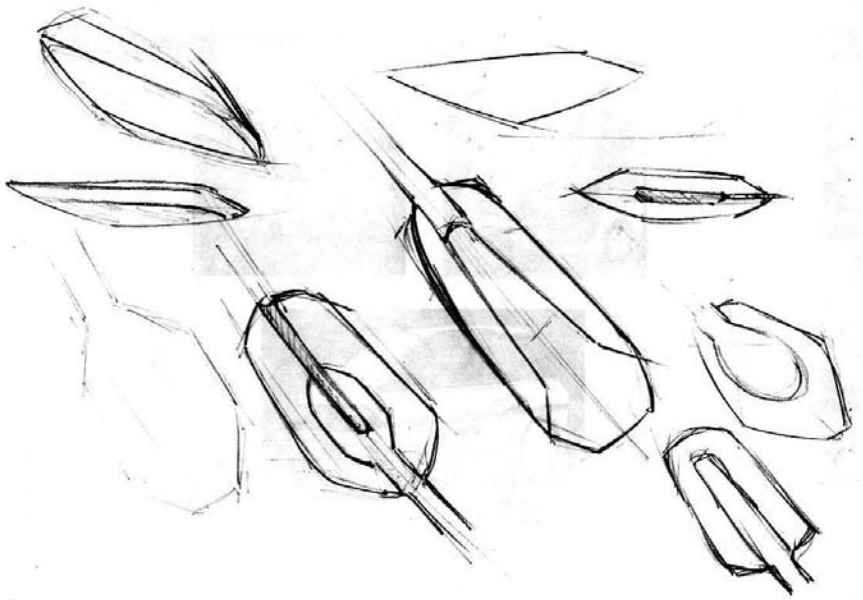


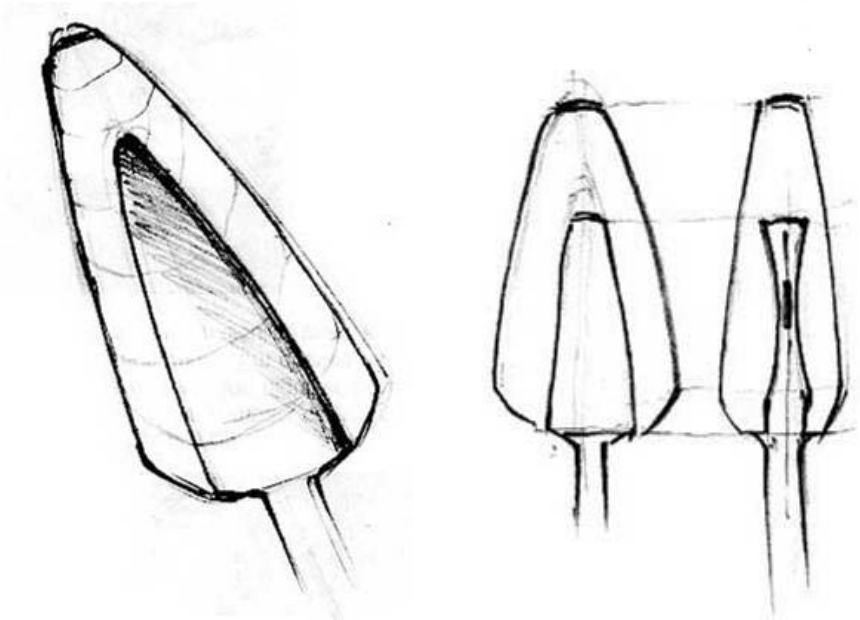


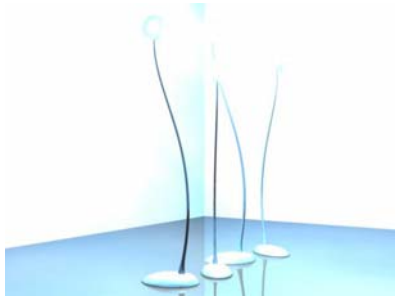


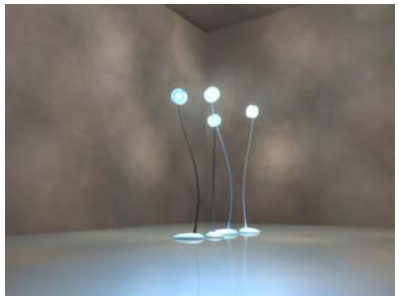
Mock up models was made to define scale and also check the proportions. The height of the lamp would be between 4-6 feet

