

Lab Plan- Innovation and Design Thinking(PCC-11-EC01)

| Expt. No. | EXPERIMENT DETAILS | CO | Date | Remarks |
|-----------|---|---------|--------|--|
| | | | | |
| 01 | Exercises/Games/Activities to boost creativity and Inspiration. | LC01 | 8-9/07 | ISE1-Continuous Assessment pre-defined Rubrics (20 Marks) |
| 02 | Article/Design Thinking Case Study Presentation/ Design Thinking Activity for given problem | LC01 | 11/07 | |
| 03 | Digital Market Survey Report and Customer Demand Analysis, Preparing competencies report to identify desired level of innovation & domain definition. | LC02 | 15/07 | |
| 04 | Immersion Activity-Body Storming/Interview | LC03 | 22/07 | |
| 05 | Finding the user needs in the market by using Social, Physical, Identity, Communication, Emotional (SPICE) Framework | LC03 | 23/07 | |
| 06 | Creation of Empathy Map, Affinity Map, Mind Map, Journey Map | LC03 | 26/07 | |
| 07 | Situation, Constraints, Objectives, People, Estimates and Scope (SCOPES) tool | LC03 | 29/07 | |
| 08 | Social, Technology, Economy, Environment and Political (STEEP) trend analysis for opportunity framing by using steep matrix template. | LC04 | 30/07 | ISE2 Idea Competition: |
| 09 | Generating new ideas with Substitute, Combine, Adapt, Magnify/Minify, Reverse, Eliminate, put to other use (SCAMPER) tool | LC04 | 2/08 | SCOPES STEEP |
| 10 | Problem Definition Canvas | LC04 | 6/08 | SCAMPER |
| 11 | Value Proposition Canvas | LC04 | 9/08 | VPC (10 Marks) |
| 12 | Business Model canvas | LC05 | 14/08 | ISE2 BMC (10 M) |
| 13 | Demo day along with Pitching of Idea | LCO 5-6 | | |
| 14 | IDEA COMPETITION and YUKTI Registration | | | ISE2 Prototype- Paper Model, Clay Model, UI Design, Actual |

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LAB ACTIVITY FILE

INNOVATION AND DESIGN THINKING (PCC-11-EC01)
SEM III (2024-2025)

Course In-charge: Prof. Swati Ringe

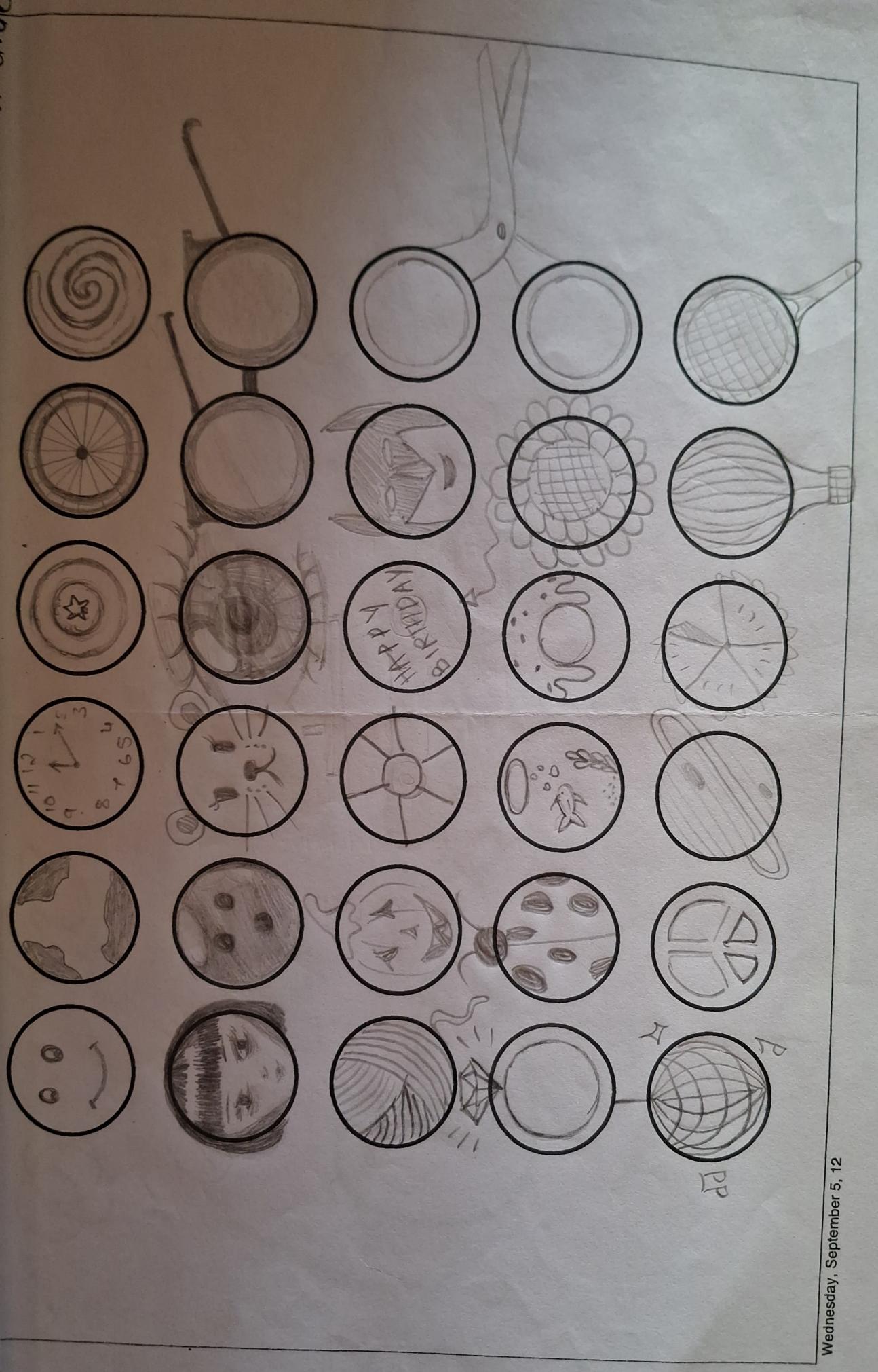
| Roll No. | Name of the student |
|----------|---------------------------|
| 10327 | Anelka Agnel Barnes |
| 10380 | Pranav Shirke |
| 10384 | Marshall Singh |
| 10381 | Suhera Siddiqui |
| 103 | Shuddhay Shirish Salunkhe |
| 10345 | Surabhi Bajankar |

