Lab 1: Problem Discovery and Need Identification

Title

Problem Discovery and Need Identification for Excessive Data and Battery Consumption in Mobile Applications

Lab 1 Report

Name: Selva K **Roll No:** 24BTCE197

Step 1: Observation

Observation Description

The usage of mobile applications was observed among students and working professionals during daily activities such as social media browsing, online classes, video streaming, and navigation.

Observed Points

- Users keep mobile data and background apps running continuously.
- Battery drains faster even when the phone is idle.
- Apps auto-refresh and sync without user awareness.
- Frequent notifications wake the screen and consume power.
- Poor network signal increases data and battery usage.

Constraints Identified

- Limited battery capacity
- Expensive mobile data plans
- Background processes controlled by apps , not users

Output: Obser

- Frequent charging required (2–3 times/day)
- Unexpected data usage increase
- Phone overheating

- User frustration due to fast battery drain

Step 2: User Identification

Stakeholder List

User Group	Role	Expectations
Students	Use apps for learning & communication	Long battery life, low data usage
Working Professionals	Use apps for work & meetings	Reliable performance, efficiency
App Developers	Design and maintain apps	High engagement, feature-rich apps
Network Providers	Provide internet services	Stable connectivity, controlled usage

Step 3: Interviews / Surveys

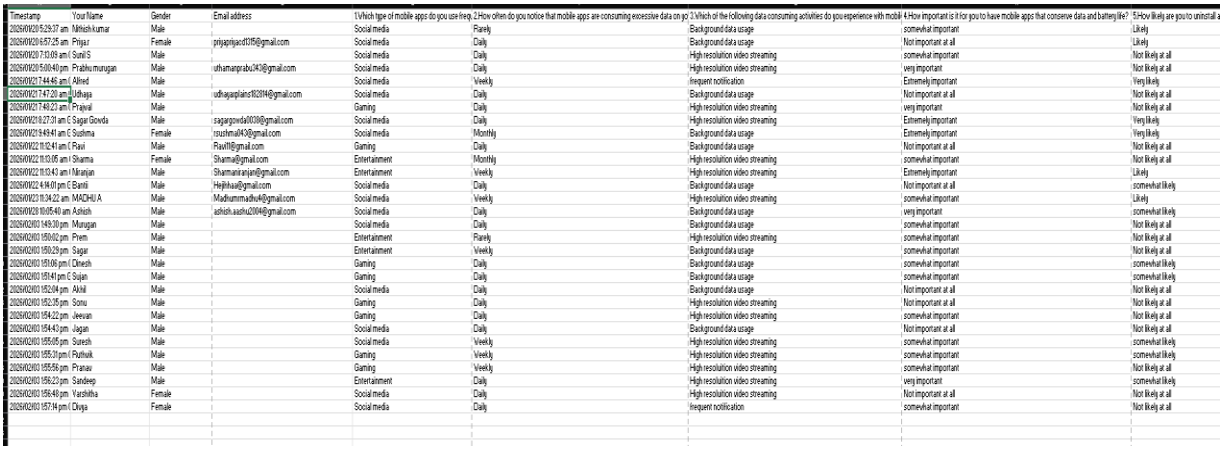
Sample Open-Ended Questions

1. How often do you experience fast battery drain?
2. Which apps consume most data on your phone?
3. Do you monitor app data usage regularly?
4. How does battery drain affect your daily activities?
5. Do you feel apps use data unnecessarily in the background?
6. Have you tried any battery/data saving features?
7. What frustrates you most about mobile app usage?

Interview Summary

- Interviews conducted with **30 users**
- Majority complained about **background data usage**
- Many users were unaware of which apps consume the most power

- Users felt frustrated when battery drained during emergencies
- Auto-play videos and background syncing were common complaints



