P1
internship at Imaginarium

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two major parts:

2. the happy project

1. understanding 3d printing

1

all about
3D printing

A process for making a physical object from a three-dimensional digital model, typically by laying down many successive thin layers of a material.

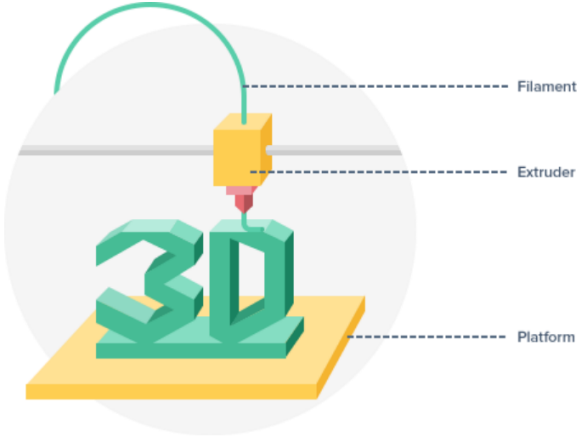
3D Printing uses softwares that slices the 3D model into layers. Each layer is then traced onto the build plate by the printer, once the pattern is completed, the build plate is lowered and the next layer is added on top of the previous one.

3d printing

Types of 3D printers		
Type	Technology	Material
Extrusion	Fused Deposition Modelling (FDM)	Thermoplastics (e.g. PLA, ABS), eutectic metals, edible materials.
Granular	Direct metal laser sintering (DMLS)	Amost any metal alloy
	Electron beam melting (EBM)	Titanium alloys
	Selective heat sintering (SHS)	Thermoplastic powder
	Selective laser sintering (SLS)	Thermoplastics, metal powders, ceramic powders.
Laminated	Powder bed and inkjet head 3D printing, Plaster-based 3D printing (PP)	Plaster
	Laminated object Manufacturing (LOM)	Paper, metal foil, plastic film
Light polymerise	Steriolithogeaphy (SLA)	Photopolymer
	Digital Light Processing (DLP)	Liquid resin

A plastic filament or metal wire is unwound from a coil and supplies material to an extrusion nozzle which can turn the flow on and off.

The nozzle is heated to melt the material and can be moved in both horizontal and vertical directions by a numerically controlled mechanism, directly controlled by a computer-aided manufacturing software package.



FDM – Fused Deposition Modelling

3d printing technologies

Materials used
The most common materials used in FDM printers are ABS, PLA, and polycarbonate (PC).

FDM – Fused Deposition Modelling

3d printing technologies

Advantages: Cheaper since uses plastic, more expensive models use a different (water soluble) material to remove supports completely. Even cheap 3D printers have enough resolution for many applications.

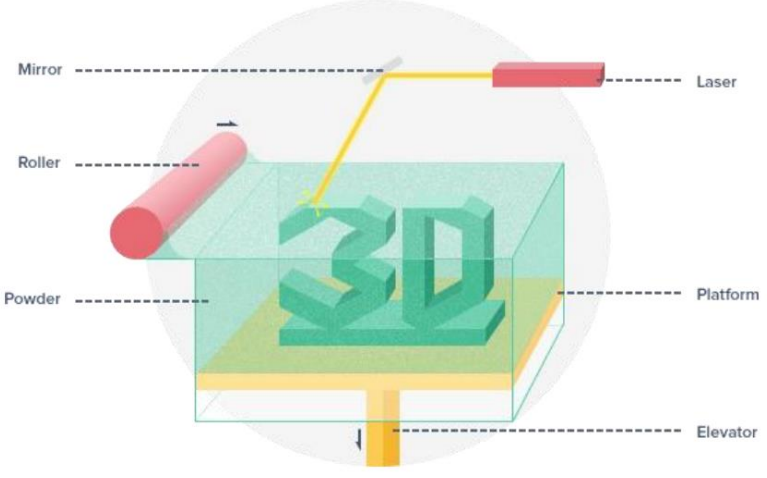
Disadvantages: Supports leave marks that require removing and sanding. Warping, limited testing allowed due to thermoplastic material.

FDM – Fused Deposition Modelling

3d printing technologies

It uses a high power laser to fuse small particles of plastic, metal, ceramic, or glass powders

The SLS machine preheats the bulk powder material in the powder bed somewhat below its melting point, to make it easier for the laser to raise the temperature of the selected regions the rest of the way to the melting point.



SLS – Selective Laser Sintering

3d printing technologies

Materials Used

Polymers such as nylon or polystyrene; metals including steel, titanium, alloy mixtures; composites and green sand.

SLS – Selective Laser Sintering

3d printing technologies

Benefits : SLS has many benefits over traditional manufacturing techniques. Speed is the most obvious because no special tooling is required

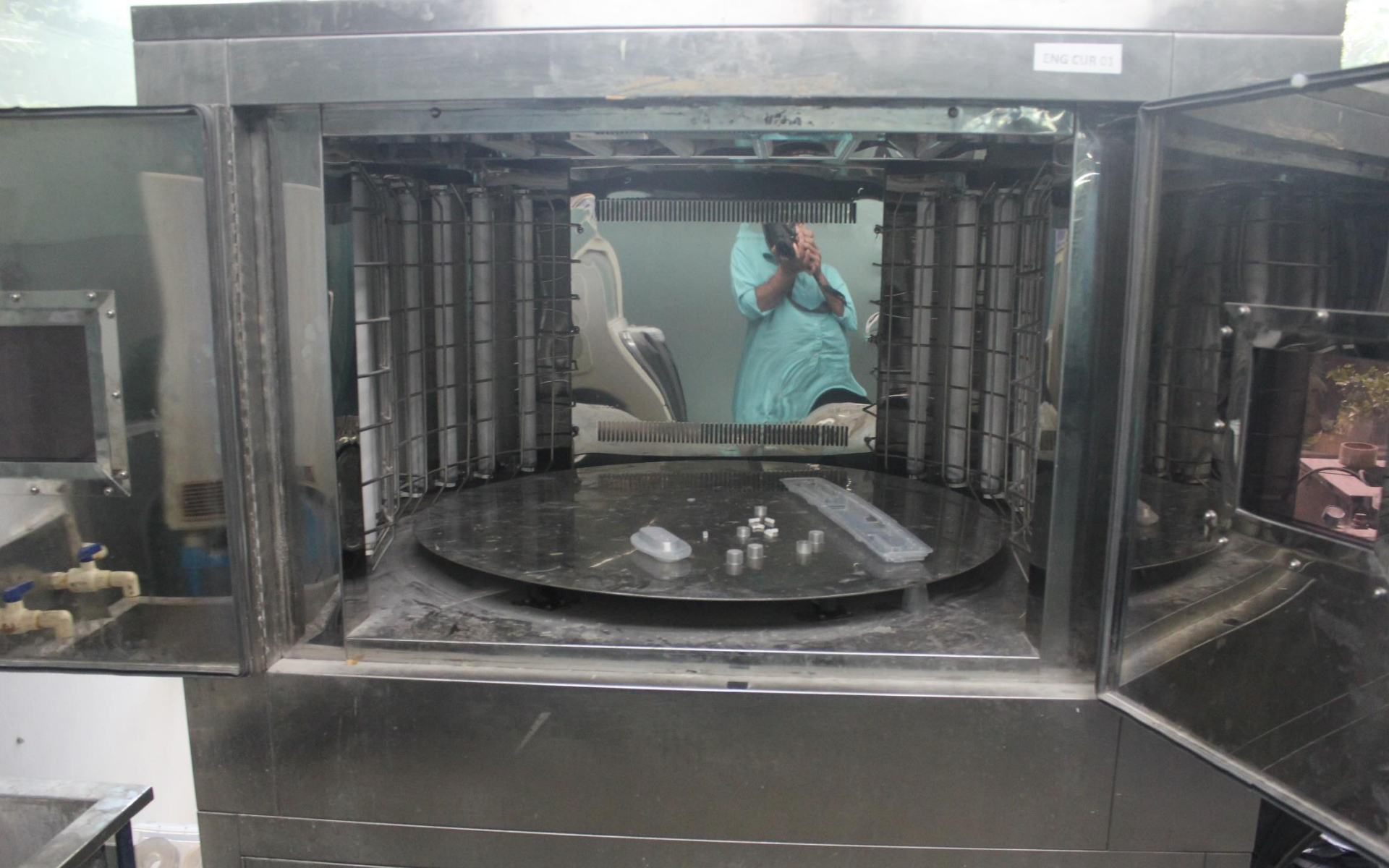
Constraints : The aspects of size, feature details and surface finish, as well as print through error in the Z axis may be factors that should be considered prior to the use of the technology.

