

# Design Engineering

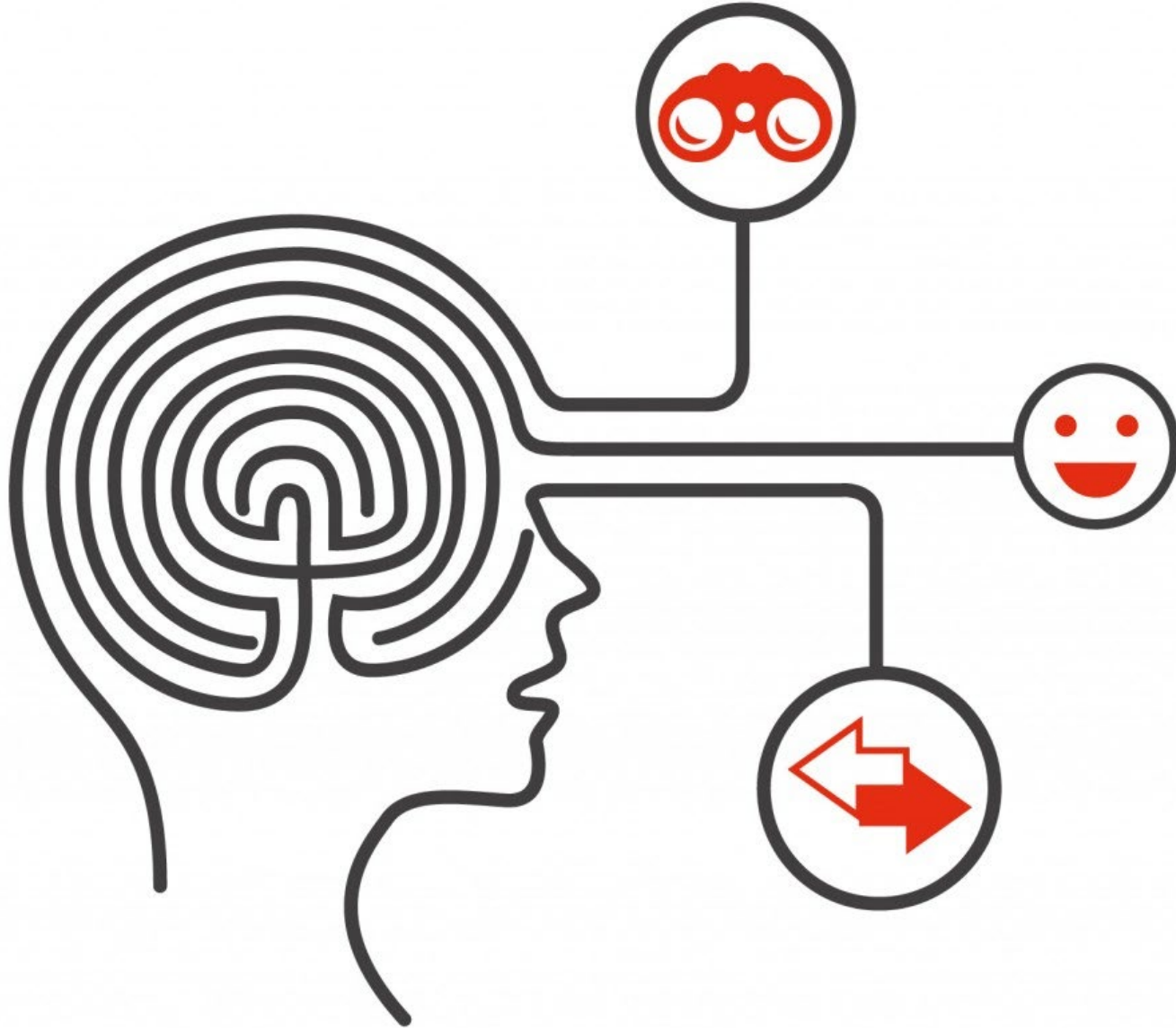
COMPUTER ENGINEERING DEPARTMENT

SARDAR VALLABHBHAI PATEL INSTITUTE OF TECHNOLOGY

VASAD

# Course Introduction

- ✓ Thinking innovative ideas and Developing innovative products using Design Thinking Approach
- ✓ Continue for 4 semesters
  - ✓ Design Engineering 1A (3rd semester)
  - ✓ Design Engineering 1B (4th semester)
  - ✓ Design Engineering 2A (5th semester)
  - ✓ Design Engineering 2B (6th semester)
- ✓ Total 100 marks per subject (20 marks (Internal)+80 marks(External))
- ✓ Group Activity
- ✓ GTU Design Engineering Portal activity
- ✓ Approach to internal Guide