Idea title:-



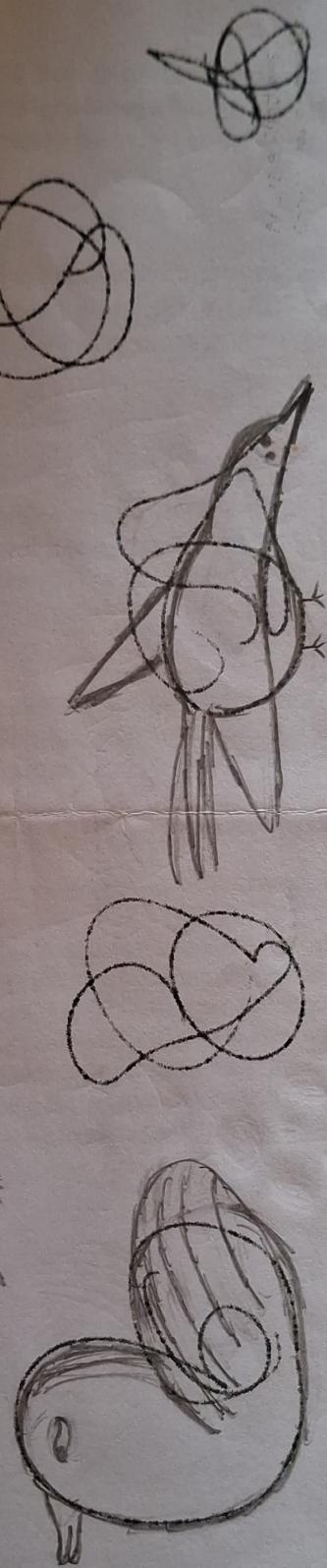
FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050



st. etch visual thinking muscle

SQUIGGLE BIRDS



1. Innovation Relay

- **Objective:** Build on each other's ideas to create innovative solutions.
- **Instructions:** One student starts by drawing a basic design for a product or system. The next student adds to or modifies the design, and this continues in a relay format.

2. Tech Mash-Up

- **Objective:** Combine two existing technologies to create a new product.
- **Instructions:** Choose two random technologies (e.g., GPS and microwave). Students must brainstorm and sketch a product that incorporates elements of both technologies.

3. User-Centered Design

- **Objective:** Design a product with a specific user in mind.
- **Instructions:** Assign a user profile (e.g., elderly person, child). Students sketch a product designed to meet the needs and preferences of that user.

4. Failure Analysis

- **Objective:** Learn from past failures to improve design.
- **Instructions:** Provide case studies of engineering failures. Students analyze the failures and redesign the product or system to prevent the same issues.