SLS – Selective Laser Sintering

3d printing technologies


SINTERSTATION
HiQ HS

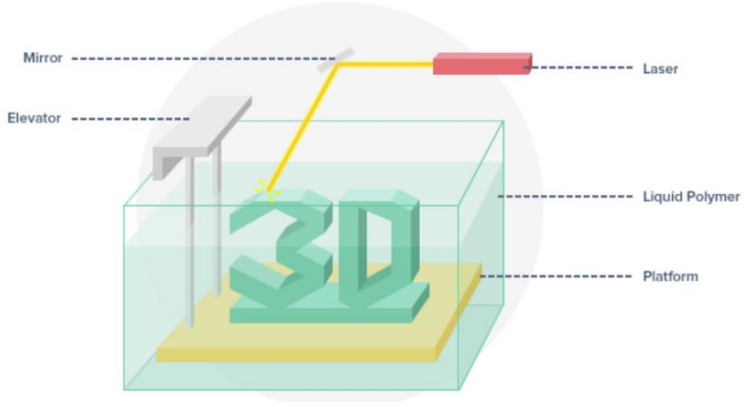

POWERBLAST
HIGH PRESSURE WATER
CLEANER, 30-120 bar
Manufactured by Baico UK for
Objet Geometries Limited
POWER
5 AMPS
ENG WJ 01



It employs a vat of liquid ultraviolet curable photopolymer "resin" and an ultraviolet laser.

For each layer, the laser beam traces a cross-section of the part pattern on the surface of the liquid resin and the exposure to the ultraviolet laser light cures and solidifies the resin.

After being built, parts are immersed in a chemical bath in order to be cleaned of excess resin and are subsequently cured in an ultraviolet oven.



SLA - Stereolithography

3d printing technologies

Materials Used

The photopolymers that mimics ABS, polypropylene, and wax.

SLA - Stereolithography

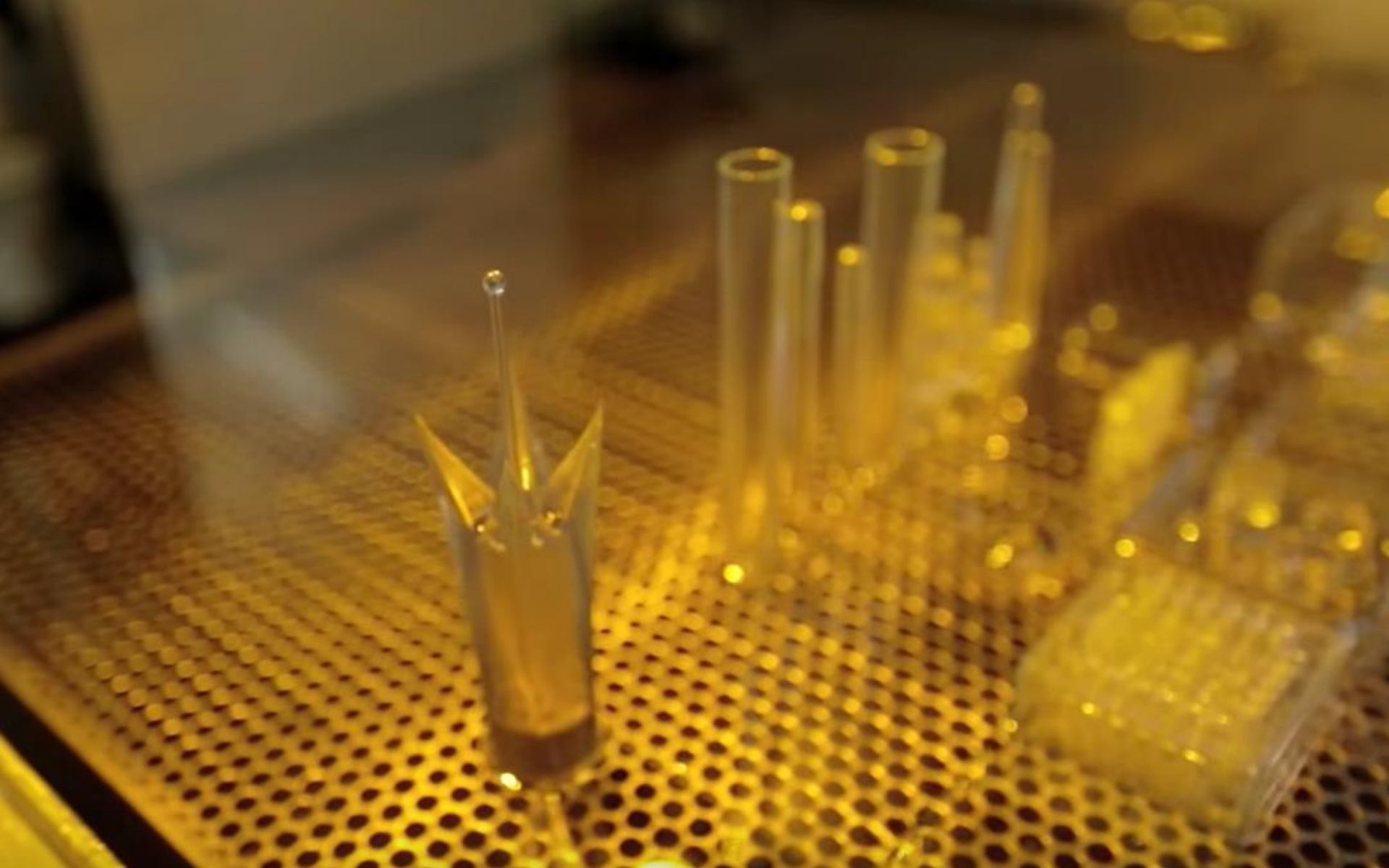
3d printing technologies

One of the advantages of stereolithography is its speed; functional parts can be manufactured within a day

Although stereolithography can produce a wide variety of shapes, it has often been expensive; the cost of photo-curable resin has long ranged from $80 to $210 per liter, and the cost of stereolithography machines has ranged from $100,000 to more than $500,000.

