# Storage in Bamboo and Metal

Guide: Prof. A. G. Rao

Darshan Rathod 02613801

**Project Goals** 

**Craft-Industry product** 

**Product Identification** 

**Product Development** 

Developing a product/range of products that would aid the craft-industry

Introducing a combination of metal with bamboo.

Intention of using **metal** for reasons like providing a **base structure** or for the **finish** it offers. **A sense of permanency** to the product.

Developing a range of products for use in the **urban markets** 

**Prototype development** 

## **Categorization of storage**

## **Market Survey**

Abdul Rehman Street
Largely plastic products for household use, Nesting boxes, stackable trays, Large
Bins

Also metal stands for shoes, bins

Folding laundry baskets( Nylon mesh)

- Crawford Market
- Abdul Rehman Street

#### **Exhibition**

• Pachchai (Industree). DC handicraft organized exhibition

#### Store

- Lifestyle
- Culture shop

# **Containers**

Closed

Small Small object storage



Crates/Bins







Laundry.

Close









# Containers

Open

#### Crates











# **Stand-alone storage products**

Desktop

Wall hung









Larger. Free Standing





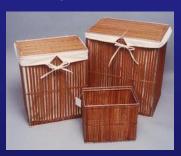
# **Systems**





# **Craft products**

Baskets/Bins



**Multipurpose Storage Boxes** 



Purpose specific(Files)



## What is Storage?

Where is storage required in the house?

What are the objects or products that require storage? Where is organization required?

Opportunities of designing storage products

Probe into finding out what is being used right now. Material. Size. Use. Cost.

Products desired for storage.

Opportunities vis-à-vis Bamboo products

Identifying areas of Acceptability of Bamboo products

# User Survey Images for discussion































# User Survey 1A

### Jhaveri's. Kandivali.

Mother. Housewife.
Husband. (Ex Army Officer)
Son. Mid-thirties. Script Writer
Daughter. (Married) Documentary Filmmaker. Lives
in Delhi

Culture of display
House well organized.
Awareness and use of bamboo products

Keyword Eco-friendly







# User Survey 1B

## Palhade's. Goregaon.

Mr. Palhade. Runs a signage designing firm Wife. Architect Daughter.

Visits exhibitions and buys products like some handicraft vases

Interested in products like Bamboo storage below kitchen counter, storage bins for laundry

Various requirements like storage for small objects, storage for children's clothes, Storage bins in shelves



#### **User Survey 1C**

D'souza's. Bandra.

Mr. D'souza. Photographer. Mrs. D'souza. Teacher. 3 sons



Concerned about cleanliness and maintenance of products.

Wants some new products that are utilitarian especially for organizing clothes, shoes and small objects like belts, stationery within the house.

Various storage needs especially for organization of books, laundry, shoes

'No grooves, avoid cockroaches, insects, dust.'

#### **Inferences**

Younger generation is more accepting towards the use of Bamboo products, the concerns being of eco-friendly nature and so on

Older people would not like to get into the hassles of cleaning and maintenance which a craft- craft industry product may demand

#### **Conclusions**

Out of the several opportunities storages for small products in transit can be addressed and a specific product to accommodate some odds and ends can be designed

**Table top storage Beauty tray** 

Cosmetics Medicines

Spectacles Small change Keys





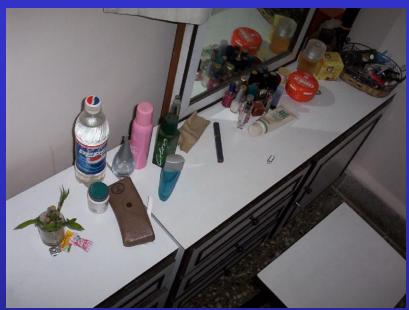
#### Actions

Display Deposit Keep Leave

**Product attributes** 

Access Display







## **Table top tray**

Books
Stationery
Phones
Diaries
Letters
Clocks

Table top caddy Free standing caddy

#### **Actions**

Layer of activities Changing Accept Accommodate

#### **Product attributes**

Open storage Easy access Can be combined with display









## **Corner/Center table tray**

Phones
Newspapers
Diaries
Stationery
Remote Control
Coasters
Letters

Display Light





Center/Side table caddy Free standing caddy

#### Actions

Layer of activities Set of products that are constantly present And accessed (Diaries-phones-stationery)

#### **Product attributes**

Open storage
Easy access
Can be combined with display



## **Side table Book rack**

Books
Diaries
Magazines
Medicines
Spectacles

Centre/Side table caddy Free standing caddy

#### **Actions**

Place Stack Display

#### **Product attributes**

Open storage Easy access Can be combined with display







## **Appliance side tray..**

Phones
Remote controls
Diaries
Spectacles
Cassettes/CDS
Watch
Small Change

Appliance caddy Wall hung/ Table side/table top

**Action**Depositing valuables

Product attributes
Protection of products
stored appliances
Access
Visibility











## Door

Used clothes Bags

Key HolderShoes/SocksBeltsUmbrellas

Letters Tennis Rackets











## **Shoe Storage**

Temporary/Visitors shoes
Outside the door. (Security)
Inside the door (Cleanliness)

Long term
Expensive shoes
Additional pairs

Newspapers









## Laundry

**Laundry Baskets** 

Intermediate storage.
Folded/Ironed clothes



Actions

Clothes carefully kept and placed

Product attributes

Storage of temporary nature.









# **Clothes Storage within shelves Wardrobes**







# **Storage within shelves**

Books Cosmetics





# **Kitchen Storage**

Storage within shelves
Organizers
Bottles
Jars
Vessels
Plastic Bags
Fruit Bowls









**Kitchen Storage** 

Onion Baskets







# **Platform top storage**

Vessels
Plates
Crockery
Ladles
Cutlery
Glass holder
Condiments









Product Opportunity	
Beauty tray Cosmetic tray	Cosmetics Medicines  Spectacles Small change Keys
Appliance side tray	Phones Remote controls Diaries Spectacles Cassettes Watch Small Change
Door	Used clothes Bags Key Holder Shoes/Socks Belts Umbrellas Letters Tennis Rackets

Product			
Opportunity			
Side table Book rack	Books		
	Diaries		
	Magazines		
	Medicines		
	Spectacles		
Table top tray	Books Stationery Phones Diaries Letters Clocks		
Corner/Center table tray	Phones Display Newspapers Light Diaries Stationery Remote Control Coasters Letters		

Product Opportunity	
Shoe Storage	Temporary/Visitors shoes Outside the door. (Security) Inside the door (Cleanliness)  Long term Expensive shoes Additional pairs  Newspapers
Laundry (Unwashed)	Laundry Baskets  Intermediate storage. Folded/Ironed clothes
Laundry (Washed)	Clothes Storage within shelves Wardrobes

Product	
Opportunity	
Laundry	Clothes Storage within shelves Wardrobes
Storage within shelves	Books Cosmetics
Kitchen Storage	Organisers Bottles
Storage within shelves	Jars Vessels Plastic Bags Fruit Bowls

Product Opportunity	
Onion Baskets	Clothes Storage within shelves Wardrobes
Platform top storage	Vessels Plates Crockery Ladles Cutlery Glass holder Condiments
Kitchen Storage  Storage within shelves	Organizers Bottles Jars Vessels Plastic Bags Fruit Bowls



### Inferences

# Storage. Concept.

Temporary	Transient	Long term	No specific storage space
Accessible Cassettes			P. am a to
Newspapers Books	newspapers	Books	Remote Watches small change Stationery
Laundry (for washing)	Laundry (washed)	Clothes storage cupboard	cudonery

#### **Product Definition**

#### Interactive Storage system for transient products

#### Table top/Bed side/Sofa side

Products for storage

Stationery

Books

Daily use products(Watches.Wallets.Small change)

Diaries

Newspapers

CD's. Remote Controls

Cosmetics

Product qualities

Warmth texture of Bamboo. Structural. Aesthetic qualities of metal

Keywords

Interaction. Movement. Acceptability. Adaptability. Display. Accommodative

# Product attributes Level 1

Smaller storage product Combining aesthetic and structural qualities of metal with aesthetic qualities of Bamboo

#### Level 2

Larger storage products

Products that become part of the Interior space more as statements and also provide functionality in terms of storing odd transient products like Newspapers/Clothes.. Basically. Products that are in transit.