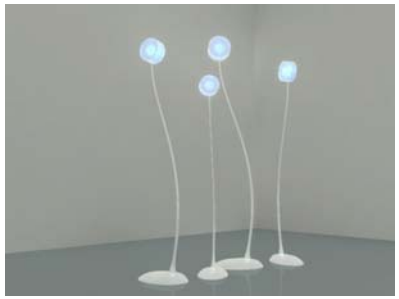
Form variations of the head piece











7.2 Concept Evaluation

The concepts were evaluated on the following basis

The ease of setting up or fixation

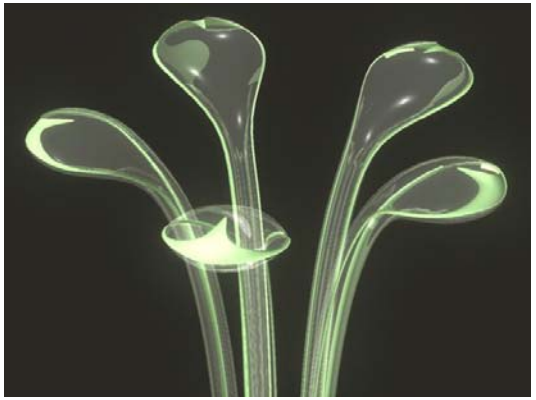
Technological implications arising from the kind of materials used and also the type of lighting requirement