SLA - Stereolithography

3d printing technologies



Imaginarium has their hands on many fields ranging from Architecture to Automotive. But focuses mainly on three different fields i.e. Product prototyping, Jewellery and Medical Field.

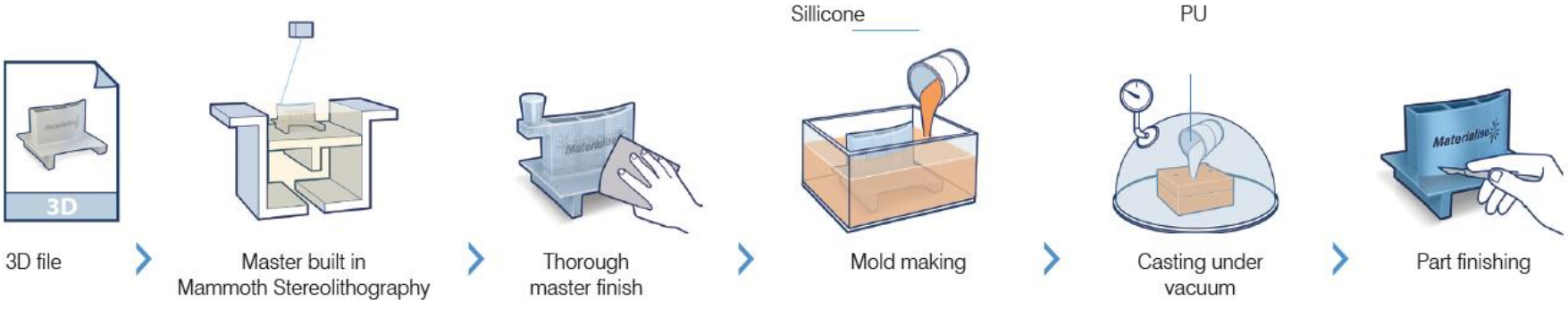
What all projects does Imaginarium do?

The method uses cast silicone moulds made as follows: a master model (that typically originates from Stereolithography or selective laser sintering) is prepared to ensure a high quality finish

Silicone is cast around the master, partially under vacuum in order to avoid air bubbles being trapped in between the master and silicone. After curing, the mould is cut according to the parting planes and the master is removed, leaving a cavity to make copies.

The reason for using silicon is that he flexibility of the silicone allows undercuts.

Product Prototyping – Vacuum Casting



Vacuum Casting


ACHTUNG
WARNING



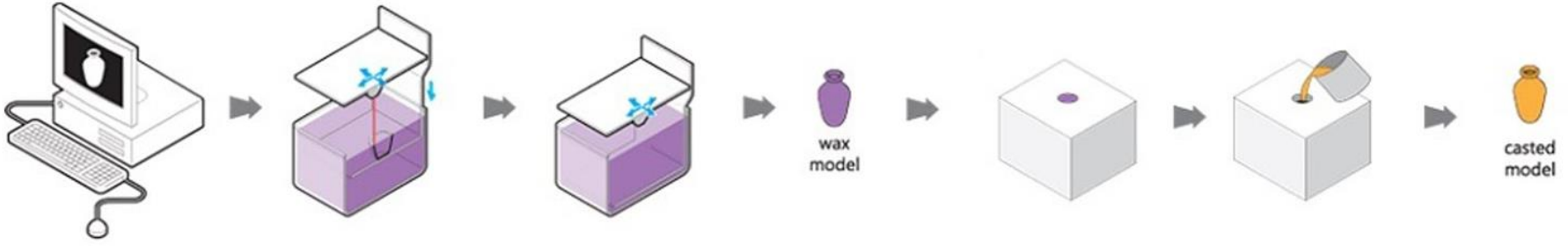
Imaginarium focuses mainly on Jewellery as the times when 3D printed jewellery sounded like an idea from a sci-fi movie are over. 3D printed jewellery is on the verge of becoming mainstream and Imaginarium is revolutionising the industry.

Jewellery

How are 3D printed jewelleries made?

For creating jewellery in gold, silver, bronze, copper and brass, imaginarium use Wax Printing and Casting. This technology builds upon modern 3D printing technology as well as traditional metal casting, Investment casting to be specific.

Jewellery



Investment Casting

What all materials & finishes does imaginarium use for 3D printing?

The most common materials Imaginarium uses are metals. Following are some of the Metals and finishes that imaginarium does.

- **Brass:** Gold-plating, color-plating, PU coating
- **Silver:** Gloss, high gloss, satin, sandblasted, antique
- **Gold:** 14k, 18k, 24k
- **Bronze:** PU coating, polishing

Jewellery

What are the 3D printing technologies used in the jewellery making ?