### **User Group**

Mid-age group Users

Eco-friendly culture
Time and inclination to maintain and keep products
Taste
Acceptance

#### New Product Range

A product that catches the fancy of younger people

Objects of fancy. Trend. Catchy. New.

Looking at products as part of the Interior space

Textures

Forms

Light

## New product Ideas

Trends

Culture Catch

Human Behavior Collect

Interaction Accept

Keep

Organize

### Craft Group

#### Chaitanya

Group of 8-10 girls working with an NGO. YUVA

Skills.

Weaving

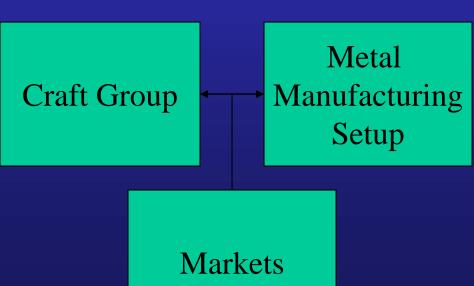
School Education.



Introduced to tools and technology, production of craft products

Products
Hair clips
Cards
Coil technique coasters
Table mats
Weave Based Trays

Other groups Sampoorna Bamboo Kendra



# **Bamboo Manufacturing**

Use of various tools and Technologies already developed by the Bamboo studio

Development of product specific tools and technologies.

Moulds
Jigs and fixtures
Joints







# **Metal Manufacturing**

Winding machines
Dies for pressing into shape

Pre finished products like stainless steel Trays boxes or elements can be incorporated into the design

Cold forming Spinning Drawing





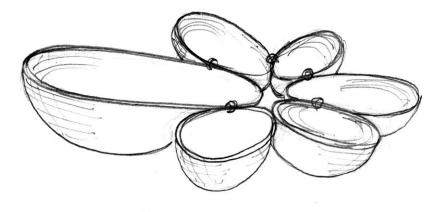




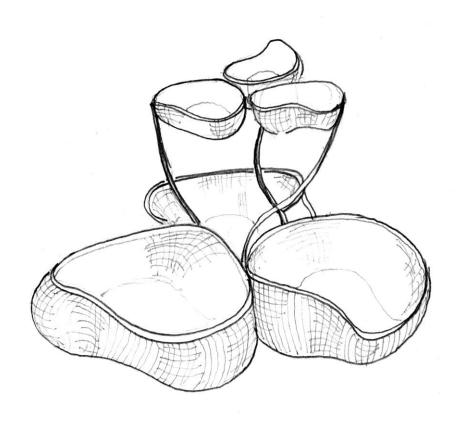


Concept Sketches

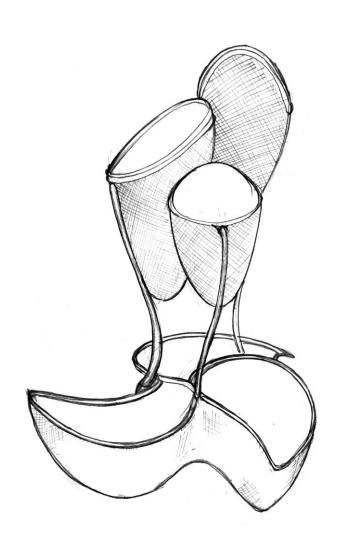




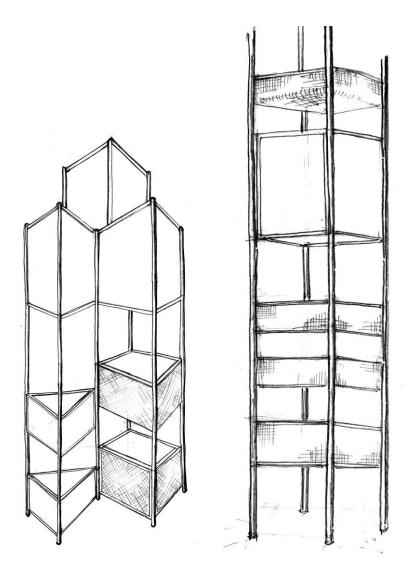
**Center table top tray** 



**Center table top tray** 



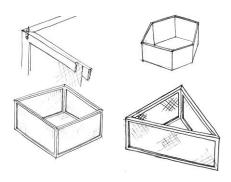
Center table top tray

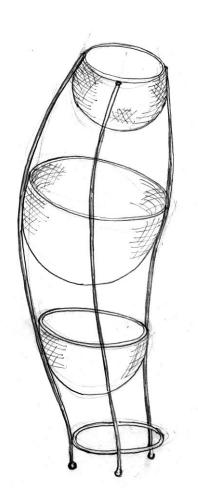


Storage. Lighting

#### **Weaving details**







Laundry storage

# Workshop at Jagdalpur

Need for identifying and designing new products

Market needs

Awareness of tools and technology for the craftsman











# Analysis 1

Hypothesis

Criteria for design

Problem restatement

Product positioning

Space usage

Position

Culture

Deeper needs

Product functions

Lifestyle/Change in society

Center or core of the house

Characterized by transition

Objects going in and coming out.

Center Table

Activity space

Layering of activity

An element of display

Mobile Stand

Pen Stands

(No specific product for diaries)

Food. Comes in and goes out (Comes in with a tray and a bowl) Should it be also accomodated

NEW PRODUCT

POSSIBILITIES

1 A set of products in a range 2 A singular product that provides for and accommodates all of this

and more

Short Term Typically overnight Newspapers Requires a permanent space

A completely New product idea that accounts for and integrates these small objects that do not have a space in the room but have a presence

- a A side table top product that integrates all of the transient floating objects
- b An independent standalone product that incorporates even objects like books and magazines

A set of co-ordinated products that responds to all such needs

Cell phone Wallets Keys Work bags

Rills Letters Snacks Tea

Diaries Stationery

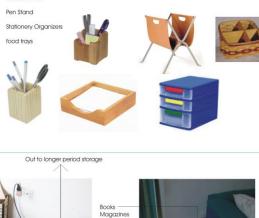
Magazines Newspapers

MUSIC BOX ENTERTAINMENT CUBE JOY BOX

A Product to keep CDS, Cassettes Remote Controls. And also other small artifacts

On the wall. Suspended near the appliance

An independent box or cube. Either free standing or suspended



Corner / Side table

/ Corner table

Side

The table top is already an open container to store things. What is needed is organization

This could be in the form of a over the surface organiser or in the form of a product by itself that accommodates the nature of all the products going in and coming

Diaries Tea cups Maybe other snacks

Daily Newspapers

Permanent

Stationery

Transit Cell Phones\_

Food



Newspaper Gadgets Phones

Objects like CDS, cassettes and remote controls find their way on top of appliances.

These could be accommodated in an innovative product near the appliances

Other small objects like spectacles and wallets find their way onto the appliances also. These could be accommodated within the product







The dining table is the center of the house. The surface attracts a number of transit objects.



