

The case study, presented in the following pages was prepared by a team of Faculty Members in a few evenings. This problem is the very first attempt made by the team. One can use this as a sample and one may be able to build his/ her design engineering problems, which may be much better.

Case: **Space Utilization for Parking**

Pages 2- 6

The Case Study can also be referred through the following YouTube link:

<https://www.youtube.com/playlist?list=PLnNDkCrMqsxfUJ0ISzT0IXAIOu3-WO65>

You can also go through the YouTube links of various projects in the YouTube channel of GTU Innovation Council.

If you succeed in making a better design problem, please send it to Hima Bhatt at paltovc@gtu.edu.in so that it may be put on the YouTube-site for the others to see.

Example for Mechanical Engineering students

Date: 15th September to 19th September

Time: 3:00 pm to 7:00 pm

Subject: Design engineering

Case Study: Space Utilization for Parking

Branch: Mechanical Engineering

Team Members:

1. Mr. Nishant Patel (S.V.B.I.T, VASAN, GANDHINAGAR)
2. Mr. Amit Patel (GIT, GANDHINAGAR)
3. Mr. Jigesh Shah (SALL COLLEGE OF ENGINEERING)
4. Mr. P.K Nanavati (GEC, GANDHINAGAR)
5. Mr. Nishant Solanki (GEC, GANDHINAGAR)

Case Study on Space Utilization of space for Parking

- On the first day, we got the basic knowledge of design engineering. What is design engineering and why we need design engineering? How this subject will be useful to the student? All this questions has been cleared properly and also that how this activity will be useful in design engineering.
- GTU Innovation Council (GIC) committee explain to us that how to explore the mind of user? How to find out problem? Where the problem is occurring? All these points are cleared out. They gave us brief knowledge of the different activities that we have to perform during this workshop.
- **GIC committee provided us Four Canvases**
 - Canvas 1: User
 - Canvas 2: Ideation
 - Canvas 3: Product Development
 - Canvas 4: Design thinking venture

Following are the various steps in all canvases, so students can easily understand what they have to identify?

Canvas 1: User

These are the first step of the project or problem. In this canvas, you have to find out what is user to your problems? What is a stakeholder? What are activities? And what are broad stories of their activates?

1. User

- In this stage, we find the various users which are directly or indirectly related to our project.
- for example: Shopping malls, Multiplex, Hospitals, Residential Purpose, Educational Area, Religious Area

2. Stakeholders

- Stakeholders mean a person or organization with an interest.
- In this stage, we find the user who will directly or indirectly related to users.
- For example: owner of vehicle

3. Activities

- Activities are directly or indirectly related to stakeholders.
- Shopping malls, define parking time, wedding ceremony ,parking rush in religious day