# Design Thinking

GTU – Design Team

# What is Design Thinking?

**A Mindset that is:**

- ✓ Human – Centered/Empathic
- ✓ Collaborative/Possibility Driven
- ✓ Optimistic/Option Focused
- ✓ Experimental/Iterative

In short,

Design Thinking is the confidence that new, better things are possible and that you can make them happen.

# Introduction - Definition

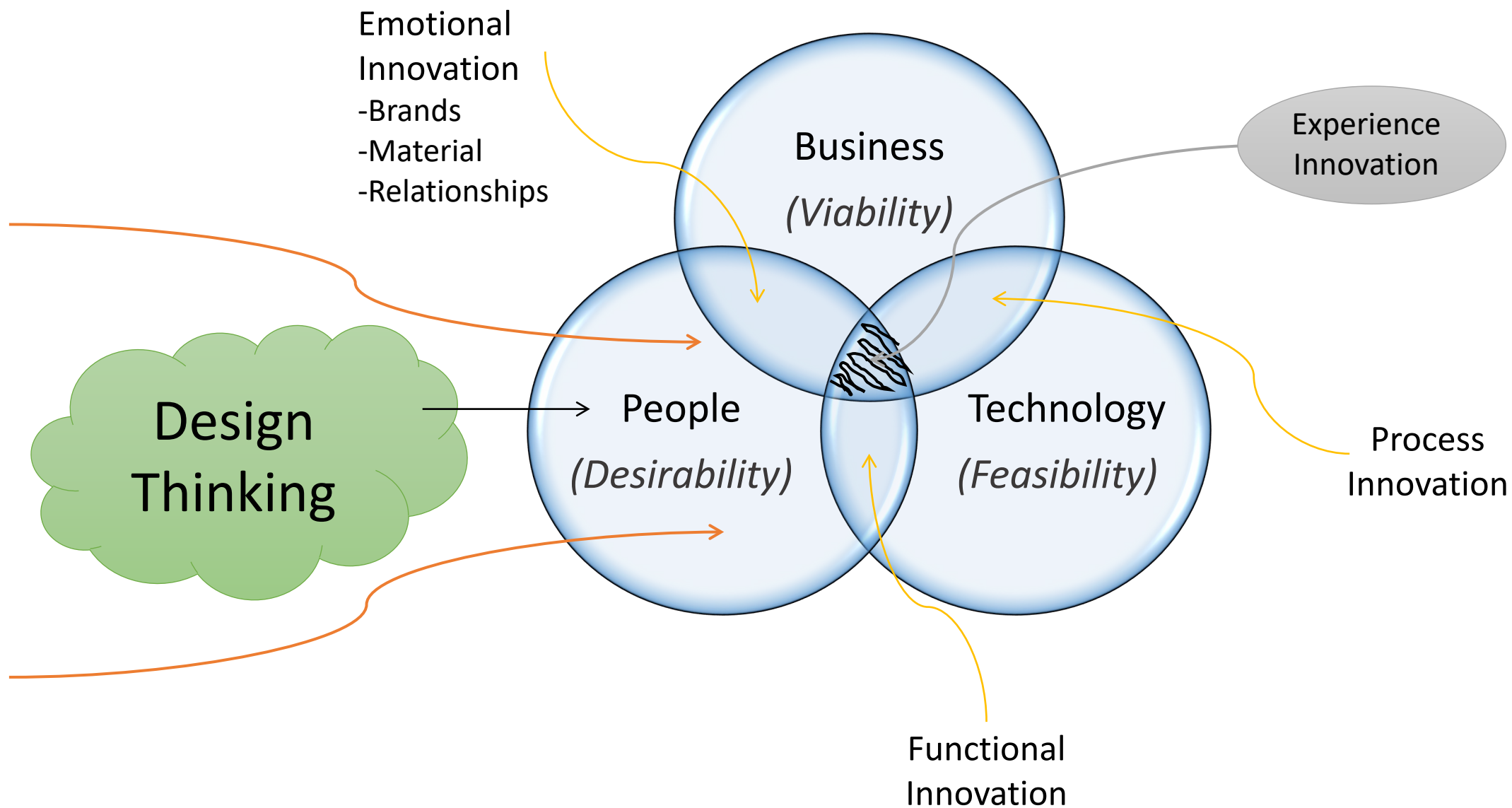
“Design Thinking  
is a **human-centered** approach to innovation  
*that draws from the designer's toolkit to integrate*  
*the needs of people,*  
*the possibilities of technology,*  
*and the requirements for business success.”*