Expressiveness of the form and its lighting quality

Size and dimensional aspects

User interaction modes

7.3 Final Concepts



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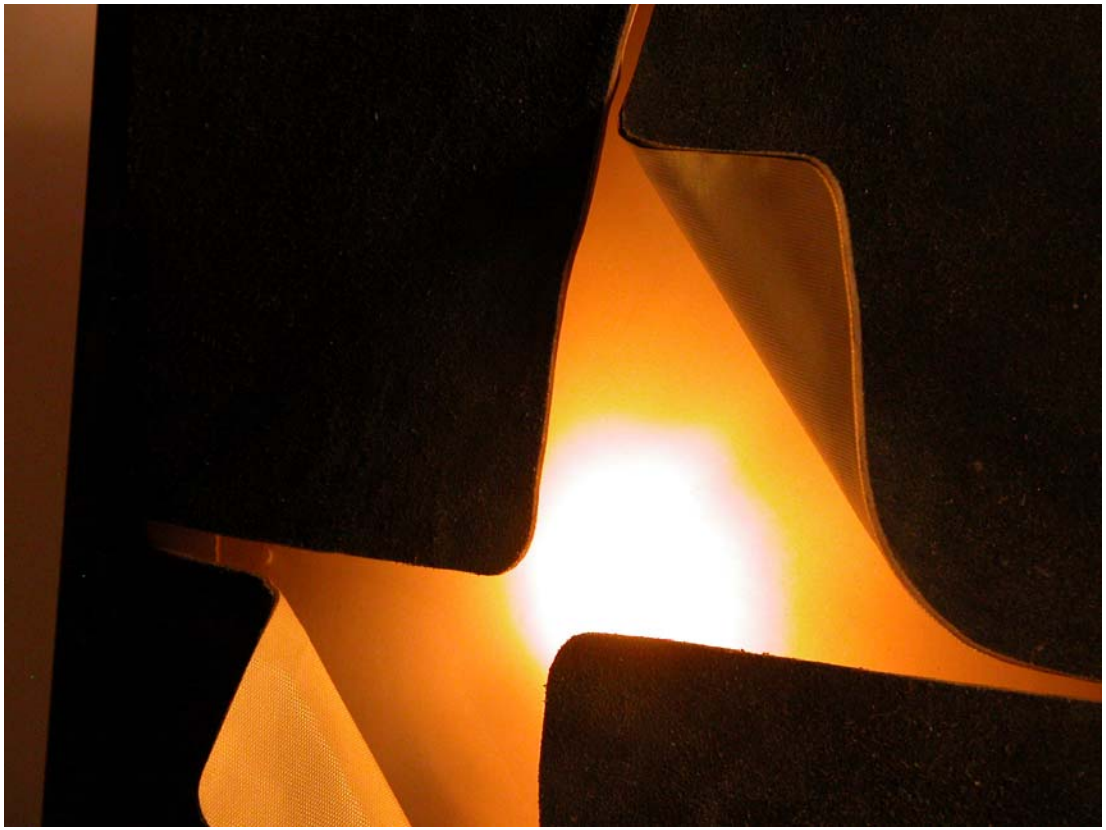
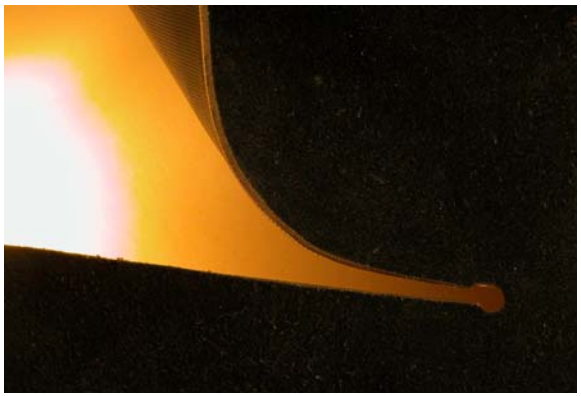
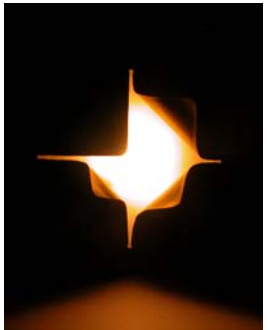
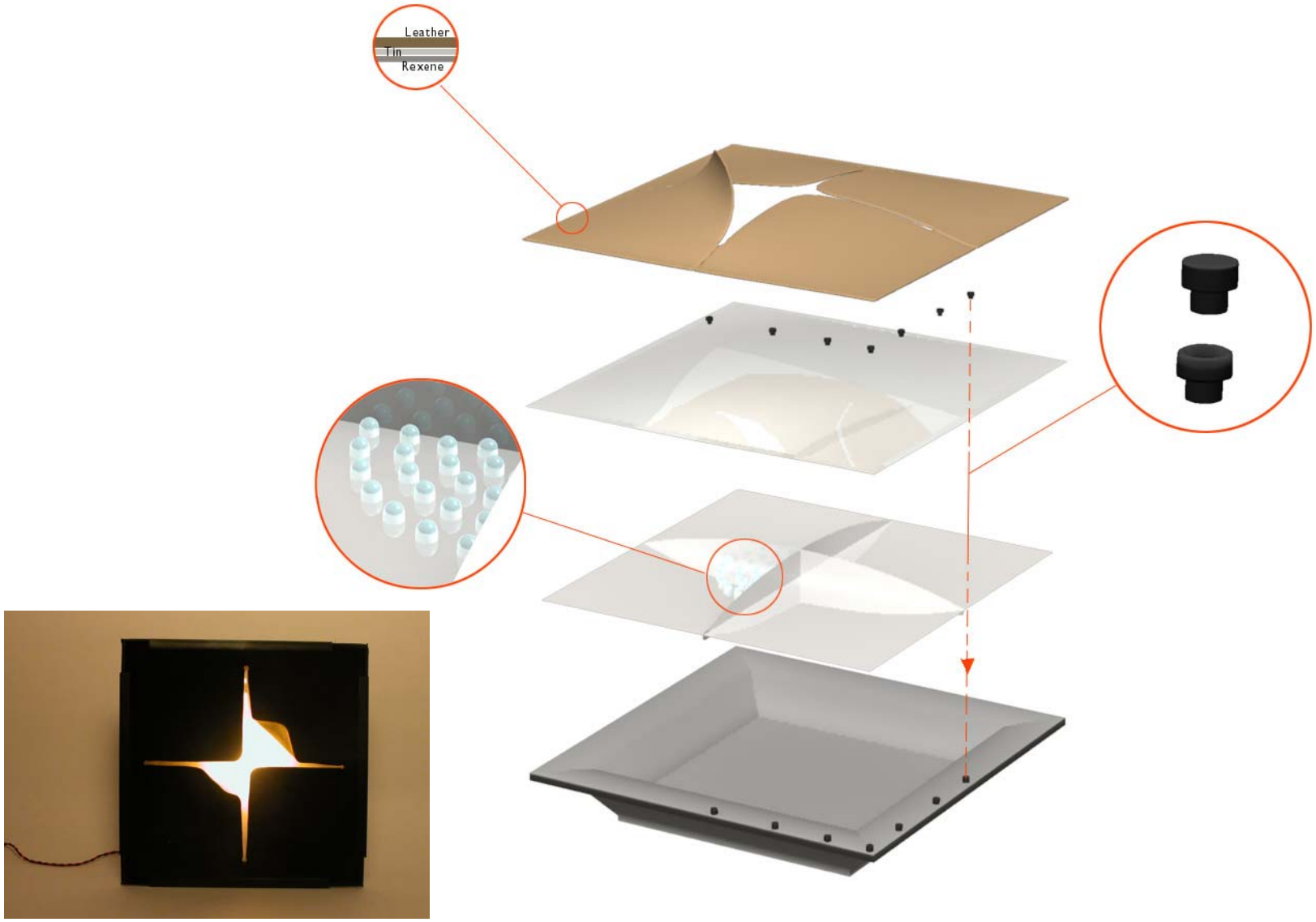
http://www.homelighting.com/
http://www.lightingmag.com/