4. Story Boarding

- Happy
- Sad

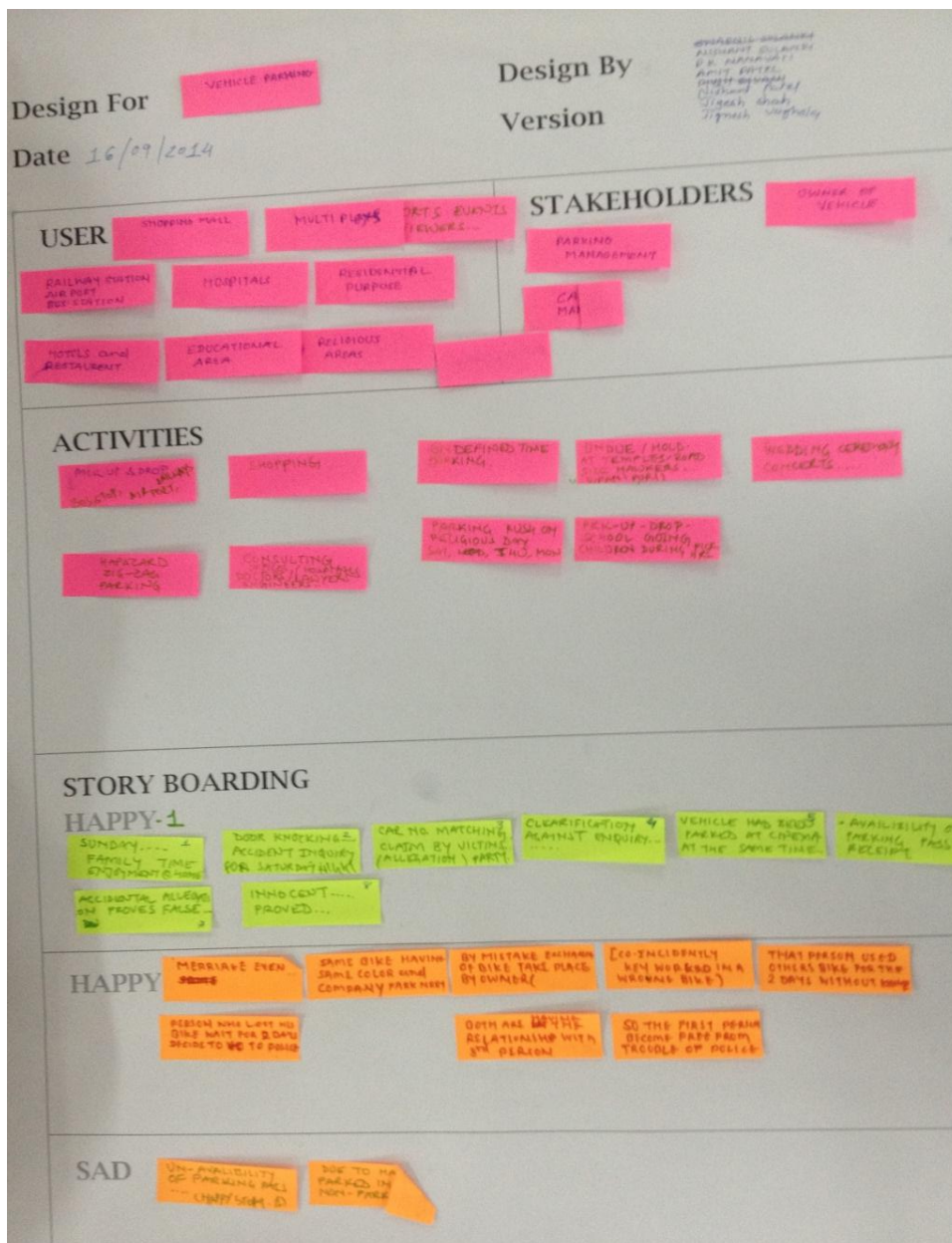


Fig.1 User Canvas

Canvas 2: Ideation

These are the second step of the project or problem. From the user canvas, you have an idea what are the people? In ideation canvas, you have to carry out which type of activities is related to your project and people? What is situation and location regarding to activities? Then after you find the possible solutions. It is depend or not depend to your activities.

1. **People:** Common public, business class, professional consultations, Government and private staff, educational students and staff
2. **Activities:** Children going to schools, visits/ tours, men/women going to shopping,
3. **Situation/Context/Location:** school in –out time, bicycle/two wheers,government/private schools, school , festivals, sales, during week end, religious places, Summer / winter vacation
4. **Props/Possible Solutions:** Division of parking space, floor managing in parking lots, green parking, bicycle vertical parking, carpooling, rustication in length of car, hydraulic mechanism.