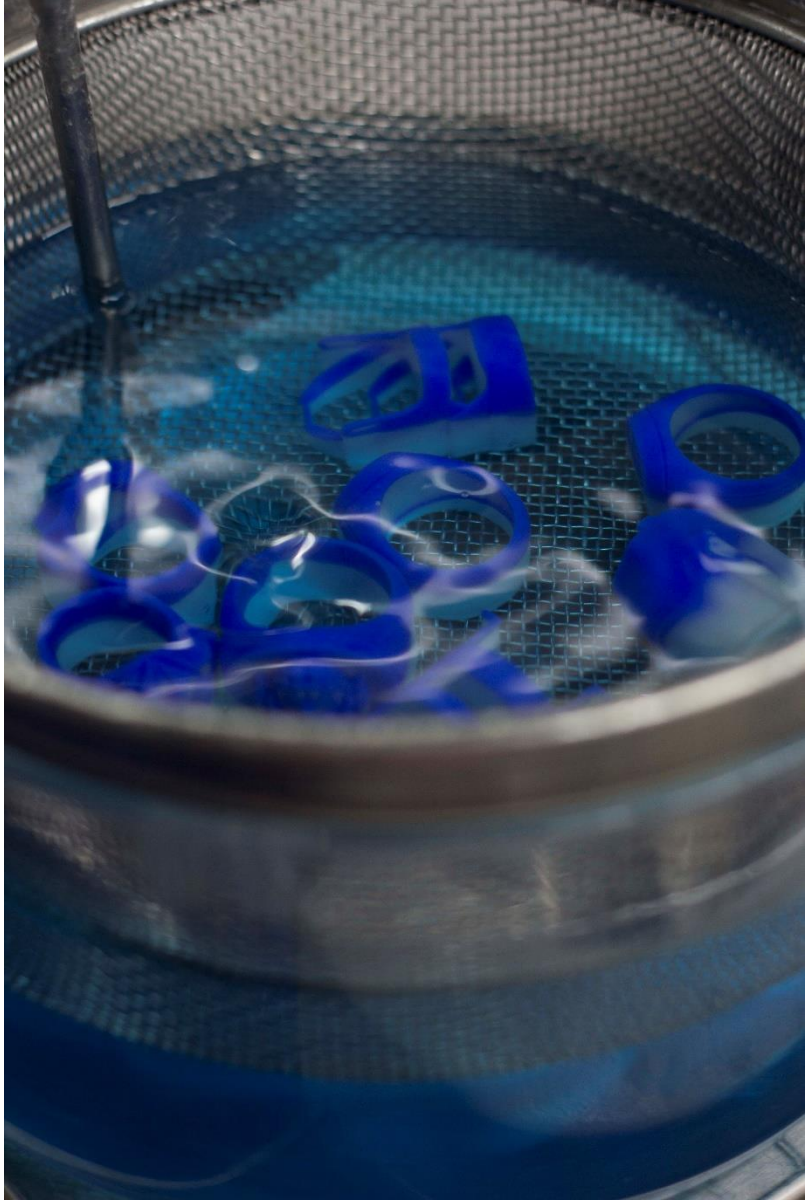
It all starts with 3D printing a 3D model in wax. The 3D printer uses a wax-like resin as printing material.

Next, one or more wax sprues will be attached to your model. Then the model will be attached by the sprue to a wax ‘tree’, together with several other models.

The tree is then placed in a flask and covered in a fine plaster. When the plaster solidifies, it forms the mould for casting the metal. The plaster mould is then put in an oven and heated for several hours to the point where the wax is completely burned out.

Jewellery

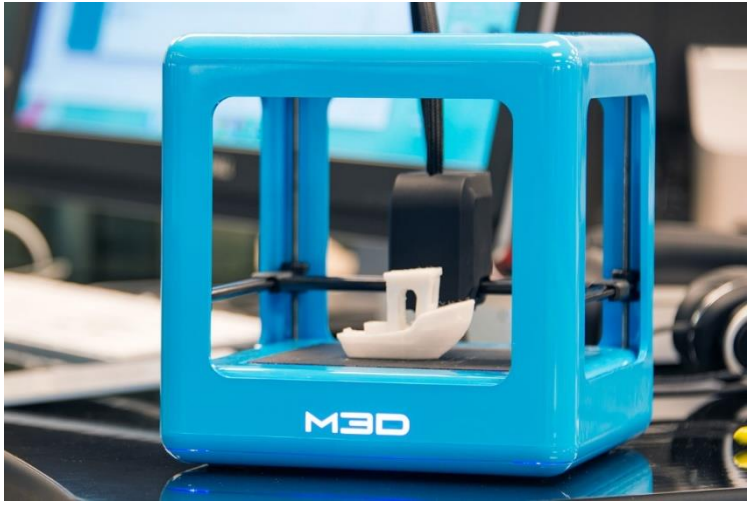

HALLY
MAGNETIC STIRRER WITH HOTPLATE
0586
RPM
SPEED
i-therm
AI-7481
41.8
PV
42.0
SV
HEATER
TEMP. CONTROLLER
Mfg. by : Hally Instruments, Mumbai. Tel: +9122 2876 9190
User's Friendly
Hally
Instruments




PULL

We were given a small table top printer to experiment for ourselves. We started experimenting by making few basic shapes like cubes and spheres and see how the support material works. We found out that the filament shouldn’t cool down easily for it to dry in a certain amount of time. It should neither dry too quickly nor too late. Since we were in an AC room the filament dried too quickly and started making issues.

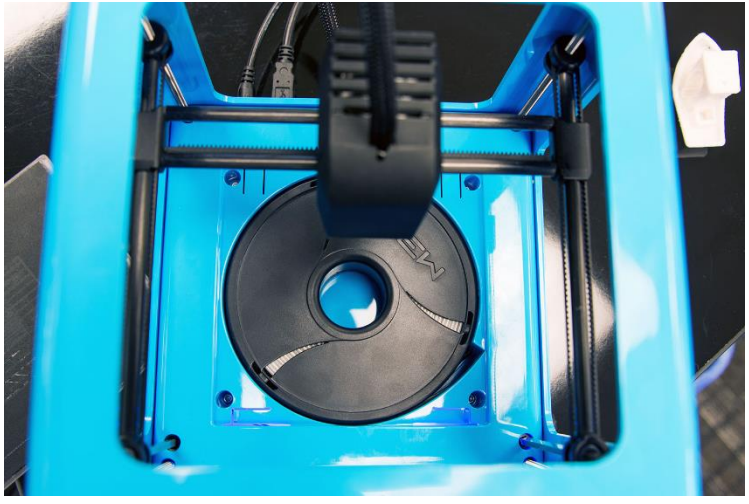
We printed about eight test objects with the printer. Most were at low or medium resolution, and one was at high. Print quality was fair in our tests; We didn't see much of a difference in quality among the three resolutions. The test prints tended to look slightly rough-hewn, and some fine detail was lost. A couple of the objects showed a fine porousness in spots, which can be eliminated by switching the fill density setting from hollow to low infill.



M3D printer experience

After printing about five objects without incident with the Micro, it stopped extruding plastic in the middle of the sixth print job, though the extruder continued to move in its programmed pattern. We aborted the print and tried to launch a new job, but the printer wouldn't extrude. This turned out to be an apparent filament jam, which led us to try (unsuccessfully) to unload the filament. Our other misprint happened when the print bed became uncalibrated. After we ran the calibration routine, the machine was able to print correctly again.

One big downside that we found to the Printer is that it's slow, even at its low-quality setting. It took about 5 hours to print an object that we tried printing. We found this printer the quietest 3D printer among the other printers that imaginarium have. Having said that, to be quite honest the machines they have were never free, they operate almost 24/7. So there was nothing much that we could've done. However we took part in 3D printing for the office works.