Product Photographs





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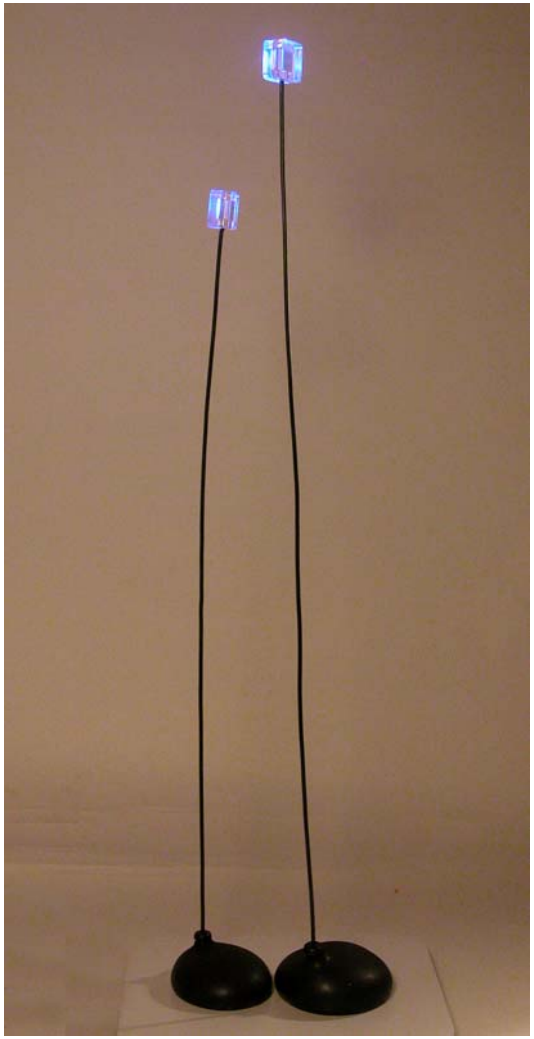