Static Condiment stand/tray Coasters

Moving Paper Bill tray

Something easily removable while having meals or an alternative place/product to keep bills and papers

essory

Appliance

#### USER SURVEY

#### Characteristics

Open Shoe storage Outside the door Beside the door

Storage Entrance Shoe Stord

Products available

Metal frame shoe racks Cane shoe racks Shoe boards(MDF/Plywood)



Two categories of shoes A Daily Use B Shoes that are worn occasionally

Other products associated with shoes Socks Shoe Brushes

Other Newspapers



Shoes stored outside the door Temporary storage visitors shoes

Criteria Dust should not enter the house

Security



Covered or uncovered shoe storage integrated with wall unit



Open Shoe Racks

Do not integrate other things that are stored along with shoes

PRODUCTS

IN MARKET

Covered shoe storage not provided



Open shoe storage independent unit

#### Temporary shoe storage outside the house

Small open rack only for visitors chappals shoes

#### Shoe Rack in Bamboo and metal

NEW PRODUCT

POSSIBILITIES

Provision for closed storage space for expensive shoes and long term storage

provision for storing additional items like newspapers, shoe accessories and other small products

Living Room Display cum Utilitity storag

A culture and flavour of displaying Making a statement An Identity Stating 'Who I am' 'Where I have been'



Open display

Display of artifacts and possesions

Stationery Keys

Utility storage

Stationery holder Key Holders Traditional touch/craft touch Letters





Utility storage tray combining display space

Could be wall mounted Storage product for letters Stationery

keyholders

Make a statement about the user





Toys lying around the house add flavour and colour to the space

Toys are almost displayed or are lying around the house

More than a crate or a bin some element of display can be added





#### TOY BOX

Separate compartments for small and big toys

An element of display added to make the product visually interesting

Considerations for child safety Design for children

## **Analysis 1**

#### **Conclusions**

Tactical analysis

- Problem solving based on observed context
- Need to address larger context based on general needs
- Deeper understanding of actual needs and requirements is needed
- Further breaking down of components for individual requirement analysis
- Opportunity of incepting new products
- Opportunity of incepting bamboo products for characteristics of warmth



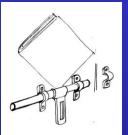
# **Analysis 2**

- Breaking down of individual components and assessing needs and requirements
- Observing and incorporating subtle features of use and interrelations between objects
- Associations with activity
- Nature of activity
- •User responses
- Product responses