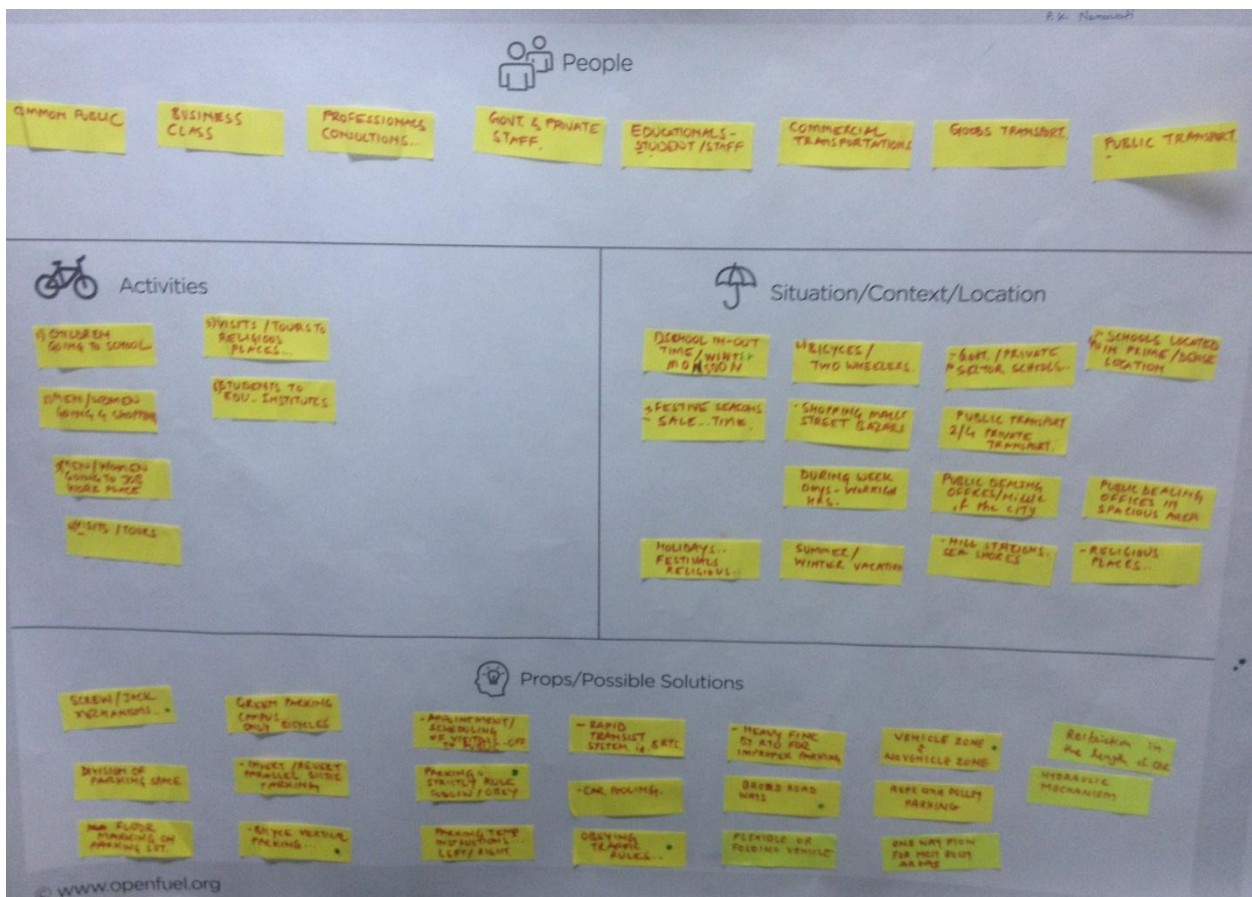


Fig.2 Ideation Canvas

Canvas 3: Product Development

Third step is development of the product. From possible solutions, you have idea about what is product? In this canvas, following things is to do.

1. **Purpose :** Reduction in parking time, Ability to handle maximum vehicle in parking system
2. **People:** Vehicle students, labors of factories
3. **Product Experience:** Fuel saving, time saving, ability to handle large traffic, Increasing comfortless
4. **Product functions:** Traffic reductions, better parking management, space utilization, creating pollution free environment
5. **Product Features:** Lock in-lock out facility, vertical parking for cycle, inclined parking for car
6. **Components:** Hook,rope,belts,c section,Tecahnical staff
7. **Customer Revalidation:** Starting of vehicle
8. **Reject/Redesign/Retain:** change the angle of parking



Fig.3 Product Development Canvas

Canvas 4: Design Thinking Venture

These are the last and final step in designing or developing a new or innovative ideas or project.