# Design Thinking

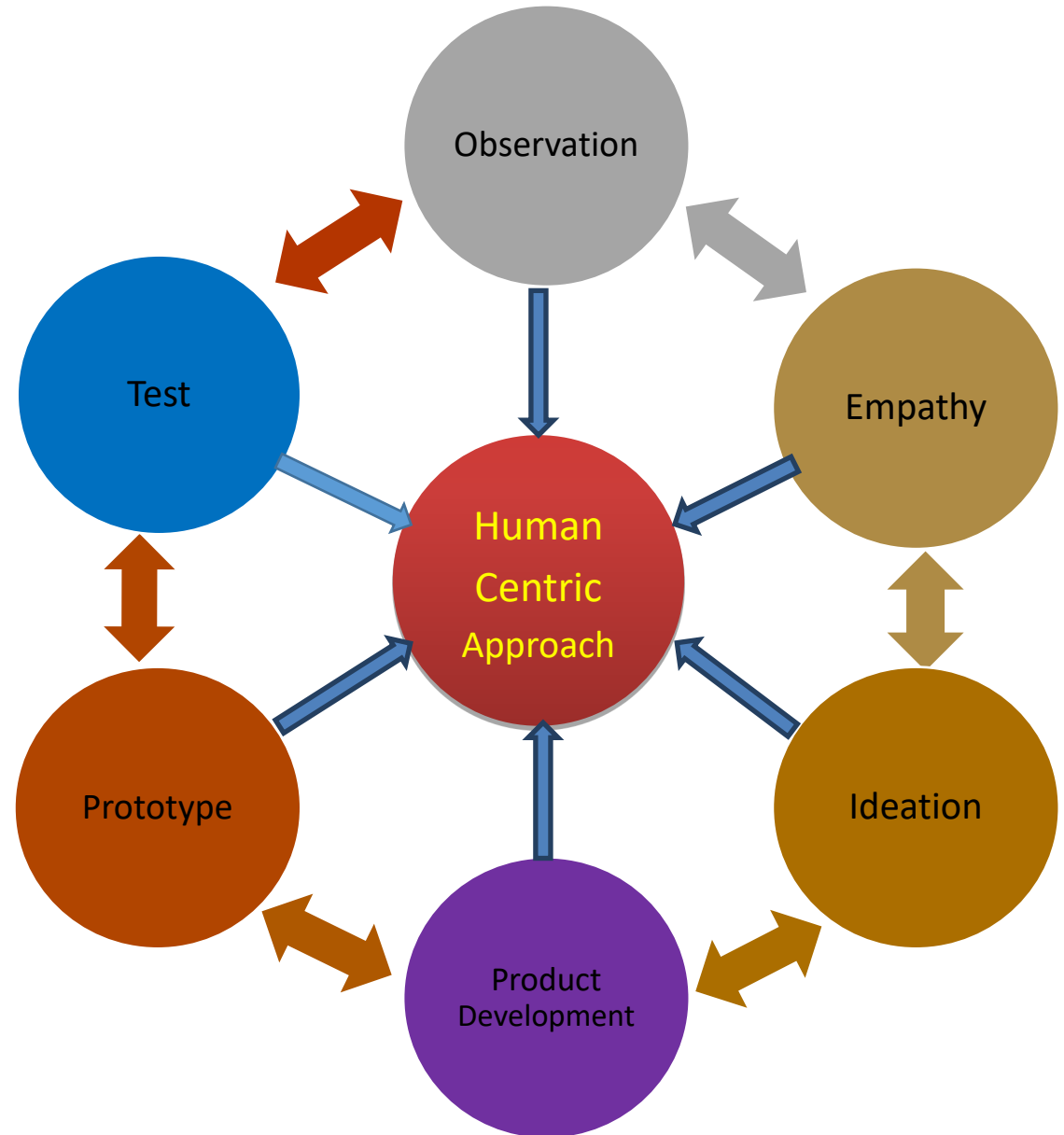


A *skill* that allows a *Designer* to align  
what **people want** with what can be done,  
and produce **a viable business strategy** that  
creates **customer value**  
and  
**market opportunity**