## Newspapers → Receiving the paper → Reading place





Dining table

Center table

Bedroom



Storage through the day — → Dead Storage

Visible/Accessible.
A place to display or rest the paper





User responses

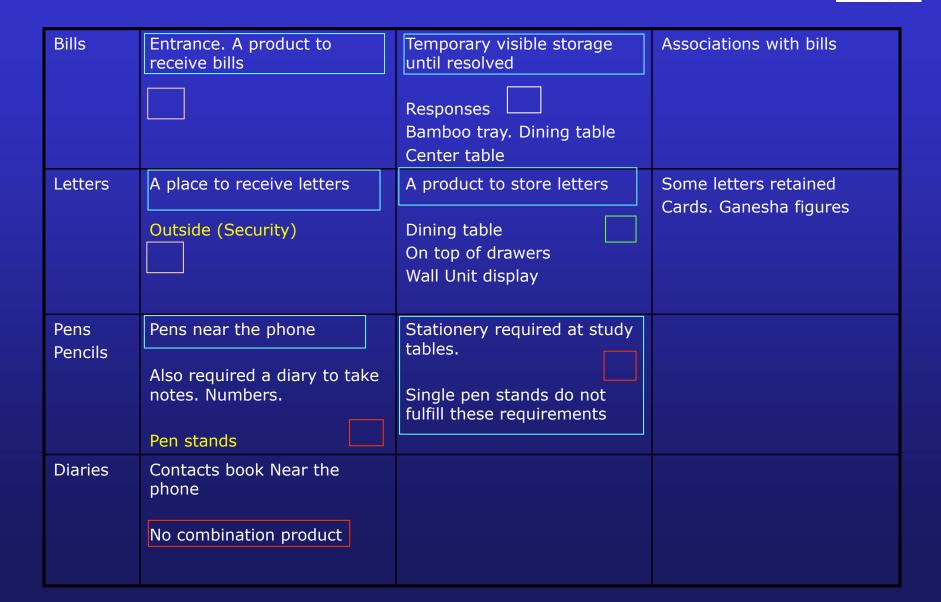
Need

Characteristics

Adopted product

Designed & Used

designed product not used



User responses

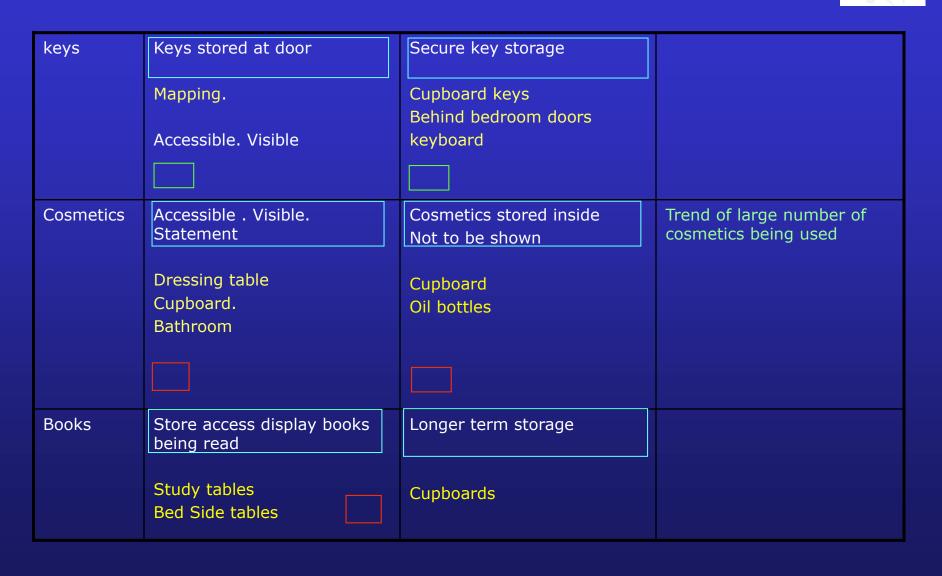
Need

Characteristics

Adopted product

Designed & Used

designed product not used



User responses

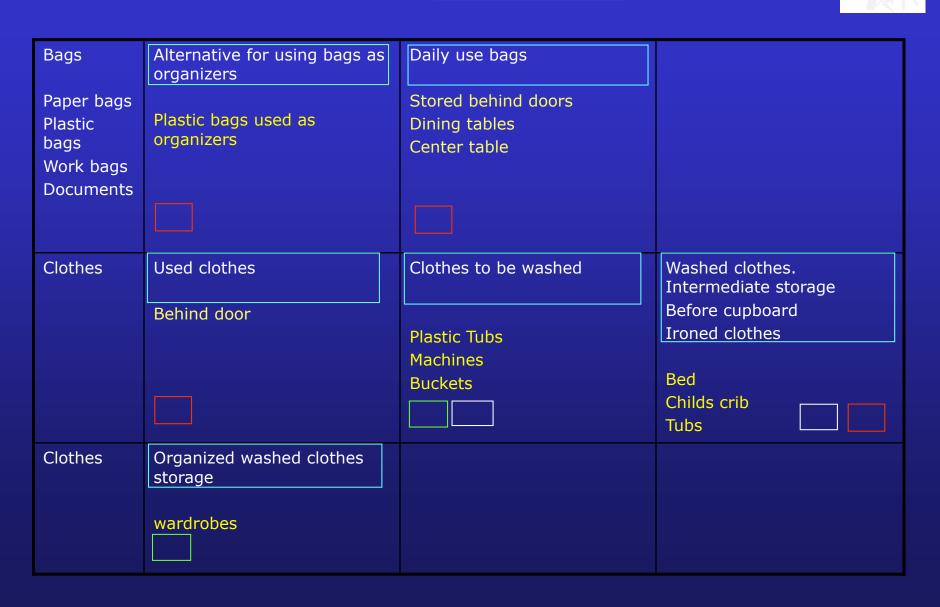
Need

Characteristics

Adopted product

Designed & Used

designed product not used



User responses

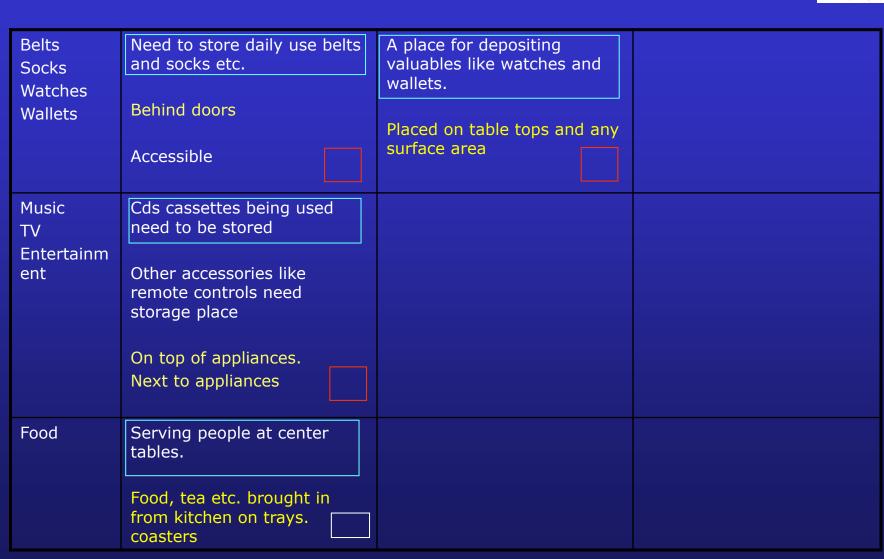
Need

Characteristics

Adopted product

Designed & Used

designed product not used





User responses

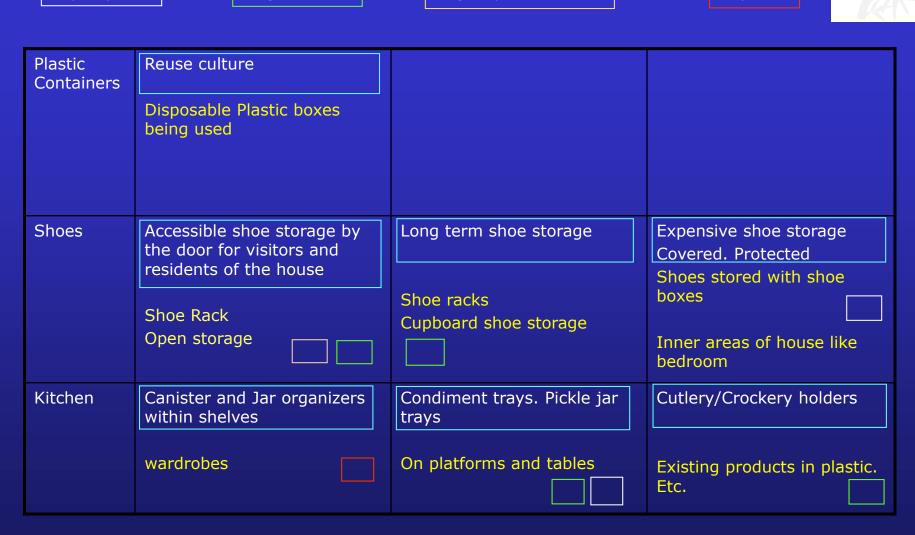
Need

Characteristics

Adopted product

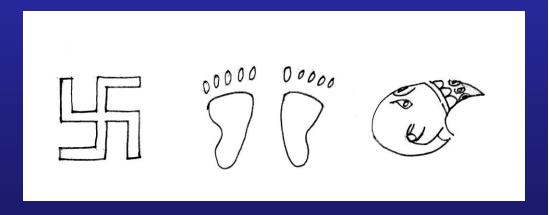
Designed & Used

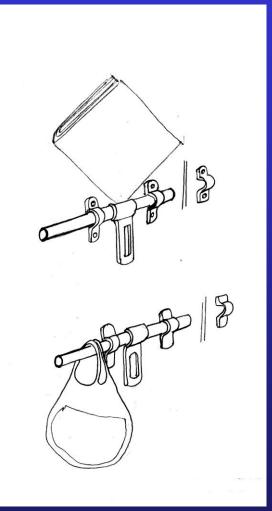
designed product not used



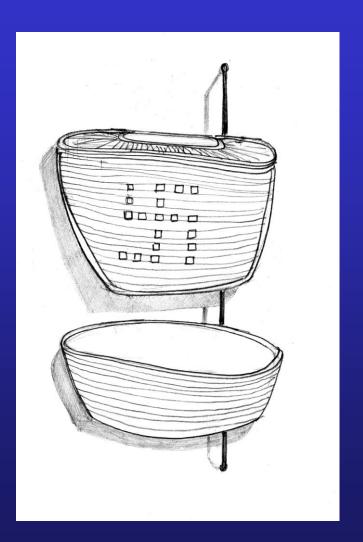


Concepts





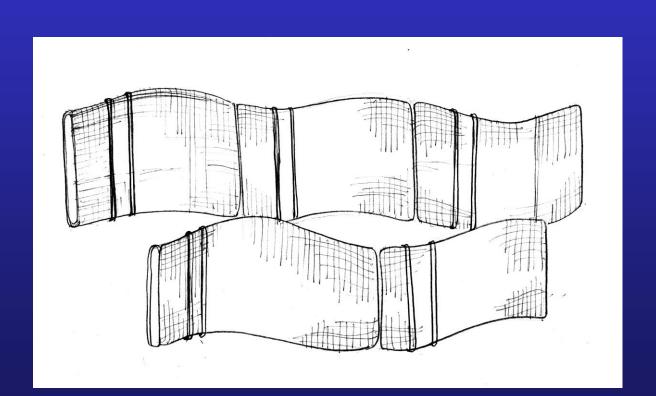
Storage at door entrance



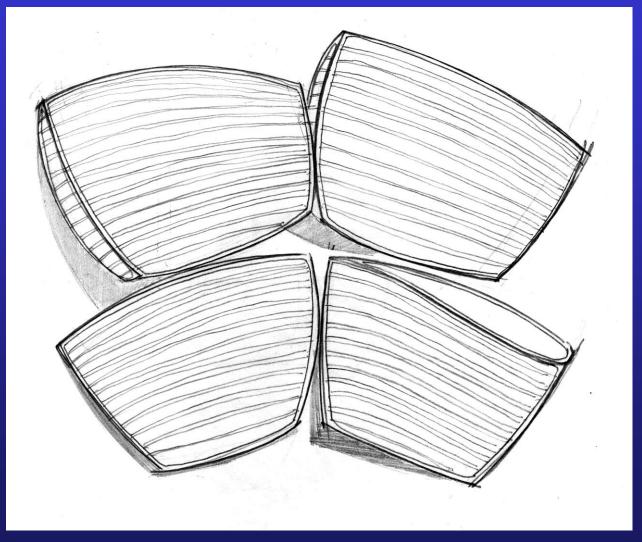
Letter and Milk bag holder



Letter and Milk bag holder

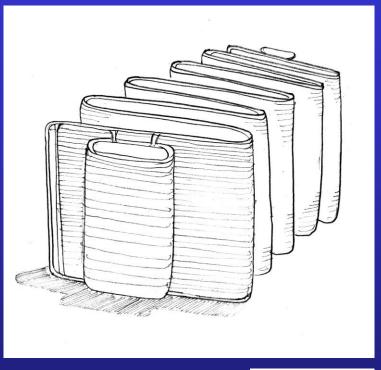


Walls. Invitation card, Letter holder and display



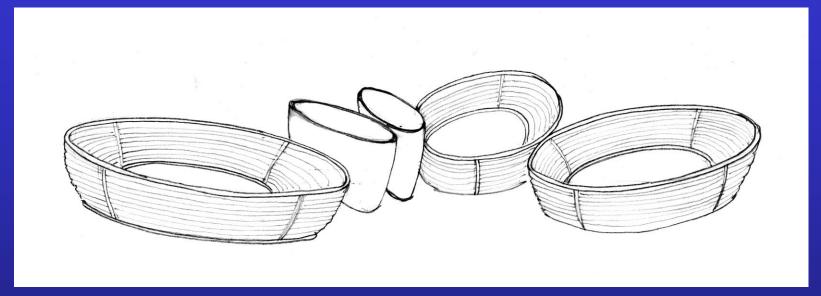
Invitation card, Letter holder and display

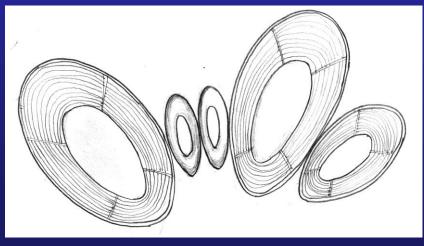




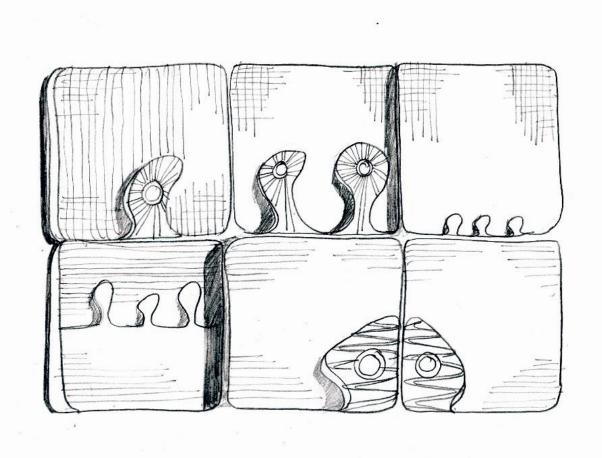


Music CD. Remote Stand





Centre table top tray set





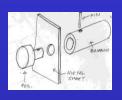
#### **Products for an alternative lifestyle**

A collection of products incorporating needs and characteristic uses of the product by the user

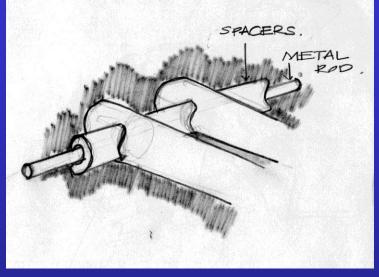
A group of products using aesthetic qualities of bamboo bringing a sense of warmth

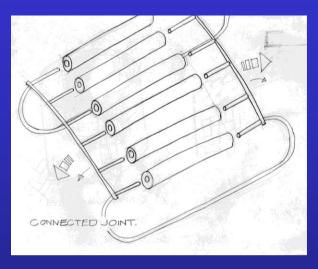
# Fixing Details

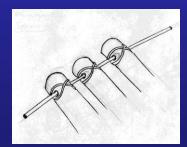
#### Full Bamboo and MS rod

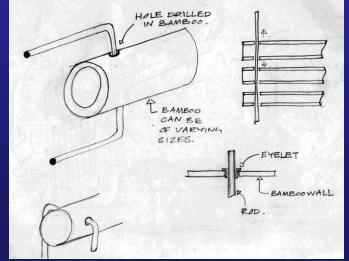


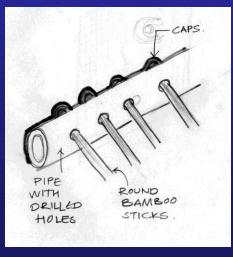






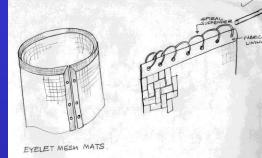




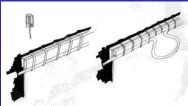


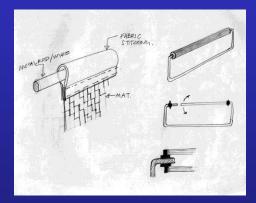
# Fixing Details Mat and Bamboo

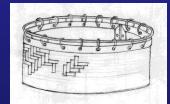