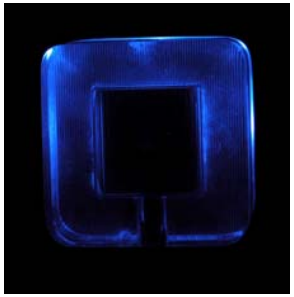

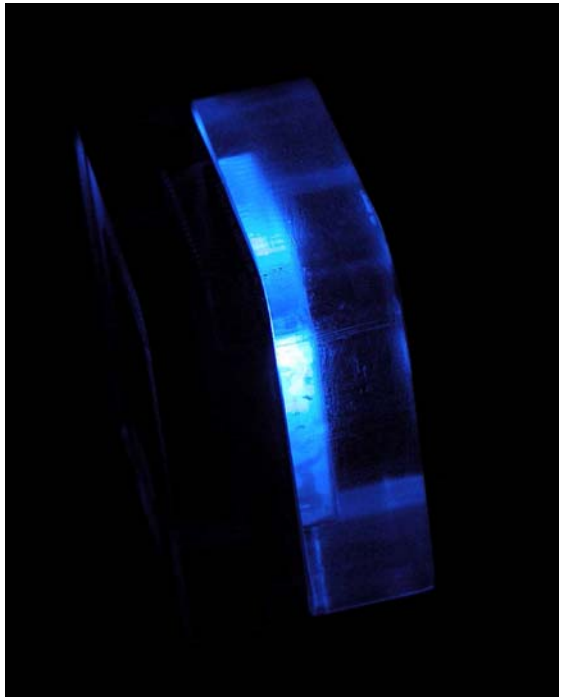

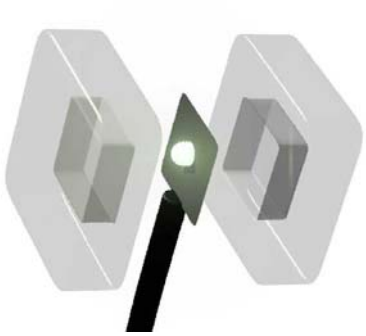

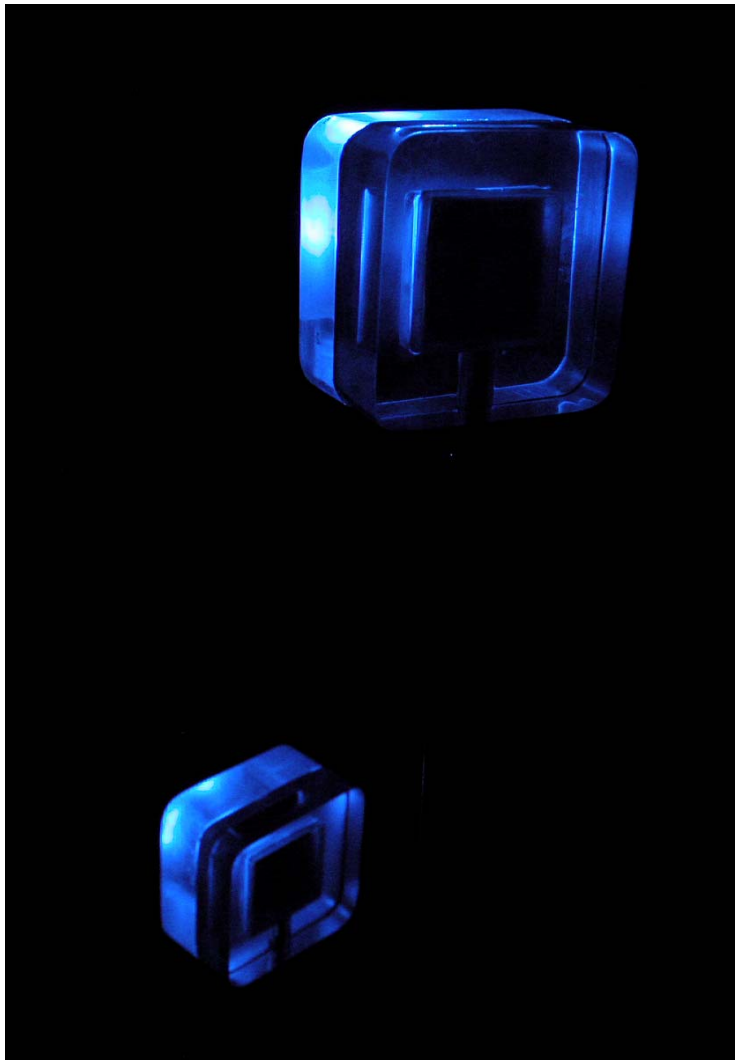