# A p p r o a c h



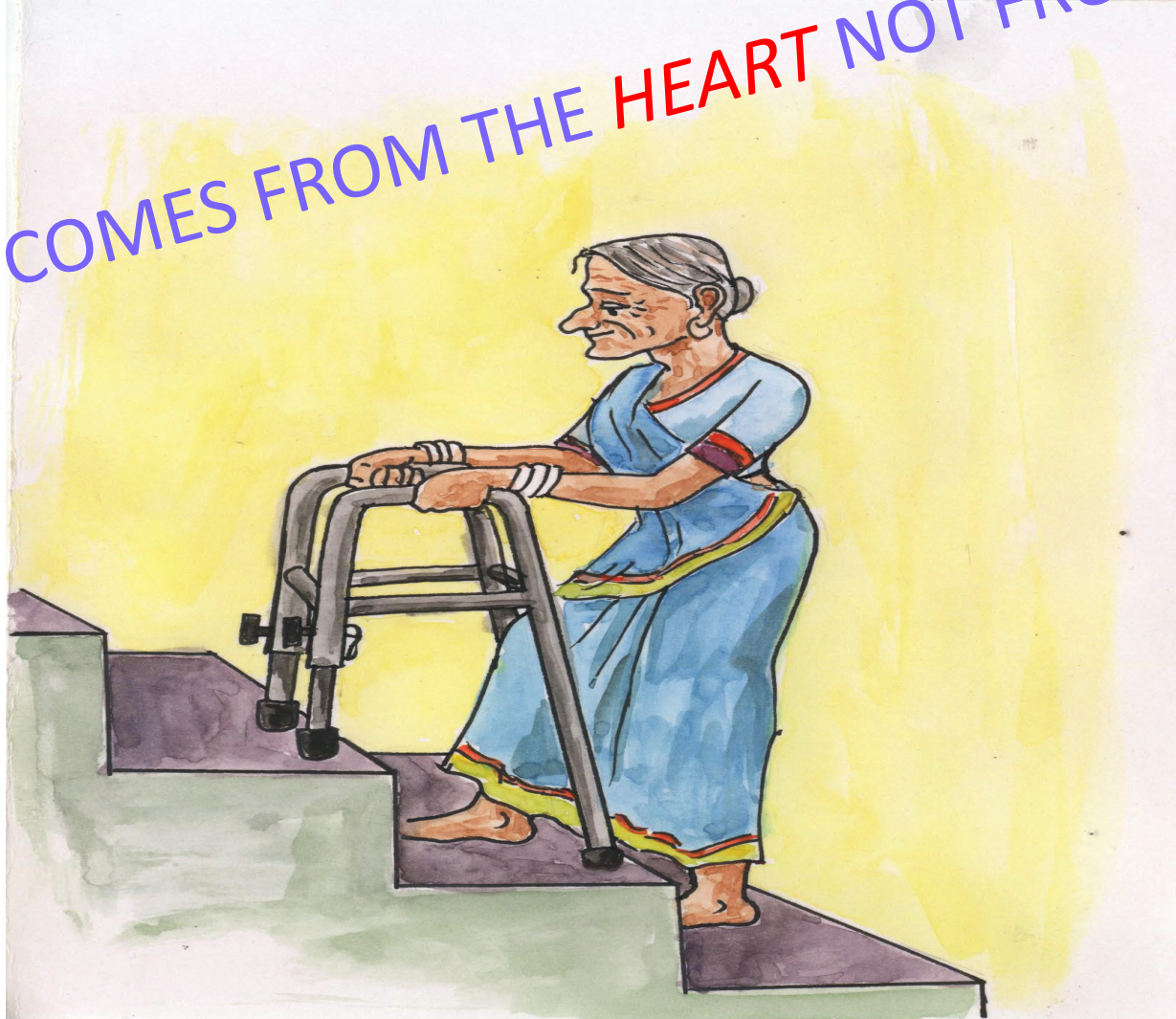
# Design Thinking - Phases





Feel the pain-

GOOD DESIGN COMES FROM THE HEART NOT FROM THE BRAIN





75,000 Civil Engineers produced by India per year... a challenge still remain to link affordable drinking water supply to masses in urban areas.