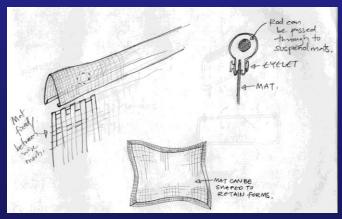












The same of the sa

Product area selection

Laundry storage in Bamboo and Metal

Cycle of movement of clothes within the house

**Product opportunities** 







1 Current storage of clothes to be washed

Dry clothes. Short period/Overnight

1A Clothes bunched on chairs and tables

1B Clothes hung on pegs behind door

Need A place to keep or dump clothes

Solutions Laundry Bag/A place to suspend clothes

Possible Location. Bedroom





1C Dry Laundry storage bin in passage

Can be a conventional laundry basket form In a bamboo and metal combination



1D

Observation Clothes dumped on top of machine (Embarrassment)

Clothes bin. Covered. Concealed



Washing space in bedroom

Bucket for dry and wet clothes

Dried ironed and folded clothes on bed

#### 1 Clothes for washing

1E
Observation
Laundry area within the house
In bedroom attached to the bathroom
(Power supply and water supply for machine)

Clothes dumped directly in machine Clothes put in a bucket by the machine (Same bucket is used to carry clothes To the drying area)

A product for keeping clothes for Washing and a tray to carry washed clothes(SM)

Washing powder that is stored separately can be combined

Ironed/Folded clothes that are put on the top can be accommodated in separate baskets or trays(SM)

Basket bag that is part of the set But can be used to carry the clothes can be used.(M)





#### 1 Clothes for washing

1F Observation Clothes are dumped in a tub in the bathroom

Clothes are soaked

Clothes are brushed before they are washed In the machine

Clothes are carried in a bucket to the machine In the bedroom/kitchen





#### 2 Washing of clothes

2A

Clothes/Soaked or dry are brought and loaded In the machine.

After washing, they are carried to the drying Area in a bucket or hand.

Tray/Tub to carry clothes.



Brushed Clothes carried to kitchen
From bathroom and then to bedroom



Clothes are brought from bedroom to machine.

Machine is pushed to the bedroom everyday for power and water



Clothes are brought from the bathroom Are put in the machine





3A Clothes dried generally in the bedrooms Or balcony

Clothes removed same evening or next day morning









#### 4 Folded clothes

Clothes folded and put on bed or other Surfaces.