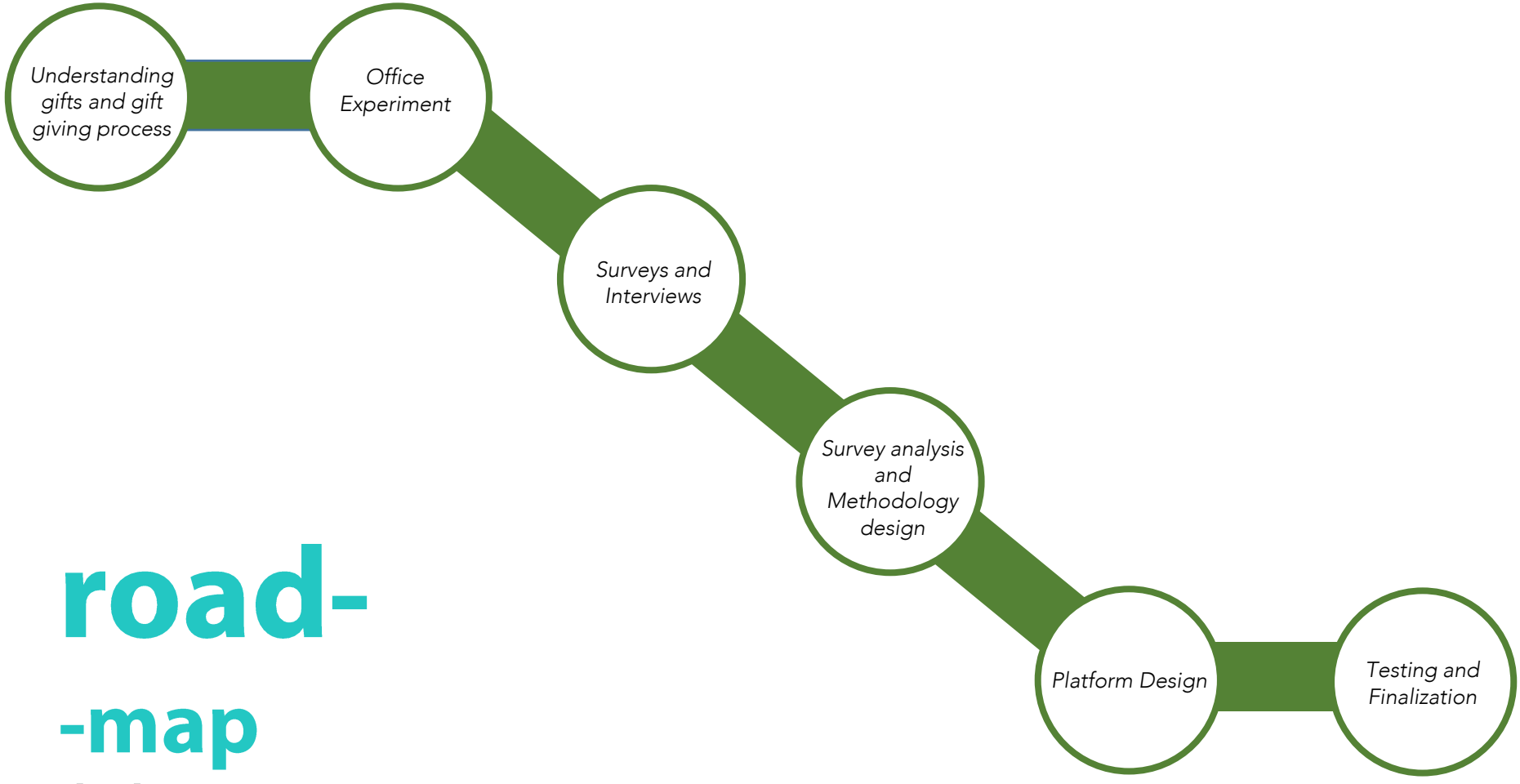


M3D printer experience

the happy project

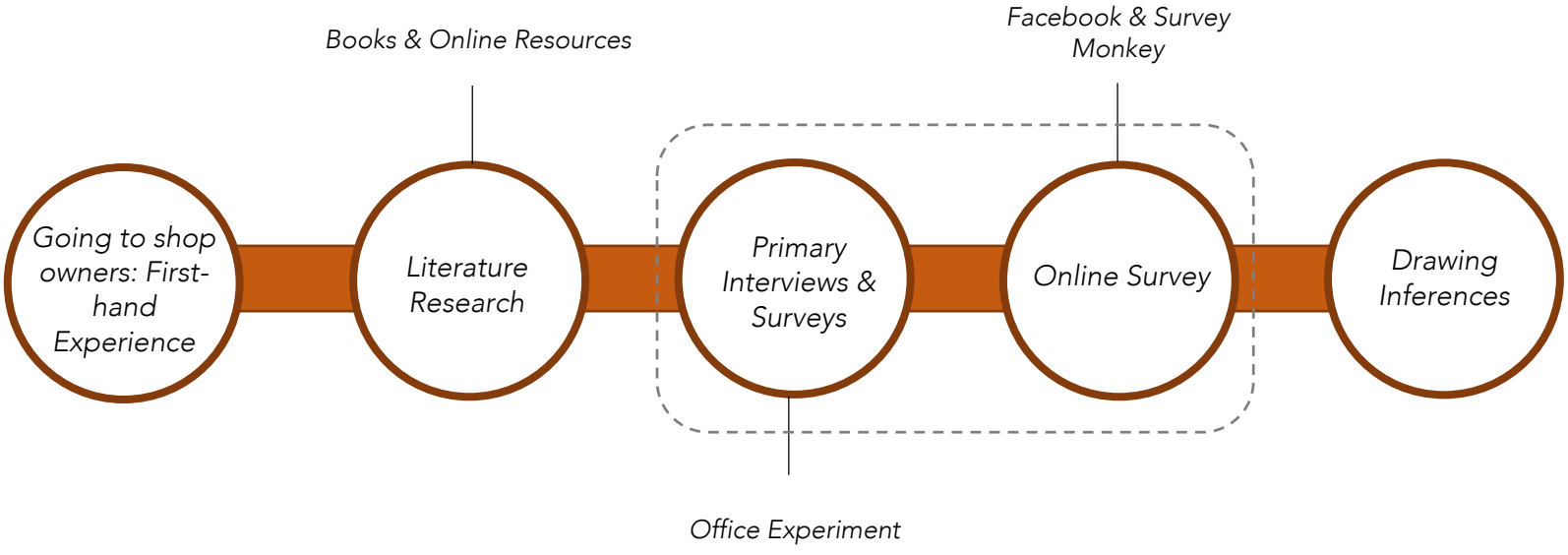
Understanding gifts and gifting behaviour

- scenarios in Mumbai as live examples
- ideas where Imaginarium could enter in this industry
- address to the flaws in the existing system



road--map

the happy project


Books & Online Resources
Facebook & Survey Monkey
Going to shop owners: First-hand Experience
Literature Research
Primary Interviews & Surveys
Online Survey
Drawing Inferences
Office Experiment

The aim was to take a first-hand of choosing gifts and understand the various constraints involved in the process.