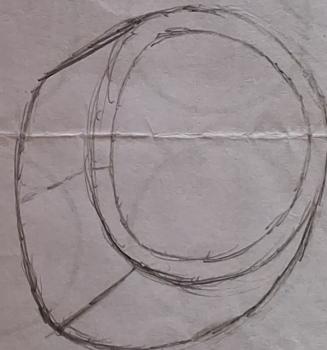
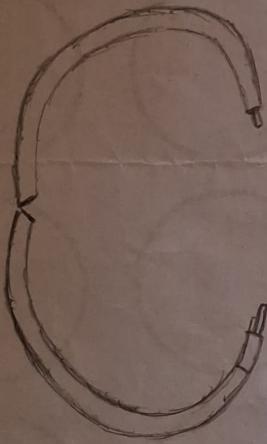
5. Debate Design Duel

- **Objective:** Enhance a product design through critical debate and iterative improvement.
- **Instructions:** One student (the Designer) draws and describes an innovative product. Another student (the Critic) examines the design and points out potential flaws or areas for improvement. The Designer defends their choices and proposes modifications. This exchange continues for several rounds, with the Critic providing feedback and the Designer refining the product. Finally, the Designer presents the improved product, summarizing the initial design, critique received, and changes made. Other students can act as a review panel, offering additional feedback.

1. High Sogen level

- 2. Red button equipment
- 3. Dual time Assistant
- 4. NFC
- 5. Medical Assistance

Front



- # main features
 - 1) Energy level detection
 - 2) Timer
 - 3) Alert and with death probability
 - 4) Emergency Doctor Assistant.

Component

- * LCD screen
- * glucose meter
- * lancet
- * blood strip (whole)

Price - APPROX
\$12

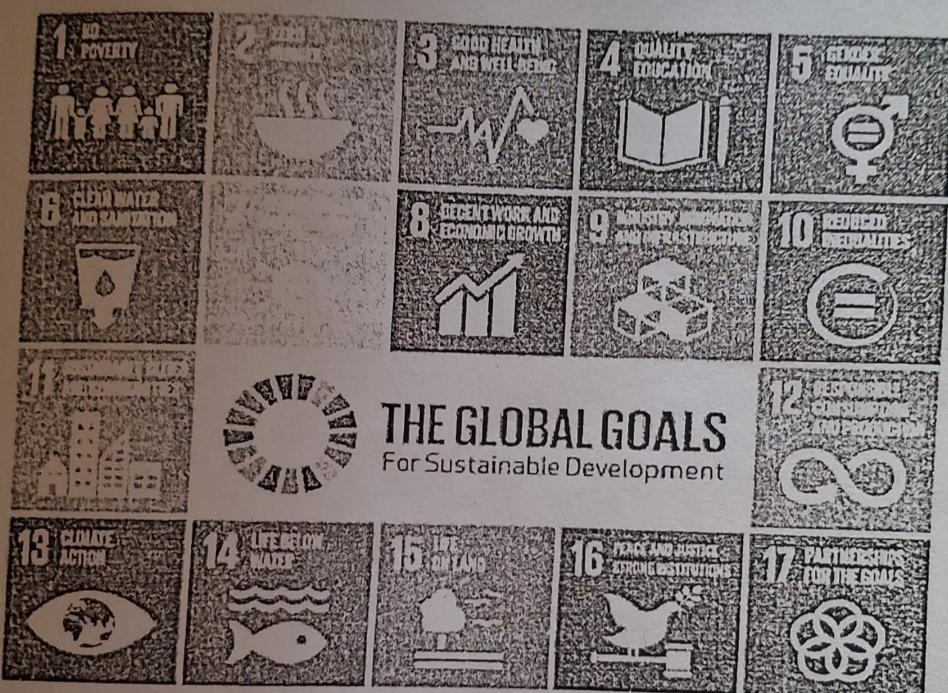
1. Design Thinking Activity:

Give some sample examples from any of the domain/emerging technology. And let them design the product by following all the steps of design thinking. The students present their prototype.

2. IDT subject ISE1 and ISE2 (Idea Competition)

Then for their IDT examination ask them to ideate and start working to solve a problem of their identified customer.