Children play with the washed clothes and Spoil them





#### 4 Folded clothes

Use of an assortment of objects to store used Clothes

Bed is used as it is a convenient work surface For folding the clothes

But after folding, clothes are left on the surface

An additional mobile trolley can be used to keep the clothes after they are folded







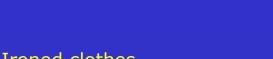
#### 5 Folding/Ironing

5A Ironing of clothes within the house

5B

Clothes given out to dhobi in a bundle for ironing (Removable Bag)

Users give a shawl/bed sheet to the dhobi to take and bring back the washed clothes





#### 6 Ironed clothes

Clothes that are ironed or received from The dhobi are left lying on the bed.

An intermediate transit storage space where the clothes are kept before being stored In the wardrobe can be incorporated

Closed. Protected. Unreachable by children



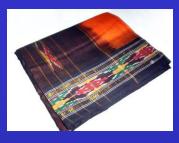
#### Folded Laundry Sizes



Kameez - (35 X 28)cms

Salwaar - (40 X 28)cms





Saree - (34X 30) cms



Shirt – (40 X 26) cms



Trousers – 4 fold (36 X 28)cmsc



Trousers – 3 fold (36 X 36)cms

Largest Dimension(Length) – 40 cms

Width dimension for all categories to fit – 30 cms

Bin – (40 dia X 44 Height)cms



# Approach 1

Product needs

Pre wash Laundry Bin A bin for clothes to be stored in the bedroom Movable

Separate compartment for white clothes

Volume of clothes.

1 day equivalent
Considering a family size of 6

Post washing

A tray to keep and carry the semi dry clothes To the drying area.

A tray to keep folded transit clothes/towels

A movable bag or bin to carry the clothes To the dhobi and bring them back

A place to keep ironed clothes Could be in the form of a tray or basket

Additional requirements Washing powder storage

# 

#### Alternative 1

Laundry Caddy Push cart. Low height

Laundry Hamper in mat and powder coated MS rods Shelves in assam bamboo and powder coated MS rods

#### Alternative 1A

Laundry Caddy Push cart. Low height

Hamper in Chic mat and shelves in full bamboo. MS frame. Powder coated





#### Alternative 1B

Laundry Caddy Push cart. Low height Laundry Hamper and shelves in chic mat

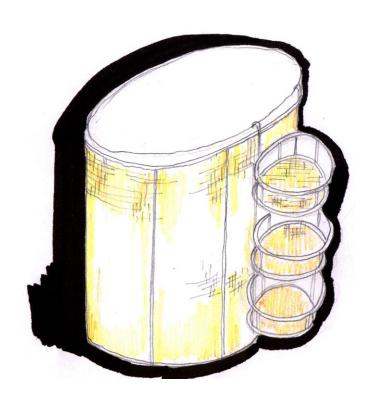




#### Alternative 2

Elliptical hamper Woven mat infill panels

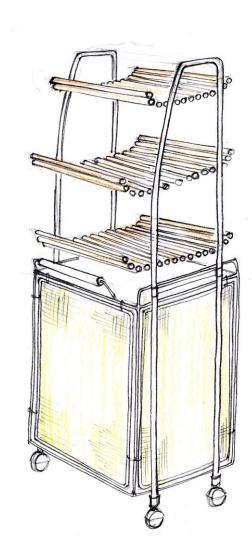




#### Alternative 3

Laundry Caddy Vertical

Hamper in MS frame and woven mat

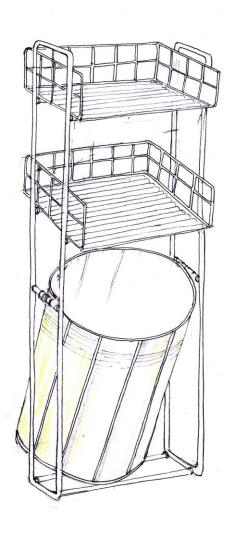




#### Alternative 3A

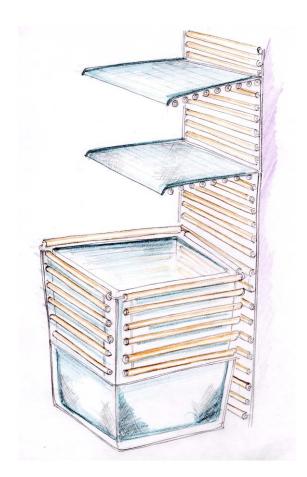
Laundry Caddy Vertical. Circular hamper. Tilting Hamper in Chic mat and shelves in full bam

Hamper in Chic mat and shelves in full bamboo. MS frame. Powder coated



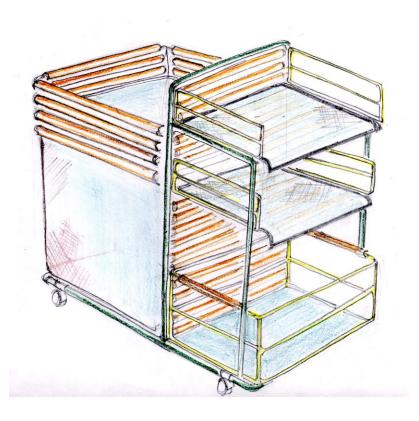
#### Alternative 4

Vertical laundry organizer Shelvesand bin in full bamboo and expanded metal



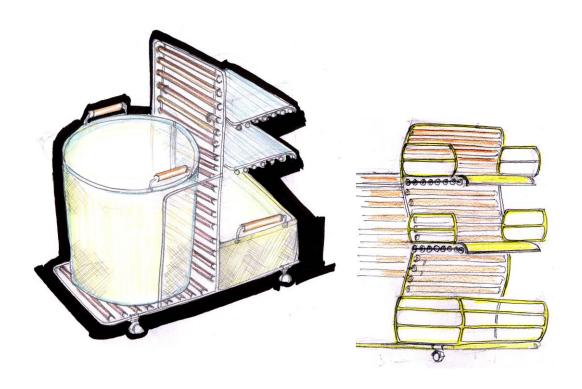
#### Alternative 4A

Hamper and shelves in expanded metal sheet and full bamboo



#### Alternative 4B

Hamper and shelves in expanded metal sheet and full bamboo



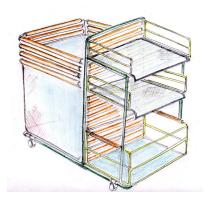


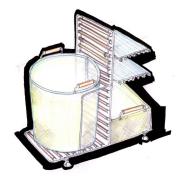
#### Further criteria

Functionality

Desired product aesthetics Contemporary.

Combination of Full Bamboo, Metal and perforated sheet.





#### Workshop at Maldah West Bengal

Different levels of skills of workers

Products can be designed addressed According to different skills.

Education and entrepreneurship combined with craft skills.

Products for local market and markets outside

Craftsman aware of needs like quality control and finishes but lacks the tools for doing so.





#### Laundry Concepts. Approach 2

Products as **part of the system** yet can be **individual products** serving specific needs.

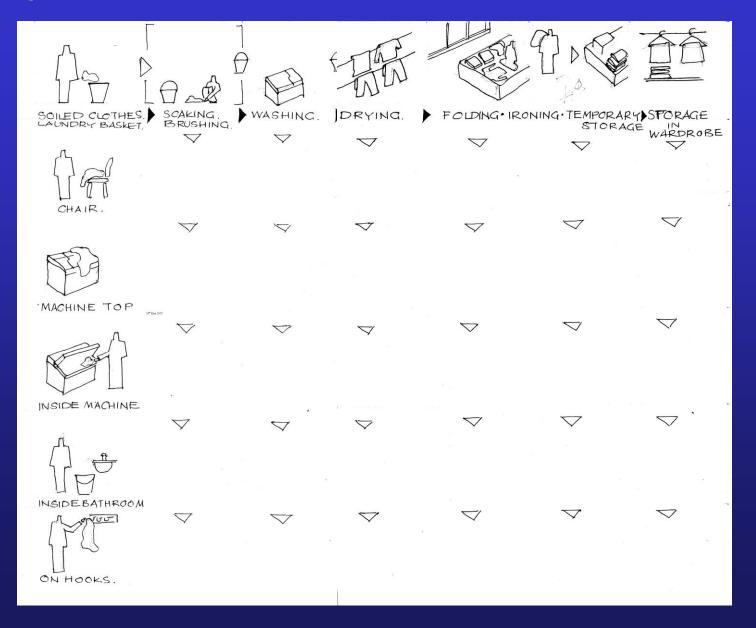
Products form a **family or a set of objects**.