The difficulties we faced when we bought gifts:
Budget
What to buy?
Appropriateness
List of products

Why did we buy what we bought?
Handmade
Handy
Desktop Products
Appropriate

gifting

first hand experience

Along with the gifts, a small questionnaire was also attached. The questionnaire included following questions:

- *Do you like this gift?*
- *What do you like/dislike in this gift? And why?*
- *What would you do if it's not useful to you?*
- *Would you consider gifting it to somebody else, if it's not useful to you?*

- People will like whatever you give them if it' anonymous
- Even if the gifts have no meaning, no soul, no story
- Hence, it's difficult for people to relate to it.
- 50% people didn't mind re-gifting
- People try to find the use for the gift

inferences

gifting

literature research

Gift giving is a social, cultural and economic experience; a material and social communication exchange that is inherent across human societies and instrumental in maintaining social relationships and expressing feelings

There are three types of obligations which preserve gift-giving

Elements of Gifting

Aim : To understand people's take on the concept of gifting

gifting

surveys and interviews

Q1: How often do you receive/give gifts?

Q2: Do you think money plays a big role in gifts?

Q3: What kind of gifts would you prefer to receive?

Q4: Does the value of gift increases with your name/identity on it?

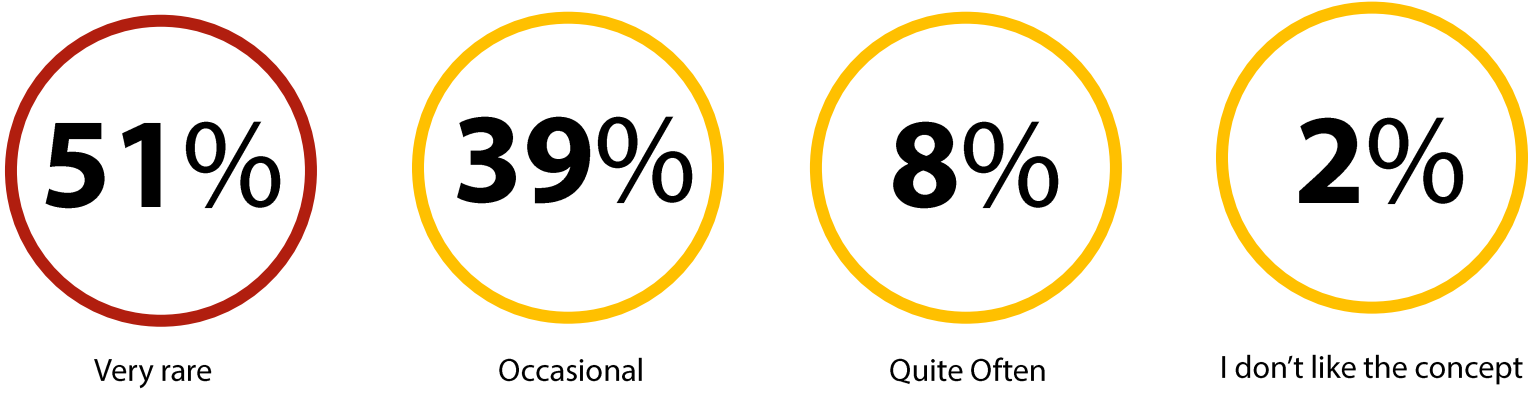
Q5: Would you prefer experiential gifts (Movie tickets, Dinner, Match tickets, Hiking, Travel Trip etc.) over tangible gifts?

Q6: What do you think about re-gifting?

Q7: You think the gifts should be made/designed by the presenter?

questionnaire

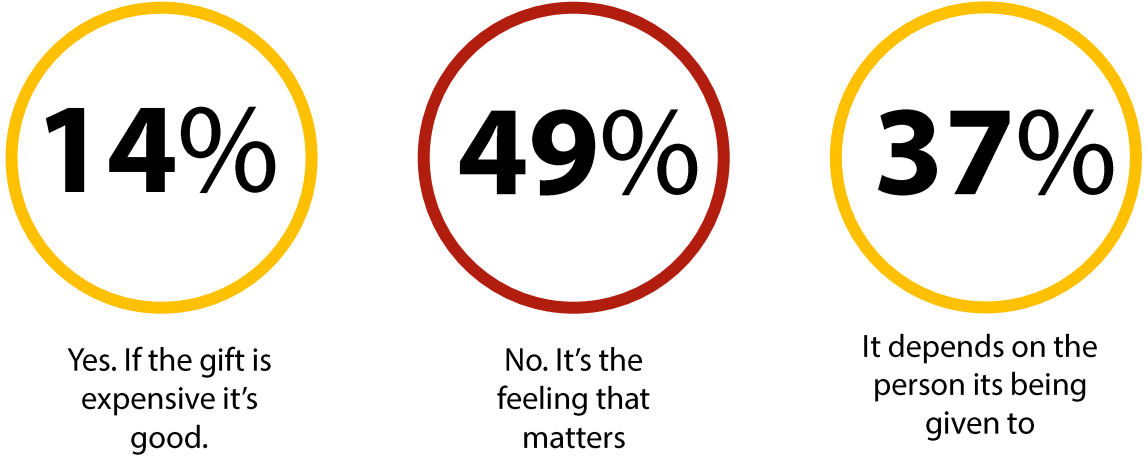
1. How often do you receive/give gifts?



Inference

The results shows that half of the people gift extremely rarely. There could be a lot of reasons that gifting is not so prevalent in this scenario. After our discussions with people, we found out that one of the major reason that people don't find any meaning in these readymade gift. It's like another picked up product.

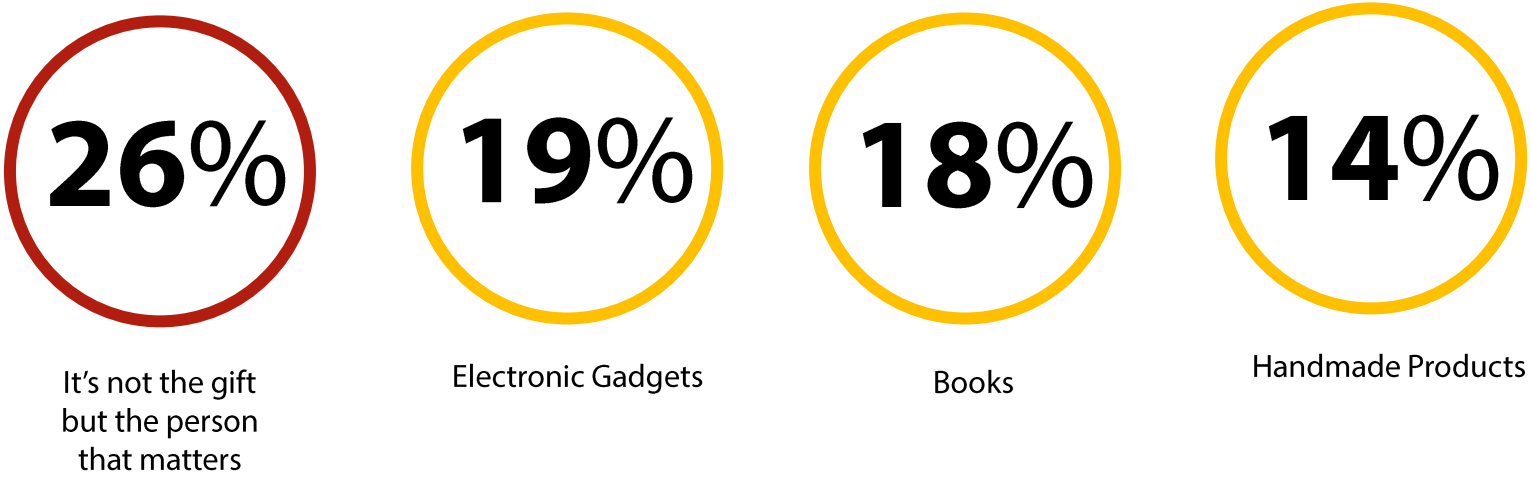
2. Do you think money plays a big role in gifts?