Ask to study 17 SDGs <https://sdgs.un.org/goals>



Disruptive Technologies:

From Generative To Agentic AI
3D Printing
5G and Improved Connectivity
Artificial Intelligence and Machine Learning
Automation and Robotics
Cyber Security Advances
IOT and smart devices/smart cities
Quantum Computing
Machine Customers
Intelligent Applications

Edge Computing
Virtual and Augmented Reality
Headless Technology
The Rise of "As-a-Service" Computing
The Work-From-Home Revolution
Voice-Activated Searches
Blockchain and Cryptocurrencies
Autonomous Devices
Biotechnology and Genetic Engineering
Genomics

T25: SPICE Framework for Understanding & Uncovering Deep User Needs

- | | |
|---|--|
| S | <ul style="list-style-type: none">SOCIAL: What does this person need from relationships with the people around them? (e.g. trust, qualified counsel, resourceful service staff, etc.) <i>Trust, reliable service</i> |
| P | <ul style="list-style-type: none">PHYSICAL: What does this person need on a functional and practical level? (e.g. responsive service, conducive environment, access to amenities, etc.) <i>A device that would look after their pet.</i> |
| I | <ul style="list-style-type: none">IDENTITY: What does this person need to define themselves? (e.g. to be contributor, raise civic consciousness, etc.) <i>Someone who deals with pets.</i> |
| C | <ul style="list-style-type: none">COMMUNICATION: What information does this person need? (e.g. non-bureaucratic language, access to reliable information, responsive feedback channels, etc.) <i>Functionalities of the device</i> |
| E | <ul style="list-style-type: none">EMOTIONAL: What does this person need emotionally and psychologically? (e.g. sense of national pride, sense of fairness and justice, etc.) <i>Stress relief</i> |

*JM
2018*

7/1/2022

Design Thinking Complete List of Templates

T 20 : User Interview Notes

| | |
|---|--|
| Interviewer Name | Aayushi |
| Note Taker and Observer | Purnav Shukla |
| Interviewee Name | Anjali, Hrushali |
| Interviewee Contact Details | +91 9284194140 |
| Date/Time of interview | 19/8/24 |
| Interview Location | Home |
| Background Details | |
| Gender | Female |
| Age Range | 18 - 24 |
| Profession | Student |
| Education Background | Pursuing degree |
| Family | Joint family |
| Hobbies | Baking, Drawing |
| Likes/Dislikes | |
| Interview Notes | Observations |
| i) Mostly one or two pets at home. ii) Student with working parents. iii) Pet alone for multiple hours iv) Multiple steps for safety of pets. v) Deep bond with pet. vi) Assigning chores to other people for taking care of pet. vii) Changes in behaviour | i) Keeping pet at home has become more relevant to overcome multiple problems such as loneliness. ii) Taking care of the pet is now became a task specially when no one's home. iii) Anxiety of leaving pet alone worrying about he being fine or not. iv) in need of some good technology for pet come with more reliability & full control over the tech. |



T21 : Post Interview Discussion : About the Interviewee

| | |
|--|---|
| Interviewee's Goals &/or Motivation | Interviewee's Aspirations: Providing a safe environment for the pet in the following feeding, cleaning, playtime, motivation-well being safety of the pet. |
| Interviewee's Current Experience | Interviewee's Challenges & /or Pain Points: Facing issues with leaving pet alone constant worry. |
| 3 most memorable things about the interviewee: | Interviewee is concerned about his pets safety. He cannot find a way to make sure the pet is fed, cleaned on time. Anxiety of leaving pet unsupervised. |
| User Insights &/or Needs: | Pet friendly design, Food and nutrition, physical activities, supervision, identification, companionship, affordable, spare efficient. |

Design Thinking Complete List of Templates

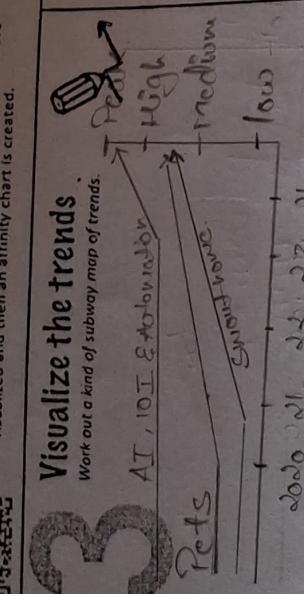
7/7/2022

35

TIKENDANALYSIS



Quick guide: The Trend Analysis allows trends to be identified early in order to include them in the problem definition and solution finding. Define a product, service or development, based on the megatrends, the trends are visualized and then an affinity chart is created.



Megatrends

Create a collection of relevant megatrends

- 1) Pet Care market growth
- 2) Smart Home Products
- 3) AI driven Systems
- 4) IoT and Automation with Robotics.

Center

Define the center of trend analysis

Background: In the Pet Care market is rapid growth of the industry of Pet Care products. Due to this, it is ideal that today many people own pets, our work has one but not possible due to busy schedule & availability of person to take care.

- 1) The Trend of Pet Care has evolved from Escalation.
- 2) Convection Evolution of AI in the market products → Cat & Dog home behaviours.