1. **People:** Common people, School students, Educational staff, Shopping malls, Hotels and multiplex
2. **Identify Multiple Problems:** Narrow road, Parking, Air and noise pollution, Dimensions of vehicle, Waste of time and fuel, Management of parking space
3. **Key Problem:** Space Utilization
4. **Identify Multiple Solutions:** Inclined parking system, Vertical parking system, folding and flexible vehicle, reduce the manufacturing size of car
5. **Key Solution:** Develop a new car parking technology
6. **Prototype:** Vertical parking system, Inclined car parking system
7. **Customer Revalidation:** Hook strength, Height of car, Comparison of flat and inclined parking, Locking system for vertical cycle parking
8. **Redesign:** Change the diameter of hook, Proper management
9. **Final Solution:** Vertical parking system, Inclined car parking system

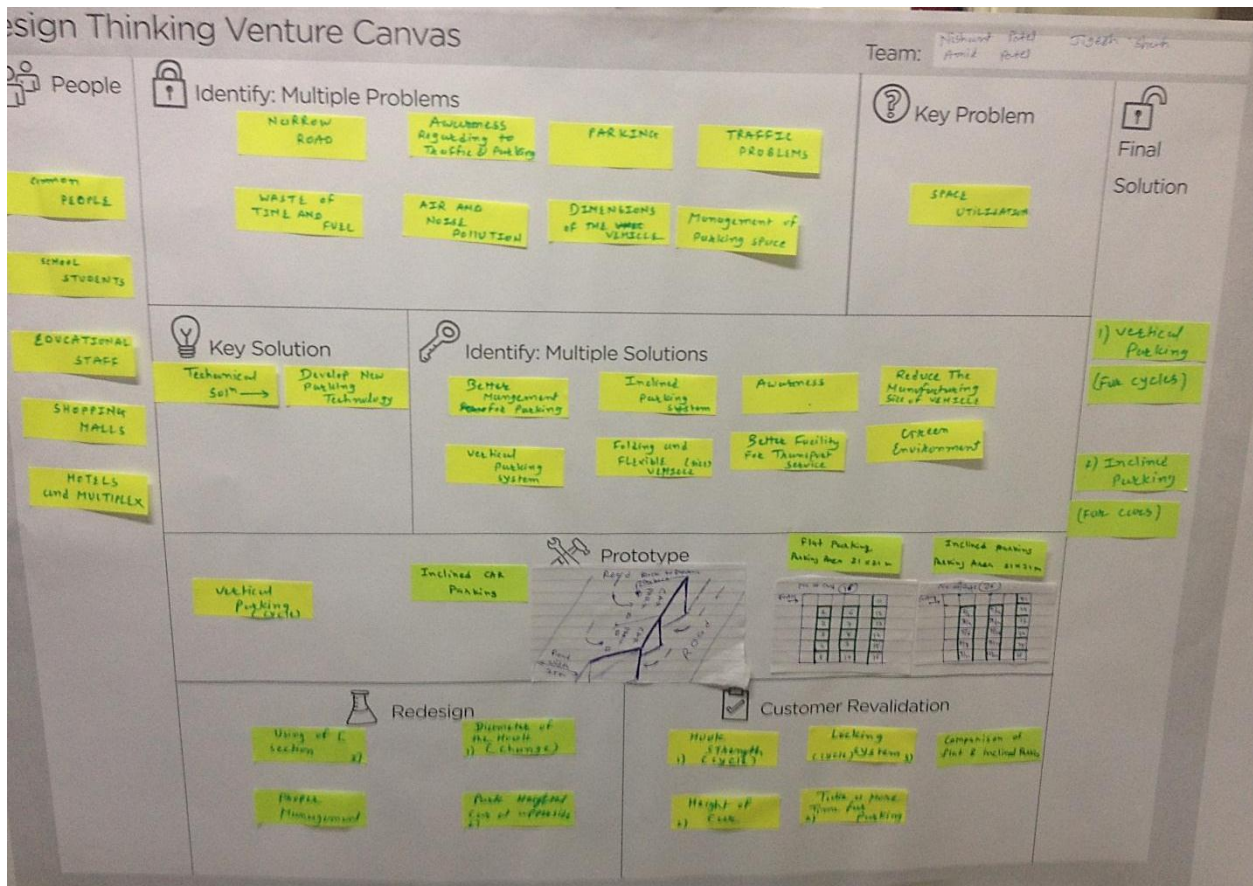


Fig.4 Design Thinking Venture Canvas