*Strengthen the appeal of socializing technologies*



# Innovations..... that take away your pain



**WATER WHEEL**

Created by : Cynthia Koenig

superhits **RED** FM 93.5  
*Baante Raho!*



YouTube 93.5 **RED** TV

@redfmindia

redfmindia



Innovation is not always involve ..... it only depends on empathy of user

## Save Water



*Wash basin above flush tank.  
What an innovative idea.  
Will help save gallons of Water  
..Very common in Japan.  
All hotels have it.*

Hi-tech Technology

Higher cost



AUTOMATION



# What is Innovation?



A new idea is a novel combination  
of existing ideas.



**Walkman + Pendrive =**  
(1979) (2000)

?



**Walkman + Pendrive =**  
(1979) (2000)

**iPod**  
(2001)



**Book + Computer =**  
(2000 BC) (1940s)

?





**Book + Computer =**  
(2000 BC) (1940s)

**iPad**  
(2010)



**Encyclopedia** + **CD** =  
(1700 ) (1982)

?



**Encyclopedia** + **CD** =  
(1700 ) (1982)

**Microsoft Encarta**  
(1995)



**Encyclopedia + Website =**  
(1700 ) (1992)

?



**Encyclopedia + Website =**  
(1700 ) (1992)

**Wikipedia**  
(2001)



**Car**   **+**   **Boat**   **+**   **Fish=**  
(1880s )   (Early Man)   (Before man came)

?



**Car**    **+**    **Boat**    **+**    **Fish=**  
(1880s )    (Early Man)    (Before man came)

**Submarine**  
(1890s)



**Car** + **Kitchen** =  
(1880s ) (Early Man)

?





**Car** + **Kitchen** =  
(1880s ) (Early Man)

**Restaurant on the Wheels**  
(1890s)

## Following Activities should be done in Design Engineering 1A

- Field Activity Observation (AEIOU Observations in Their Log Book)  
A-Activity, E-Environment, I-Interaction, O-Objects, U-Users
- AEIOU Summary Canvas
- Mind Mapping (On A3 size blank sheet)
- Empathy making Canvas (Story boarding and user's activity)
- Ideation Canvas (identify situations-locations with activities and props)  
From Ideation Problem statements will identified by them
- Product Development Canvas (Product experience, Features and functions)
- Rough Prototype (Rough idea about product implementation through flow diagram on blank sheet)
- Study of Research papers and articles (Prior Art Search)
- Report (On GTU Report format)
- Logbook

# Portal Activity

[www.de.gtu.ac.in](http://www.de.gtu.ac.in)

- Student Registration
- Team Registration
- Uploading Canvases-Prototype-Report
- Generating Completion Certificate (end of the semester)

# AEIOU Summary:

Group ID:

Domain Name:

Date:

Version:

## Environment:

- General impressions / observations (Style, material & atmosphere)
- Floor plan
- Elements, features and special notes
- Scenes

## Interactions:

- General impressions / observations (Who is interacting with whom, what?)
- Scene of interaction (How it is being done)
- Elements, features and special notes

## Objects:

- General impressions / observations (What components are involved? How?)
- Inventory of key objects
- Elements, features and special notes

## Activities:

- General impressions / observations
- Sketch/photo Summary of activity
- Elements, features and special notes

## Users:

- General impressions / observations (Who is present? Role and responsibilities)
- Scene of user in context
- Elements, features and special notes

# AEIOU Summary:

Group ID:

Domain Name: Road : ACP - Anna Garden

Date: 2.3.16

Version:

## Environment:

- General impressions / observations (Style, material & atmosphere)
- Floor plan
- Elements, features and special notes

## Interactions:

- General impressions / observations (Who is interacting with whom, what?)
- Scene of interaction (How it is being done)
- Elements, features and special notes

## Objects:

- General impressions / observations (What components are involved? How?)
- Inventory of key objects
- Elements, features and special notes

## Activities:

- General impressions / observations
- Sketch/photo Summary of activity
- Elements, features and special notes