Attributes and trend topics

Search for correlations and overlaps

- 1) Correlation of need of a human to pets
- 2) Our Powder → Human tend to pets

THE DESIGN THINKING TOOLBOX

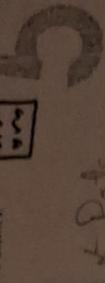
More tips & tricks for this template on book page: 119

Lernfeld / Lise / Litter
The Design Thinking Toolkit
174-1-119-4-2313-1



Affinity chart

Create an affinity chart with the trend themes.



2

Pet Care market has evolved with more products & technology with AI

The thought of having a pet & care towards animals is increased.

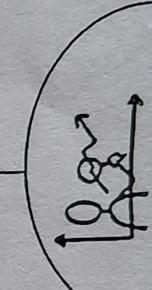
Dogs preferred

Integration of AI in multiple fields

Take care objects to be self-aware.

Automation with self-learning tools for human to move around and help.

Robotics used produced in various operations even at domestic level.



BASIC TEMPLATE

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Premium Design
Thinking Template:
www.DT-TOOLBOX.com/SHOP

Quick Guide: With the 5x Why questions a problem can be understood in depth and not only scratched on the surface. The principle is very simple: You ask, for example, like a toddler, again and again "Why". Repeated questions help to identify hidden problems that would not emerge from a one-off questioning.



More tips & tricks for this template on book page 71.

Leurkink / Link / Leurk
The Design Thinking Toolkit
978-1-119-02111-1



Why is the problem a problem?

1 Pet owners have to leave their pets unattended for long periods of time due to work / other personal reasons.

e.g. problem description:

Why?

2 The pet's safety is at risk due to lack of supervision. The pet is also not fed and cleaned on time.

e.g. direct impact:

Why?

3

As a result of insufficient interaction with the owner the pet gets needy leading to aggressiveness / mutininess / stress / of bomaness / lethargy which will have ill impact on his health e.g. cause effect

Why?

Space Requirements, adaptability and adjustment in home environments, emergency / unexpected situations.

e.g. organizational hurdles:

Why?

Battery life, customization and settings, handling emergencies.

e.g. system hurdles:

dTP THE DESIGN THINKING TOOLBOX

BASIC TEMPLATE

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Premium Design
Thinking Template:
www.dt-toolsbook.com/shop

(2.0)



| Who? | What? | When? | Where? | Why? | How? |
|--|---|--|--------|--|--|
| Who is the target customer? | What function does the pet butter perform? When will new features be added? | When? | Where? | Why is the bionic pet butter needed? | How does the bionic pet butter serve real time monitoring? |
| Who can the customers contact for technical support? | What support is available for the customers? | When? | Where? | Why go for the bionic pet butter? | How does the device integrate with smart home systems? |
| Who else can benefit from the device? | What are the draw backs of the device? | When will warranty support be available? | Where? | Why might the customers need to update the software? | How does the device ensure safety of pet? |
| Who can customers reach out for feedback? | What makes the bionic pet butter different? | When can it not be used? | Where? | Why is an e-book guide regarding the device manual care? | How does the Bionic pet butter handle power issues? |

Empathy Map

- 1) Pet owners
- 2) Veterinarian hospitals

1 WHO are we empathizing with?

Who is the person we want to understand?
What is the situation they are in?
What is their role in the situation?

Individuals who own pets
and need to leave them
alone or various
reasons.

'You shouldn't
have adopted a
pet'
'It is wrong of
you to leave your pet
alone and go out'

GOAL

'The pet is a burden'
What do they need to do differently?
What job(s) do they want or need to get done?
What decision(s) do they need to make?
How will we know they were successful?

'neighbour's dog is
smaller than ours
where available for their pet.
is not the see human
guaranteed caretaker could get
abuse / neglect the pet.'

7 What do they THINK and FEEL?

PAINS

What are their fears,
frustrations, and anxieties?

- Anxiety about
pets / will being
left alone
- Worry about
leaving them alone
when they are away
- Worry about
feeding
- Anxiety about
pet safety etc
- Separation anxiety

GAINS

What are their wants,
needs, hopes and dreams?

- Something that
would 'look after'
their pets needs
- And friendly caretaker

6 What do they HEAR?

What are they hearing others say?
What are they hearing from friends?
What are they hearing second-hand?
What are they hearing?

- 'The pet is a burden'
- 'You should get a caretaker
for your pet'
- 'You are always
worrying
about your
pet'
- 'They are caged by the
fear that the pet might
come in contact with
harmful substance equipment'

3 What do they SEE?

What do they see in the marketplace?
What do they see in their immediate environment?
What do they see others saying and doing?
What are they watching and reading?