Inference

The monetary value of the gift has a very little part in making a good gift. However, it's very essential. Most people believe that it's that hidden emotion that matters in gifting. The current mass manufactured gifts that are available in market are unable to provide this to the gift giver and receiver hence do not enable people to gift more.

3. What kind of gifts would you prefer to receive?



Inference

Again, as expected the emotional part of a gift is quite an important part. Thus, a lot of people agree to that it's the person that matters and the feeling that makes a gift important.

4. Does the value of gift increases with your name/identity on it?

Inference

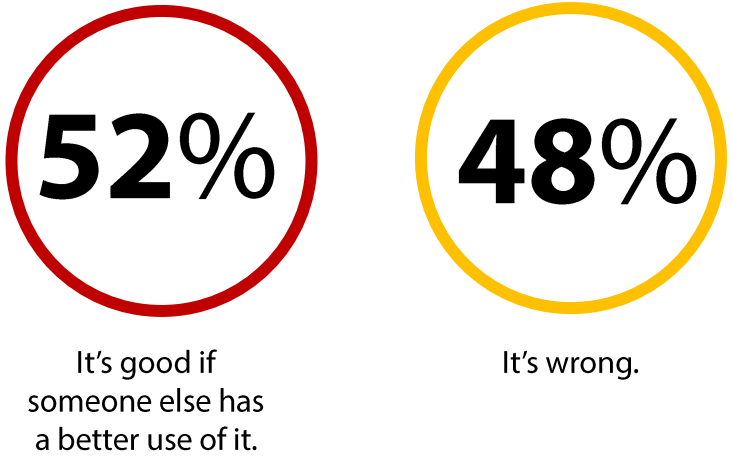
This is quite debatable because it differs drastically from person to person and from gift to gift. And that's what the survey shows, a major part of people say that it depends on the gift whether the name or identity should be present or not.

5. Would you prefer experiential gifts over tangible gifts?

Inference

It was interesting to see that a lot of people prefer intangible and experiential gifts over tangible conventional gift. This particular question shows how mundane and soul-less gift loose as compared to presents which gives a rather important landmark of memory to a person.

6. What do you think about re-gifting?



Inference

The almost half–half opinion of people about re-gifting is quite strange. However, looking practically re-gifting should not be discouraged but still it's considered unethically wildly among the masses especially in our context.

7. You think the gifts should be made/designed by the presenter?

Inference

However, the mixed reviews of people on this one shows that it doesn't really matter if one makes a gift or not. But its sure that making a gift implies that one had put extra effort for someone, making him/her special than just picking up something from a gift shop.

What did we learn ?

How to make people gift more? Since, almost 51% of them receive gifts very rarely?

What are the different ways to personalize a gift ?

Can a tangible gift and Experiential gift be combined ? How ?

Can there be a platform for re-gifting?

How to make everyone a designer?

questions after the survey

Name as the product
Value Addition
Customizable edible items
Unique/Premium packaging
and many more…

What are the different ways to personalize a gift ?

plat-
-form
design

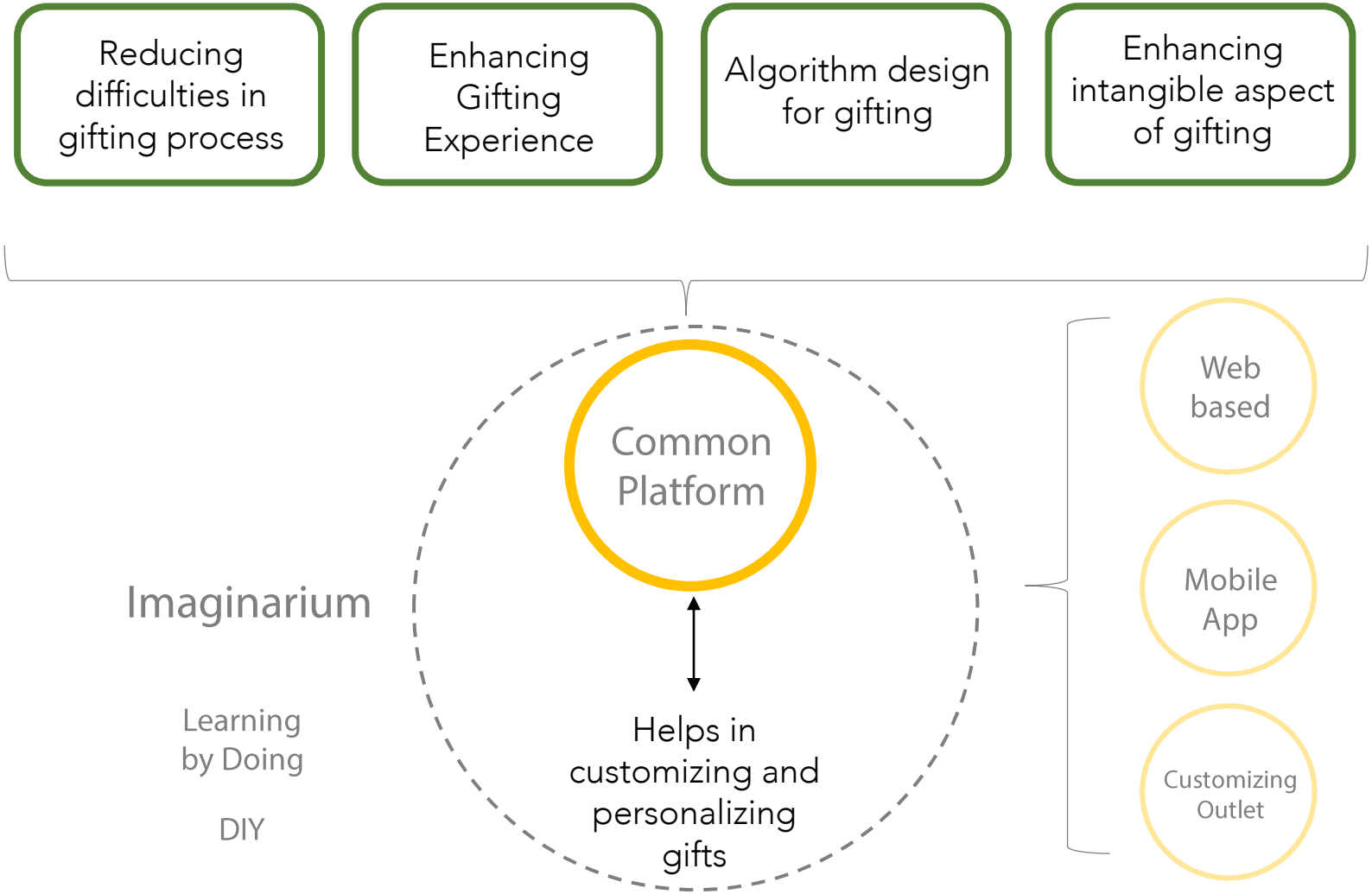
The platform design came mostly from the survey analysis and self-experience throughout the project. The major part aims of the project turned out to be:

- Need of enhancing the gifting experience of the giver as well as recipient.

- Reduction in difficulties while choosing/making gift for someone special.

- Algorithm design which could be followed when choosing gifts.

- Enhancing the intangible aspect of tangible gifts.


Reducing difficulties in gifting process
Enhancing Gifting Experience
Algorithm design for gifting
Enhancing intangible aspect of gifting
Imaginarium
Learning by Doing
DIY
Common Platform
Helps in customizing and personalizing gifts
Web based
Mobile App
Customizing Outlet

The platform as yet is at concept stage, the challenging job was to actually take it to implementation stage. The platform actually tells that everyone should be a designer. So the more critical question was,

how to make everyone a designer?

The thought of customizability seems legit and promising but until carried out properly can't be trusted. The next step was to test the feasibility of the platform. In order to do that, we designed an exercise which could help us get an idea how practical idea would be if given to people. And so we came up with the 'wallet exercise'.

Implementation: customizability

Aim: To understand *how personalization could happen in gifting on a larger scale.*

the wallet exercise

Intriguing part about this exercise is that it gives an opportunity to facilitators to touch on the fundamentals of human centered design. Hence, enabling them to be able to look for a better solution for a gift.

the wallet exercise

The 8 step Exercise

The exercise goes as follows:

STEP 1: The participant is given a mentor who helps him designing the entire gift as per his own experience with the recipient.

STEP 2: The participant is supposed to design a trial gift for the person with sketches. The gift could have anything that he thinks would be suitable for the recipient. This should take around 10 min.

STEP 3: This is the critical part, this involves discussion with the mentor about the person, about your relation with the person and what is the motive behind the gift etc. This helps mentor to empathize the giver so that he could help him better in designing this gift.

STEP 4: This is one common step, where the giver and mentor sit together and think about the possibilities of design.

STEP 5: Finalize findings and thinking about practicality of it through design. This step is where the mentor helps the person in looking the recipient's experience with him in a newer manner, may be the way he/she doesn't see it.

STEP 6: This step where the user is allowed to take a stand on the preference of gift, and the way the gift would be made and delivered to the recipient.

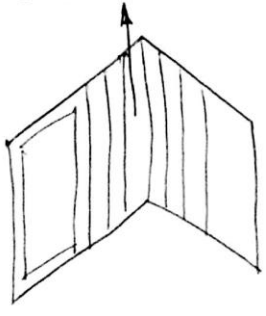
STEP 7: After taking a stand, and approval of the mentor the prototype of the gift is to be made. This would be the longest step as the industry would come into picture at this step.

STEP 8: The final design in form of a prototype is also ready now. The step is to finally take a last look at the gift before final making. If however, the participant is not happy with the gift he/she can go back to any step before and repeat the steps to get better results that time.

TO DESIGN A SAFE WALLET

write your problem statement above

CARDS INSIDE



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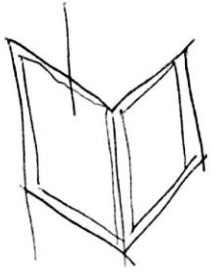
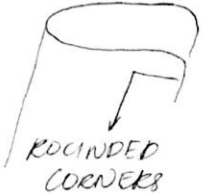
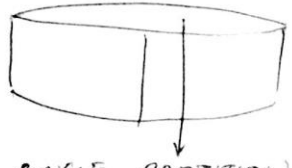


NO PHOTO ID NEEDED AT THE BACK

A PROFILE THAT SETS PERFECTLY ON THE POCKET



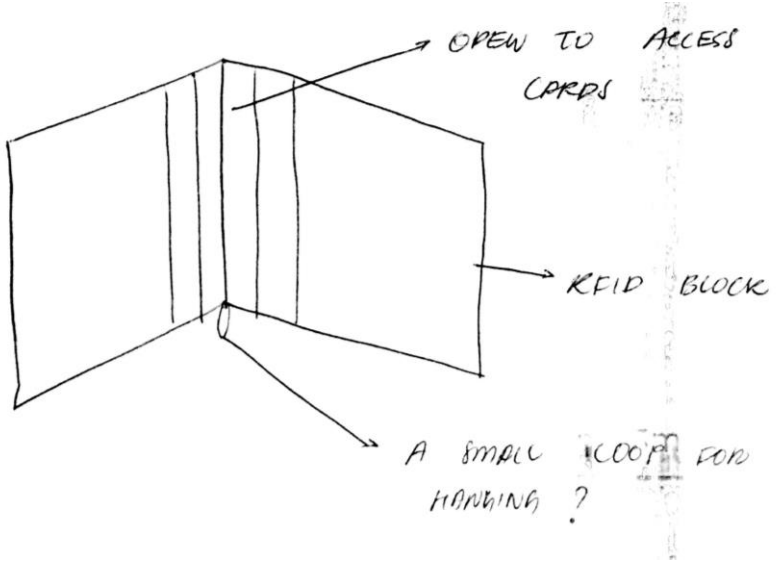
THICK OUTSIDE COVER FOR SAFETY



SINGLE PARTITION

Come up with few unique ideas to present the gift

Reflect & generate a new solution.



What did we learn ?

the wallet exercise

This helped the project in quite effective way. We found out that if people have assistance/mentors they can come up with creative ideas.

This could be an opportunity for the people to push themselves to think beyond the obvious.

the wallet exercise

After going through this journey of understanding gifts, we could realize that it's not just the gift but the feeling and emotions embed in it!

And by this project if we could enhance that feeling by even a little bit would be a success in bringing happiness in people's lives.

learnings

fin.