## Users:

- General impressions / observations (Who is present? Role and responsibilities)
- Scene of user in context
- Elements, features and special notes





Empathy Mapping Canvas

Design For Date	Design By Version
USER	STAKEHOLDERS
ACTIVITIES	
STORY BOARDING HAPPY	
HAPPY	
SAD	
SAD	

Design For  
Date

Operating System  
for Gujarati People  
15/07/2014

Design By  
Version

1.0

Design For  
Date

Operating System  
for Gujarati People  
15/07/2014

Design By  
Version

1.0

USER

People who know Gujarati language but don't know English

STAKEHOLDERS

Housewife

Villagers

Old People (Gujar)

Gujarati School & Colleges

Government

Farmer

ACTIVITIES

1/2 Property Card Issue

Online for farming

Online Information

Video Calling

E-Commerce

Online shopping for nearest market

Online card payment

Getting Information about Govt. Policies

Getting Information about Subsidy

Getting Information about Agricultural loan

Monitoring Database about Villagers

STORY BOARDING

HAPPY

Farmer wants to issue 7/12 Property Card. Issue. He goes to office of Talati. At that place he met one person that is good friend of himself in childhood. Now, that person helps him to get the property card. He felt very good.

HAPPY

A villager is talking with his son, who is studying in foreign using telephone/mobile. He is communicating with his son leaving too far by mobile phone. He is very happy though this costs him very much.

SAD

Now, that farmer again wants to issue 7/12 Property card for another land. He goes to office of Talati. He assumes that his childhood friend will help him and he will get property card easily. But now that person is no more in that office. Right now no one is going to help him and he felt confused. Whole day is wasted but didn't get property card.

SAD

A person lives in a metro city from last two decades. Now he has some financial problem. So, he thought that he should sell his land which is located in his village, where he had not gone since many years. When he visited his village, he came to know that the owner of land was someone else. Now he is a victim of Land fraud. He is very confused about what to do?



# Ideation Canvas

The Ideonaut: *Ideation Canvas*

Project:

Team:



People



Activities



Situation/Context/Location



Props/Possible Solutions

The Ideonaut: *Ideation Canvas*

SPARTAN PERSON

KIDS



People

BUSINESS MAN

SHEPHERD

TEACHER

WORKING WOMAN

HOUSEWIFE

DRIVER

AGED PERSON

WORKERS

TRAILER

HANDICAPPED PERSON

STUDENT

CARPENTER

PASSENGER



Activities

RELAXING

PLAYING

CRYING

SINGING

COOKING

WALKING

REPAIRING

CYCLING

TRAVELING

DRIVING

TRACKING

TRAINING

READING

SWIMMING

EATING

SLEEPING



Situation/Context/Location

HOME

PARTY

BALCONY

KITCHEN

RESTAURANT

BIRTHDAY PARTY

GYM

UNDER WATER

BUS

KITTY PARTY

CULTURAL EVENT

HIGHWAY

CAR

RAINFALL

CITY

GRASS

TRAIN

SUNSET IN MOUNTAINS



Props/Possible Solutions

PHONE

WEB CAM

HEADPHONES

LAPTOP

CD

INTERNET

POWER BANK

PEN DRIVE

# Product Development Canvas

Product Development Canvas			Team/Date/Version: / /
<b>Purpose</b> What is the purpose of this canvas (are you developing)? Does it solve a problem, or it enhances a certain experience? Is it something you need or it is trying to create a new trend or has an opportunity?	<b>Product Experience</b> Define what your customer should feel like when he uses your product/feature? What emotions, feelings would define the experience? Feeling of comfort, convenience, or feeling of buying more with less time consumed or feeling of greater security, safety etc.	<b>Customer Revalidation</b> Once you've finished with your feature set, test with the customer. Does it fit the features, functions are useful, depends on the customer use.	
	<b>Product Functions</b> Functions are a product's answer to user problems (needs). They do something that user wants. They are often verbs in nature. Every function is powered by many features. Multitasking is a function. Browser tabs is a function that powers the multitasking feature. A function can have one or more features powering it. Functions are very generic in nature. Features are often more specific. Functions can be similar to product experience. Safety product function provides a feeling of safety (product experience).		
<b>People</b> Who is the key customer segment who will use this product? Develop on the end (a mix) of the canvas (your product)? Write from about them, describe them in 100s.	<b>Product Features</b> Product features are generic. They are more features in function. Technical details, details are often not power the selling features. Browser tabs, Apple's home button is multitasking between apps. As features powering the multitasking function. Each feature will have many components that components powering it. Sometimes a very popular component becomes a feature itself. Like car wheel is a major component and a feature of the car. Sometimes the in-car entertainment function powers entertainment as a product experience.	<b>Reject, Redesign, Retain</b> Post customer validation, reject those functions or features that the customers don't find useful. Redesign those that were partially useful and retain those that the customer found useful as functions/features or experience.	
	<b>Components</b> Components build up the features. For a selling it will comprise a lot of component like logs, triggers etc. For a tablet browser it will comprise of various chunks of code that will make the tabs work in cases where the feature is a major component. You could list here the auxiliary components that are required to make the major component work. You can also list new components and innovations you're planning here, as the component need.		