4 What do they SAY?

'I want to make sure my pet
is safe and happy'
'I am worried about his health'
'My pet gets aggressive'

5 What do they DO?

'I hope my pet doesn't feel lonely'
'They have my pet becomes restless'
'They are always talking to other friends'
'He sits at the front
door waiting for
me to come back'
'The pet safely'

✓✓✓✓✓

T2 : STEEP TRENDS ANALYSIS

STEEP ANALYSIS

SOCIAL & DEMOGRAPHICS

- changing lifestyles
- aging population
- growing pet ownership
- attitude towards tech
- ethical consumers

ENVIRONMENT & NATURE

- sustainability
- energy consumption
- waste management
- environmental impact of pets

7/7!

TECHNOLOGY

advancements

- robotics
- integration with smartr homes bys
- AI in industry
- data security
- battery & power management

ENVIRONMENT & NATURE

OUR DESIGN
CHALLENGE
ISSUE

ECONOMY

- cost of development
- market demand
- affordability
- economic condition
- pet industry growth.

POLITICS & LEGAL

- regulation
- compliance
- animal welfare legislation
- trade & tariff policies
- public health policies.

7

T3 : STEEP Analysis Matrix

STEEP ANALYSIS MATRIX

| Uncertain to Occur | High Impact |
|---|--|
| <p>adapt to sudden changes in pet ownership trends prepare for potential regulatory changes by incorporating sustainability practices</p> | <p>growing pet packaging ownership market demand compliance stress relief for pet owners with Animal welfare and safety legislation requiring cruelty minimize power consumption</p> <p>potential customers are not familiar with technology pet care businesses may resist promoting at home pet care</p> <p>new niche and needs may arise fluctuations new regulations may affect compliance low cost offshoots unlikely to disrupt the market significantly</p> |

T4 : STEEP Analysis Prioritization

STEEP ANALYSIS PRIORITIZATION

Discuss 2 key trends from the High Impact - Likely to Occur quadrant:

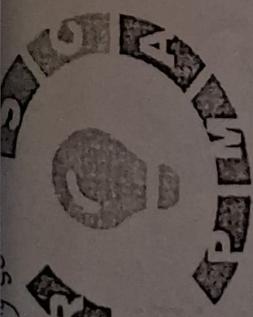
1. Stress relief for pet owners by providing a secure and reliable device would lead to increased pet ownership because people tend to avoid getting pets due to the worry of leaving them alone.
2. Eco friendly packaging and recyclable components.

Discuss 2 trends from the High Impact - Uncertain to Occur quadrant

1. Adapting to changes in pet ownership trends and keeping up with new rising trends and requirements. Ability to develop new features moderately as the demand arises.
2. Sustainable practices and complete use of renewable resources while adopting latest and most relevant technology.

✓ 18/02/2019

7/7/1



Product
to impress
our
>) Then
ask &
3) Apply &
to
values

Substitute the manual feeding mechanism with a more automated one perhaps using AI to predict the pet's feeding schedule based on behavior. Replace with eco-friendly or sustainable materials.

benefit
services
touch up
product
attribute
pricing
markets

i) Look
at
answers
Do any
answer
stand
out as

Adapt the device for use with multiple pets, enabling it to be differentiable between them and cater to their needs. Adjust the product for use with various types of pets, with modifiable options for their environmental needs.

Put to Another Use
use the Bionic Pet Butler in veterinary clinics or pet shelters to automate feeding and monitoring, saving time and ensuring consistent care. Adding secondary use is also another use.

a
Viability
sofa

Reverse

Reserve the usual operation schedule by programming the device to operate more during specific times when the pet owner is away, ensuring comfort.

Visualize the Bionic pet butler with a pet monitoring camera that allows owners to interact with their pet via audio video. Include GPS if it leaves the house.

Modify

Modify the size and design to be more compact & portable, allowing it to be easily moved around the house or taken trips. Enhance the product's functionality by adding features treated feed dispenser & for positive reinforcement training.

Eliminate

eliminate the need for manual refilling by designing a larger or auto-refillable food reservoir that integrates with most home systems to notify when it needs refill. Feeding by timer are out.

Visualize by programming specific times maximum

Problem Statement Canvas

Idea/Innovation Title:

YUKTI Proto ID:

Date of Submission:

Prepared By:

Who Is Your Customer Segment:

CONTEXT

When does the problem occur?

Your Answer: The problem occurs when pet owners can't consistently care for their pets due to busy schedules. This can lead to health issues in pets. Feeding & monitoring is an issue as well.

PROBLEM

What is the root cause of the problem?

Your Answer: The root cause of the problem is inconsistency in caring for pets due to busy schedules. This can lead to health issues in pets. Feeding & monitoring is an issue as well.

CUSTOMERS

Who has the problem most often?

Your Answer: The problem is most often faced by busy professionals, elderly or physically disabled pet owners who have no one to help manage large numbers of animals.

EMOTIONAL IMPACT

How does the customer feel?