Products designed in terms of interiors of urban houses in terms of proportion, scale and warmth.

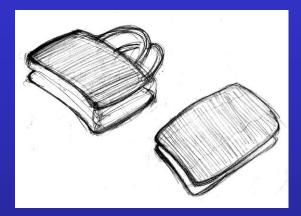
Products based on **sequential analysis** of laundry cycle

- 1 Laundry Basket
- 2 Product for Hanging Clothes
- 3 Folded/Ironed Clothes Organizer
- 4 Ironing Board
- 5 Clothes hanger
- 6 Bag for Carrying Laundry

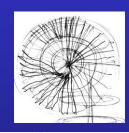
#### **Cloth movement cycle**

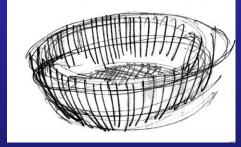


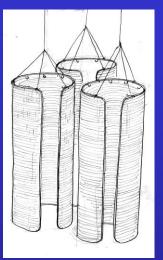
# Laundry Products. Sketches

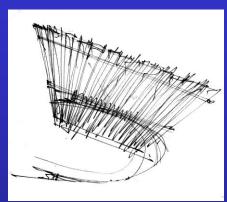


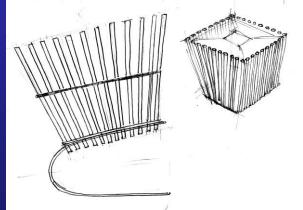












- 1 Laundry Basket
- 2 Product for Hanging Clothes
- 3 Folded/Ironed Clothes Organizer
- 4 Ironing Board
- 5 Clothes hanger
- 6 Bag for Carrying Laundry

#### **Final Product Selection**

A Laundry Basket

B Folded/Ironed clothes storage

Laundry basket

Placed in the bedroom or other part of the house like passage space

Scale. Warmth. Décor.

Placed near corners or walls.

Bin size for one day volume of clothes.

Wash cycle approx. 2 buckets.

Handles for carrying/Castors for mobility.







# Folded/ Ironed Clothes storage Laundry Caddy

Clothes folded on surface of bed after removing from the line.

Clothes sorted and stacked.

To accomodate Clothes left on the bed surface/ on tables or other surfaces after folding

Clothes that are got from ironing

Visualization of product based on scenario observed.

Folded clothes storage for a days volume of clothes

Mobility.

Dust control option

Sizing based on cloth sizes

## **Product Concepts**

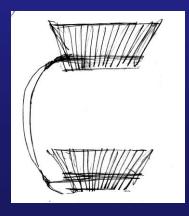
## Concept 1

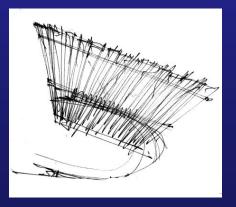
Smoked Assam Bamboo with metal frame

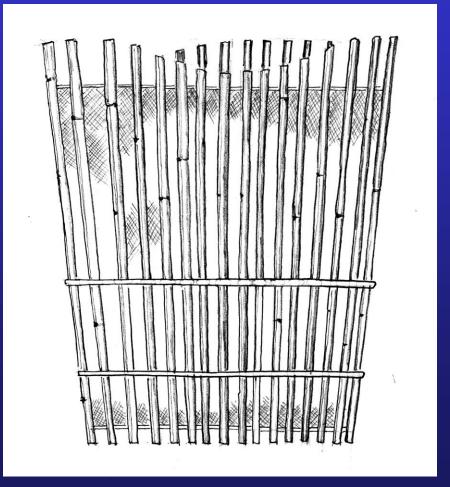
Consistent diameter and finish

Wiremesh

Contemporary simple form



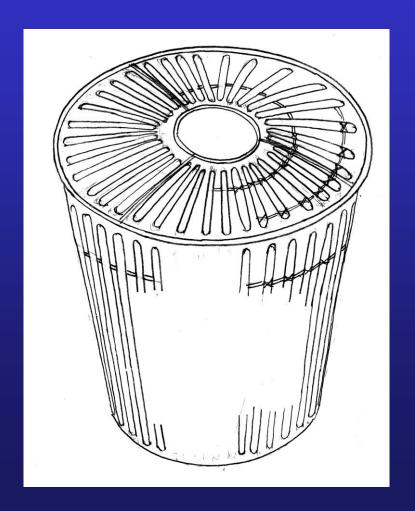




Bamboo strips joined to Metal frame with cane winding.

Lid with similar winding.

Conventional Bin form for design.



Folded clothes basket.

Initial ideas. Trolley/shelves.

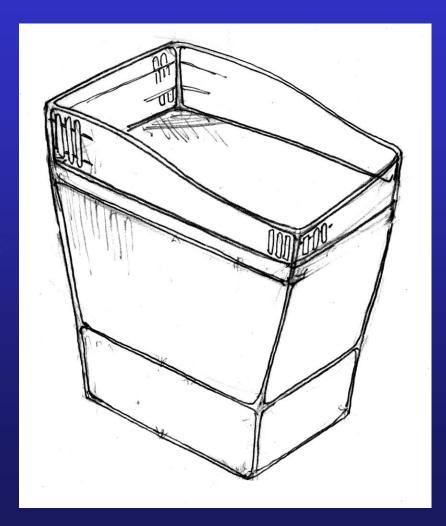
Association with laundry.
Use of a conventional Basket form.

Compactness.

Visual assocaition with laundry basket design.

Lid as a tray to allow sorting.

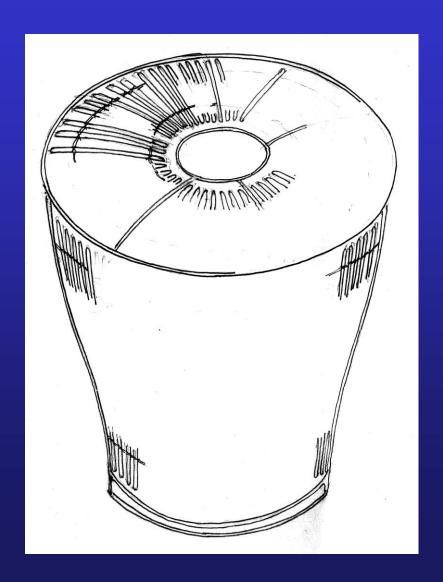
Mobility



# Concept 2.1

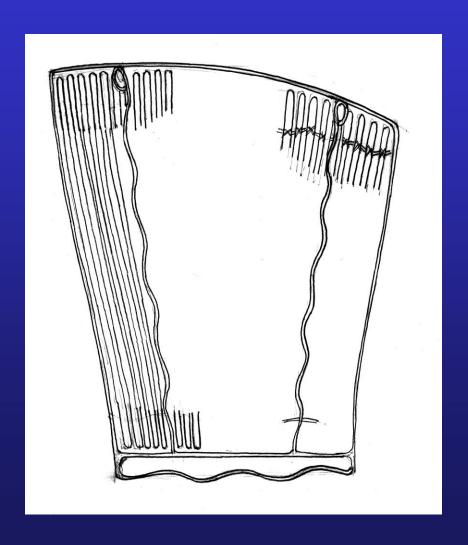
Subtle curves and variations in the form.