© Copyrights: Openfuel | www.openfuel.org

Product Development Canvas			Team/Date/Version: schneider/1401/17/01/17/1.0
<b>Purpose</b> What is the purpose of this canvas (are you developing)? Does it solve a problem, or it enhances a certain experience? Is it something you need or it is trying to create a new trend or has an opportunity?	<b>Product Experience</b> Define what your customer should feel like when he uses your product/feature? What emotions, feelings would define the experience? Feeling of comfort, convenience, or feeling of buying more with less time consumed or feeling of greater security, safety etc.	<b>Customer Revalidation</b> Once you've finished with your feature set, test with the customer. Does it fit the features, functions are useful, depends on the customer use.	
	<b>Product Functions</b> Functions are a product's answer to user problems (needs). They do something that user wants. They are often verbs in nature. Every function is powered by many features. Multitasking is a function. Browser tabs is a function that powers the multitasking feature. A function can have one or more features powering it. Functions are very generic in nature. Features are often more specific. Functions can be similar to product experience. Safety product function provides a feeling of safety (product experience).		
<b>People</b> Who is the key customer segment who will use this product? Develop on the end (a mix) of the canvas (your product)? Write from about them, describe them in 100s.	<b>Product Features</b> Product features are generic. They are more features in function. Technical details, details are often not power the selling features. Browser tabs, Apple's home button is multitasking between apps. As features powering the multitasking function. Each feature will have many components that components powering it. Sometimes a very popular component becomes a feature itself. Like car wheel is a major component and a feature of the car. Sometimes the in-car entertainment function powers entertainment as a product experience.	<b>Reject, Redesign, Retain</b> Post customer validation, reject those functions or features that the customers don't find useful. Redesign those that were partially useful and retain those that the customer found useful as functions/features or experience.	
	<b>Components</b> Components build up the features. For a selling it will comprise a lot of component like logs, triggers etc. For a tablet browser it will comprise of various chunks of code that will make the tabs work in cases where the feature is a major component. You could list here the auxiliary components that are required to make the major component work. You can also list new components and innovations you're planning here, as the component need.		

© Copyrights: Openfuel | www.openfuel.org



# Examples



# Activity Submission Schedule

Sr. No.	Name of Activity	Duration	Review/ Submission Date	Marks/weightage
1.	Lecture on DE with Activity introduction		6/10/2022	
2.	Team Formation, Student Registration on DE Portal	1 Week	10/10/2022	
3.	Guide Allocation		12/10/2022	
4.	Field Observation, Contact Guide and Team Registration on DE Portal	1 Week	19/10/2022	
5.	AEIOU Canvas, Mind Mapping, Empathy making canvas, Ideation Canvas	4 Weeks		
6.	First Review of DE Activity		23/11/2022	40
7.	Upload Canvases on DE Portal and get Reviewed by Internal Guide		26/11/2022	
8.	Product Development canvas, Prototype	2 weeks		
9.	Second Review of DE Activity		7/12/2022	20
	Upload Canvases on DE Portal and get Reviewed by Internal Guide		10/12/2022	
10.	Seminar on Report Writing		14/12/2022	
11.	Prepare Report according to format and verify softcopy with Internal Guide	1 week	21/12/2022	
12.	Upload Report on DE Portal and get Reviewed by Internal Guide		24/12/2022	20



**Thank You...**