Your Answer:

quietly and anxious

QUANTIFIABLE IMPACT

What is the measurable impact (include units)?

Your Answer: Higher pet care costs & pet health issues

ALTERNATIVES

What do customers do now to fix the problem?

Your Answer: Customers address the problem by managing feeding pets, using automatic feeders, hiring pet sitters, using day care services, or seeking for family & friends for help.

ALTERNATIVE SHORTCOMINGS

What are the disadvantages of the alternatives?

Your Answer: Alternatives are usually inconsistent & costly, manual feeding takes time, automatic park monitoring is always expensive, & doesn't suit all family, friends may be unreliable.

lose your best "How Might We" (5HMW) Questions Share the top 5 brainstorm questions that you created and let the group determine where to begin by selecting one question to move forward with based on what seems to be the most promising for idea generation in the areas you are trying to impact

How might we... [insert problem statement here]?

How might we design a solution that seems -fully integrates into the daily routines of busy pet owners?

How might we... [insert problem statement here]?

How might we create a solution that allows pet owners to automate feeding and care routines?

How might we... [insert problem statement here]?

How might we make pet care more convenient and affordable for owners with busy or unpredictable schedules?

How might we... [insert problem statement here]?

How might we provide a reliable and customizable solution for households with multiple pets?

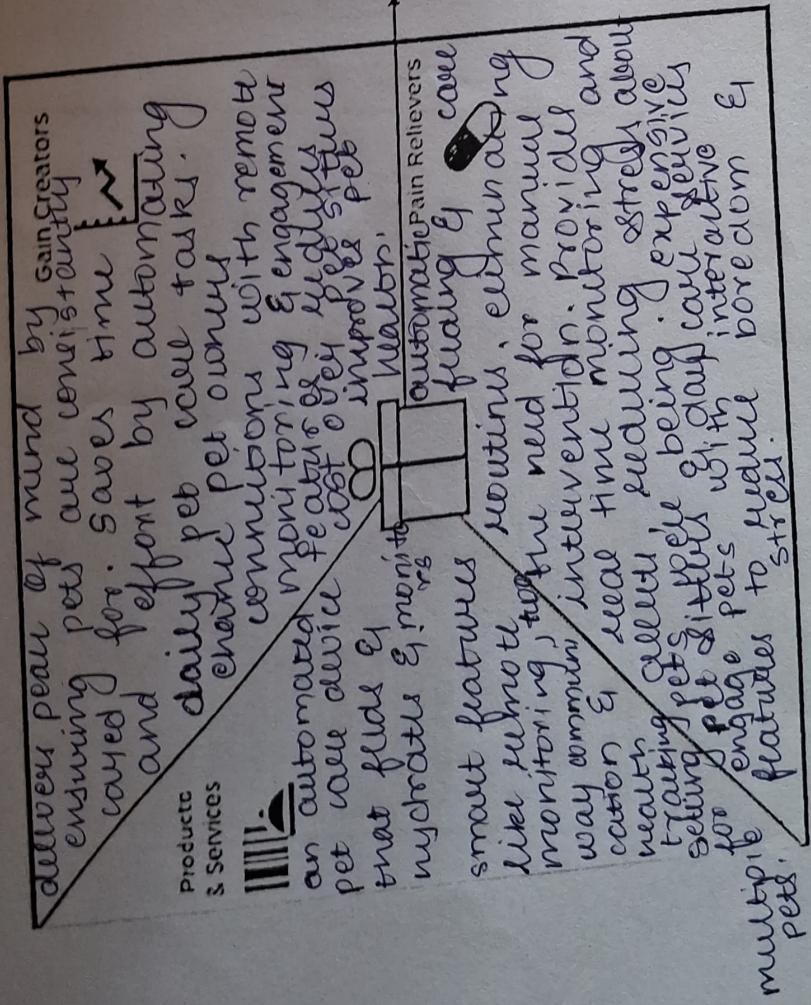
How might we... [insert problem statement here]?

How might we reduce the stress & anxiety of pet owners who are unable to be with their pets all the time?