Organic, Floral form.

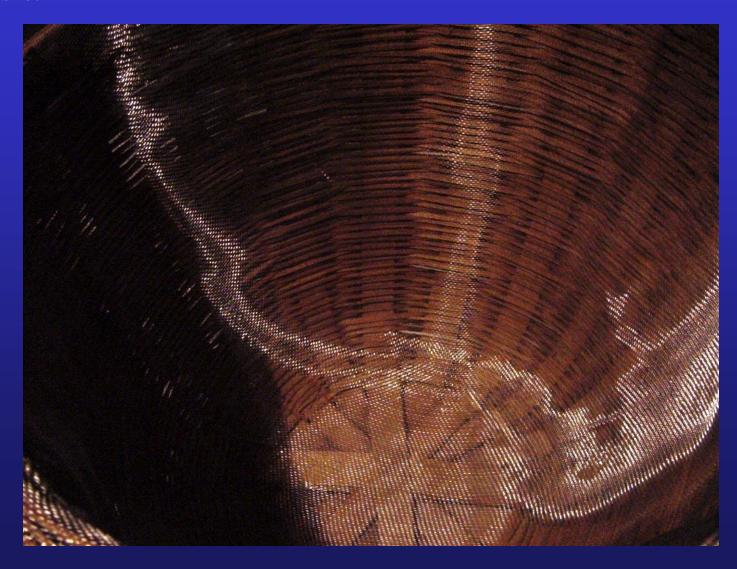


# Concept 2.2

Variations in the metal frame and weave pattern



# Wire mesh and Basket

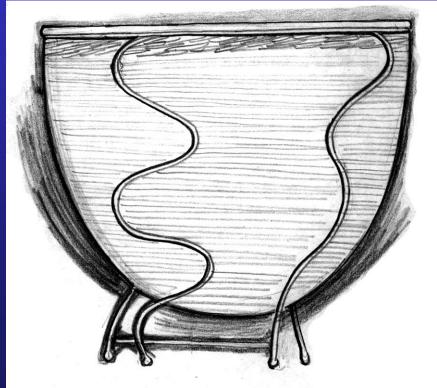


Traditional weave combined with wire mesh.

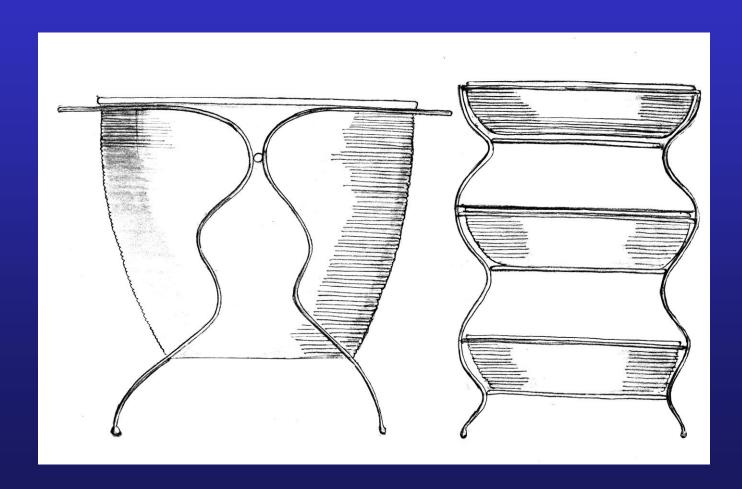
Quality of wire mesh to take up shapes without any special processes is explored.

Basket form can be combined with metal frame

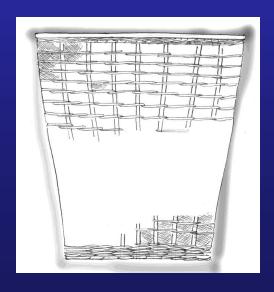




# Variations in the metal frame and weave pattern



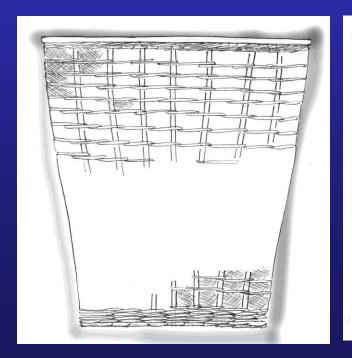
# Weave with round strips and wire mesh

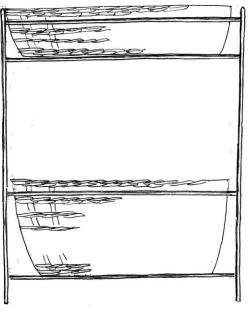




Baskets separately made by craft group

And placed in the metal stand. Inside of the basket can be with a wiremesh finish.



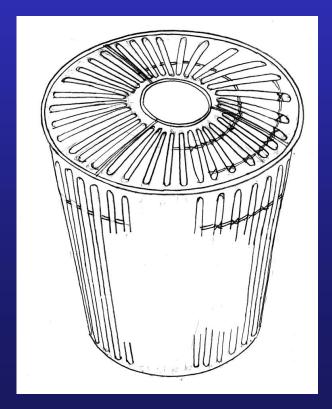


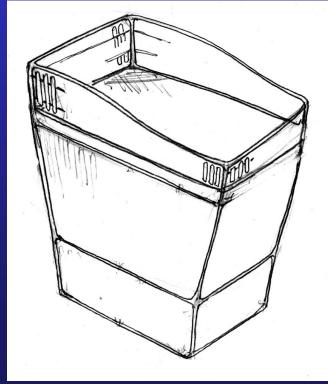
# **Final Concept Selection**

Pre-manufactured metal frame and Bamboo strips added later.

Identification of product based on simple skills of craft group like Chaitanya.

Contemporary interiors.





Scaled models



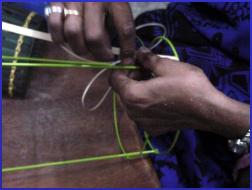


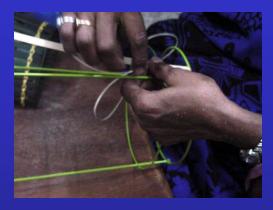


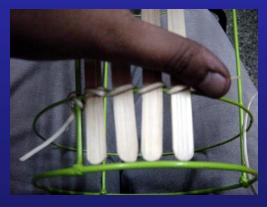


# Detail and fixing













Heights for laundry caddy









# 禁

# Concept development.

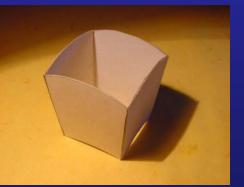
Form Exploration

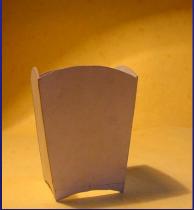












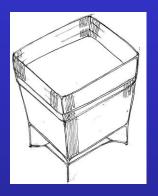




#### Scaled models







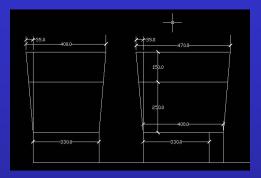


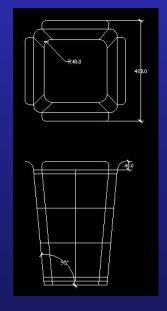


# NA.

# Concept development.

#### Scaled models













# Prototype development

















# Final Model







# Final Model