Timestamp	Your Name	Gender	Email address	1.Which type of mobile apps do you use freq	2.How often do you notice that mobile apps are consuming excessive data on yo	3.Which of the following data-consuming activities do you experience with mobil	4.How important is it for you to have mobile apps that conserve data and battery life?	5.How likely are you to uninstall a
2026/01/20 5:29:37 am	Nitheish kumar	Male		Social media	Rarely	Background data usage	somewhat important	Likely
2026/01/20 6:57:25 am	Priyasr	Female	priyapriyasd03f9@gmail.com	Social media	Daily	Background data usage	Not important at all	Likely
2026/01/20 7:13:09 am	Sunil S	Male		Social media	Daily	High-resolution video streaming	somewhat important	Not likely at all
2026/01/20 5:00:40 pm	Prabhu murugan	Male	uthamanprabu043@gmail.com	Social media	Daily	High-resolution video streaming	very important	Not likely at all
2026/01/21 7:44:46 am	Alfred	Male		Social media	Weekly	Frequent notification	Extremely important	Very likely
2026/01/21 7:47:20 am	Udhaya	Male	udhayaplains182@gmail.com	Social media	Daily	Background data usage	Not important at all	Not likely at all
2026/01/21 7:48:23 am	Prajwal	Male		Gaming	Daily	High-resolution video streaming	very important	Not likely at all
2026/01/21 9:27:31 am	Sagar Gowda	Male	sagargowda0038@gmail.com	Social media	Daily	High-resolution video streaming	Extremely important	Very likely
2026/01/21 9:49:41 am	Sushma	Female	rsushma043@gmail.com	Social media	Monthly	Background data usage	Extremely important	Very likely
2026/01/22 11:02:41 am	Ravi	Male	Ravi7@gmail.com	Gaming	Daily	Background data usage	Not important at all	Not likely at all
2026/01/22 11:03:05 am	Sharma	Female	Sharma@gmail.com	Entertainment	Monthly	High-resolution video streaming	somewhat important	Not likely at all
2026/01/22 11:03:43 am	Niranjan	Male	Sharmaniranjan@gmail.com	Entertainment	Weekly	High-resolution video streaming	Extremely important	Likely
2026/01/22 4:04:01 pm	Bantli	Male	Hejkhaa@gmail.com	Social media	Daily	Background data usage	Not important at all	somewhat likely
2026/01/23 11:34:22 am	MACHU A	Male	Madhummadhu4@gmail.com	Social media	Weekly	High-resolution video streaming	somewhat important	Likely
2026/01/28 10:05:40 am	Ashish	Male	ashish.aashu2004@gmail.com	Social media	Daily	Background data usage	very important	somewhat likely
2026/02/03 1:49:30 pm	Murugan	Male		Social media	Daily	Background data usage	somewhat important	Not likely at all
2026/02/03 1:50:02 pm	Prem	Male		Entertainment	Rarely	High-resolution video streaming	somewhat important	Not likely at all
2026/02/03 1:50:29 pm	Sagar	Male		Entertainment	Weekly	Background data usage	somewhat important	Not likely at all
2026/02/03 1:51:06 pm	Dinesh	Male		Gaming	Daily	Background data usage	somewhat important	somewhat likely
2026/02/03 1:51:41 pm	Sujan	Male		Gaming	Daily	Background data usage	somewhat important	somewhat likely
2026/02/03 1:52:04 pm	Akhil	Male		Social media	Daily	Background data usage	Not important at all	Not likely at all
2026/02/03 1:52:35 pm	Sonu	Male		Gaming	Daily	High-resolution video streaming	Not important at all	Not likely at all
2026/02/03 1:54:22 pm	Veevan	Male		Gaming	Daily	High-resolution video streaming	somewhat important	Not likely at all
2026/02/03 1:54:43 pm	Jagan	Male		Social media	Daily	Background data usage	Not important at all	Not likely at all
2026/02/03 1:55:05 pm	Suresh	Male		Social media	Weekly	High-resolution video streaming	somewhat important	somewhat likely
2026/02/03 1:55:29 pm	Ruthvik	Male		Gaming	Weekly	High-resolution video streaming	somewhat important	somewhat likely
2026/02/03 1:55:56 pm	Pranav	Male		Gaming	Weekly	High-resolution video streaming	somewhat important	Not likely at all
2026/02/03 1:56:23 pm	Sandeep	Male		Entertainment	Daily	High-resolution video streaming	very important	somewhat likely
2026/02/03 1:56:48 pm	Varshitha	Female		Social media	Daily	High-resolution video streaming	Not important at all	Not likely at all
2026/02/03 1:57:14 pm	Divya	Female		Social media	Daily	Frequent notification	somewhat important	Not likely at all

Step 4: Pain-Point Analysis

Pain-Point Table

Pain Point	Category
Fast battery drain	Functional
High mobile data consumption	Functional
Phone overheating	Functional
Anxiety about battery availability	Emotional
Frustration due to frequent charging	Emotional
Lack of user control over background activity	Systemic

Critical Pain Point

➞ Uncontrolled background activity of mobile apps

Step 5: Root Cause Identification (5-Why Analysis)

Problem

Mobile apps consume excessive data and battery.

1. **Why?**
   Apps run continuously in the background.
2. **Why?**
   Auto-sync, notifications, and updates are enabled.
3. **Why?**
   Apps are designed to maximize user engagement.
4. **Why?**
   There are limited restrictions enforced by default settings.
5. **Why?**
   Users lack awareness and control over app permissions.

Root Causes

- Inefficient app design
- Poor battery optimization
- Default background permissions
- Lack of user awareness

Step 6: Wicked Problem Understanding

Why this is a Wicked Problem

- Difficult to define because data and battery usage vary by user behavior.
- Multiple stakeholders (users, developers, network providers) have conflicting goals.
- Developers want engagement; users want efficiency.
- No single solution works for all apps and users.

Problem Classification

➞ Wicked Problem

Step 7: Reflection

What assumptions **were** incorrect**?**

Answer:- Initially, it was assumed that excessive battery drain was mainly caused by poor battery quality or old devices. However, user interviews revealed that uncontrolled background app activity, auto-syncing, notifications, and unnecessary data usage were the major reasons for battery and data drain

- How did user perspectives change your understanding?

Answer:- User perspectives showed that the problem varies based on **individual usage patterns, app permissions, and device settings**. Many users were unaware of which apps consumed the most battery and data, highlighting that **lack of awareness and control** plays a significant role in the issue

- Why is jumping to solutions risky?

Answer:- Jumping directly to solutions without understanding user behavior and root causes can result in **ineffective fixes**. Without proper analysis, solutions may address symptoms rather than underlying issues such as **inefficient app design and default background permissions**

- What skills did you develop through this lab?

Answer:- This lab helped develop essential skills including:

- Observation of real-world user behavior
- Conducting interviews and surveys
- Empathy towards user frustration
- Root cause analysis using the 5-Why method
- Critical thinking for identifying wicked problems