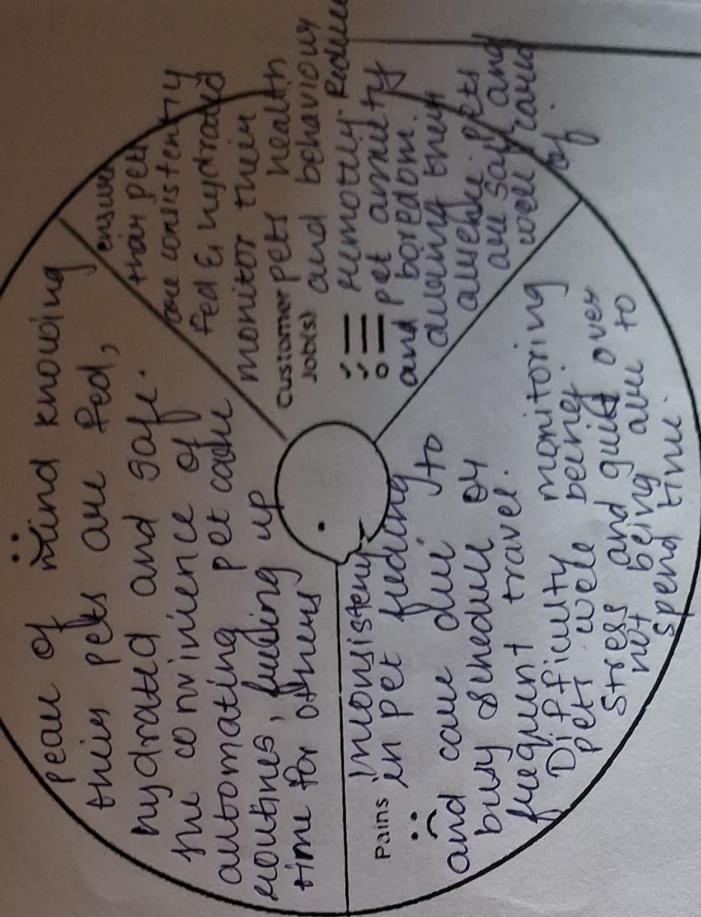
The Value Proposition Canvas

Customer Segment

Value Proposition



Gains



③ Strategyzel

The Business Model Canvas

| Key Partnerships | Manufacturing partners for production & assembly. E-commerce platforms for distribution | Key Activities | Research & development manufacturing & promotion. Customer service & support. | Value Propositions | Automated feeding, hydration and monitoring. Building loyalty program & avenues for pet owners | Customer Relationships | Customer Segments |
|---|--|----------------|--|--------------------|--|------------------------|---|
| Veterinarian clinics and pet centers for product endorsement & partnerships | Key Resources Tech and product development for innovation and smart customer support technology. Improved pet nutrition network. Growth & awareness | Channels | Different to consumer. Online sales via the company own e-commerce platform like Amazon. | Revenue Streams | Revenue model for the product would be from the following sources : 1) Product sales 2) Subscription based software & education programs | Cost Structure | Manufacturing costs R&D, marketing & sales, inventory & up port, partnership & commissions. |
| | | | | | | | Copyright Strategyzer AG The museum of business models |

| ©①②

③ Strategizer

CREATE A PITCH

Short Instruction: Create a pitch notes to share the results or
and the insights of the class members. There is a simple
regular analysis with some questions. There is a simple
instruction which contains the most important questions to be
answered.



Learner's / Link / Letter
The Design Thinking Toolkit
978-1-119-42319-1

More tips & tricks for this template on book page: 247

| Questions to be answered: | | Time: | Key messages: | Feedback from test |
|---------------------------|--|-------|---|--|
| Intro | | 2 min | A would where Pet Owners have no time, worried about their Pets. They are bed on time, worried outcome By BPPB | Concerns Concerns & Queade introduction some issue area need to be looked upon |
| Problem | | 5 min | <ul style="list-style-type: none"> 1) Busy schedules of Pet owners having to leave the Pet alone. leaving them alone can lead to over breeding, negatively impact their health, Anxiety , delay diagnosis. | The Stressed Stressful Clearly identify the Challenges faced by pet owners. |
| Customers | | 2 min | <ul style="list-style-type: none"> 1) Pet owners / Individual ii) Zoo's. iii) Ngo's iv) Pet shelter | <ul style="list-style-type: none"> v) Veterinary Hospital. |
| Solution/Idea | | 5 min | The Solution 'Bionic Pet botton' is a advance robot uses AI & IoT technology how its operation with doing various task like taking care of your pet etc. | <ul style="list-style-type: none"> Pet botton is a modern day solution how ever age old problem is still there. |
| Business model | | 2 min | <ul style="list-style-type: none"> Business model -> Product Sales Hardware. -> Subscription based Software. -> Education & training. | <ul style="list-style-type: none"> Tested app received the client to business approval. & the various business model available. |
| Next steps | | 2 min | Spreading awareness about Pet care & making own product more easy to use with easier interface. | It can analysis the customer & provide enjoyable experience to pets. |
| Summary | | 1 min | All in one product is both Pet care with absolute best features. | <ul style="list-style-type: none"> Learn how the product enough to use & experience & look forward ideas. Genarate Premium Design Ideas. |

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BASIC TEMPLATE

www.DT-Toolbox.com/shop