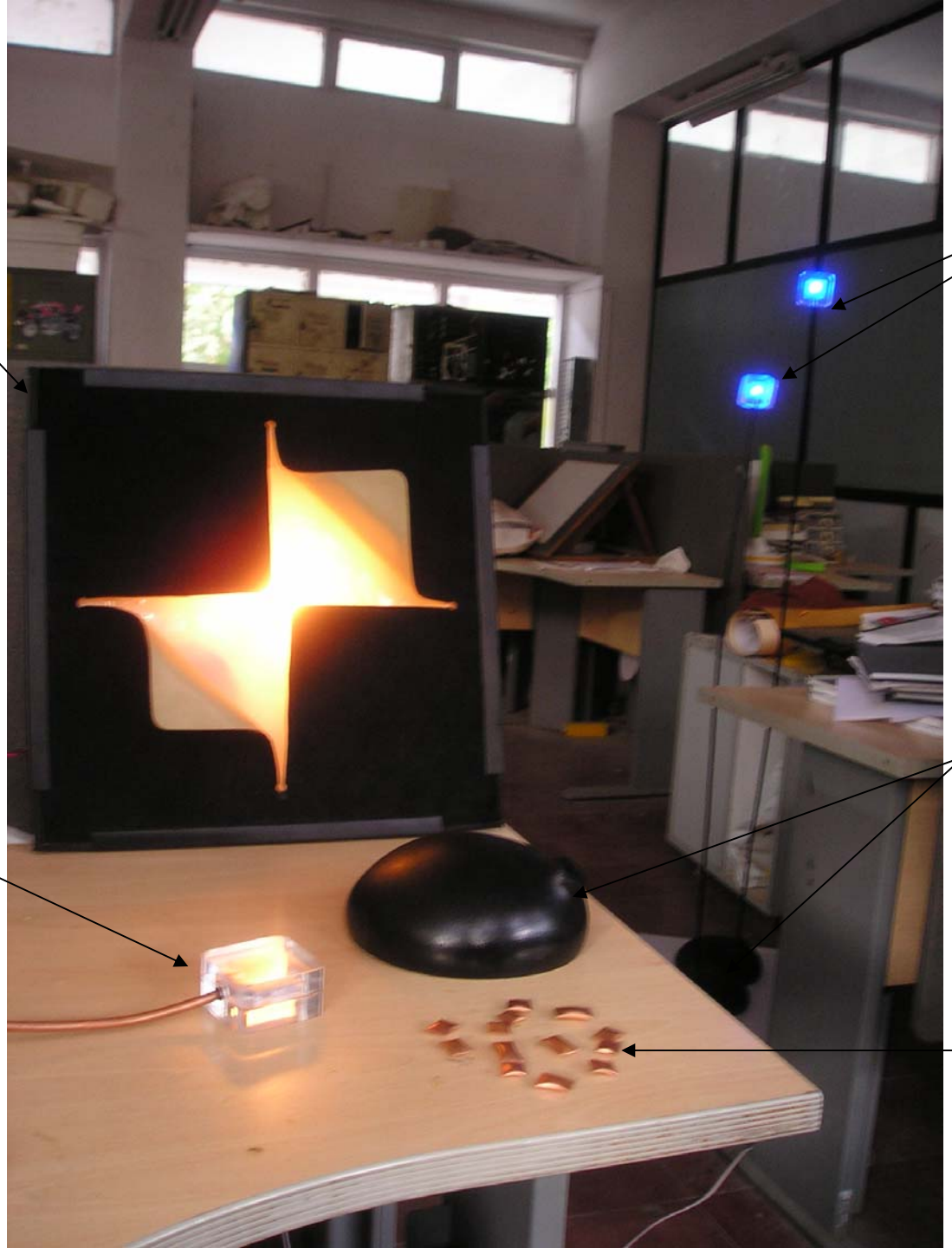
bloom concept
sunflower concept
base unit for
sunflower concept
head unit with
2 led's
copper cheeslings