Sample Answer – LAB04: Data Gathering Techniques for Requirements Discovery

System Studied: Smart Campus Energy Management Dashboard

Part A – Planning a Data Gathering Strategy

Research Goals:
- Understand how students and staff interact with energy systems in shared campus buildings.
- Identify behavioral factors that influence electricity consumption and awareness.
- Discover usability issues in existing campus dashboards and suggestions for improvement.

Participants:
- 4 students living in dormitories, 3 facility staff, and 2 administrative users.
- Selected through convenience sampling from Faculty of Information Technology.
- Aim to represent different energy consumption behaviors and levels of technical expertise.

Ethical Considerations:
- Obtain written consent for observation and energy usage tracking.
- Mask personal data (e.g., room numbers, power usage identity).
- Inform participants about how data will be stored and anonymized.

Part B – Conducting Interviews

Interview Type: Semi-structured interview combining quantitative logs with open-ended feedback.
Duration: 20–30 minutes on-site in the dormitory control room.

Sample Questions:

1. How do you currently monitor your room's energy usage?
2. Which information is most useful to you in an energy report?
3. How often do you check the campus energy dashboard?
4. What features would help you reduce power waste?
5. Do you prefer numeric statistics or visual graphs? Why?
6. Have you encountered any technical difficulties using the dashboard?
7. Would you agree to share your energy usage with peers for sustainability comparison?
8. What motivates you to conserve electricity on campus?

Recording and Remote Plan:
- Audio recorded via mobile phone with permission; screenshots taken of dashboard usage.
- For remote users, Microsoft Teams interview paired with shared Excel sheet of energy logs.

Part C – Designing a Questionnaire

Objective: Collect quantitative data on energy awareness, habits, and system usability from larger campus population.

Sample Questions:
1. How frequently do you check your electricity consumption report? (Daily / Weekly / Monthly)
2. Do you understand how the energy score is calculated? (Yes / No)
3. I would like real-time alerts when my consumption exceeds the campus average. [1–5 Likert]
4. The dashboard's data visualization is easy to understand. [1–5 Likert]
5. I am motivated by reward systems for energy saving. [1–5 Likert]
6. What information would you like added to the system? (Open-ended)
7. Do you prefer energy reports by device type or total usage? (Multiple choice)
8. Would you allow anonymous comparison with other dorm rooms? (Yes / No)
9. What prevents you from checking your usage regularly? (Open-ended)
10. How satisfied are you with the current dashboard's accuracy? [1–5 Likert]

Pilot and Feedback:
- Pilot tested with 5 students for clarity and timing (avg. 6 minutes).
- Revised questions to avoid double-barrel wording and reorder Likert items logically.

Part D – Observation and Ethnography

Observation Goal:
To analyze how dormitory residents react to energy-saving notifications and interact with the dashboard.

Method:
- Non-participant observation conducted in dormitory common area and IT control lab.
- Duration: 90 minutes per session during evening peak hours.
- Observation aids: Camera screenshots, activity notes, and interaction logs.

Robson & McCarten Framework Application:
- Space: Dorm common area with shared display.
- Actors: Students checking their personal usage data.
- Activities: Comparing energy scores, discussing high usage.
- Objects: Smart meters, dashboard screens, smartphones.
- Acts: Checking, pointing, sharing screenshots.
- Events: Leaderboard updates, campus notifications.
- Time: Evening 7–9 PM when usage spikes.
- Goals: Understanding daily patterns and motivation triggers.
- Feelings: Curiosity, competitiveness, mild frustration with delay.

Ethical Sensitivity:
- Ensure participants' identity is hidden when observing shared screens.
- Obtain consent before any photographs or screen captures.

Part E – Triangulation & Reflection

Triangulation:
Interviews revealed strong interest in visualization and gamified feedback.
Questionnaire data showed 82% of students wanted alerts when usage exceeded the average.
Observation confirmed that public energy leaderboards motivated competition among peers.

Triangulated Requirement:
- The dashboard should include real-time visual indicators and reward points for energy reduction while preserving anonymity.

Reflection:
Among the methods, observation was the most insightful because real actions often contradicted verbal intentions. Students who claimed to check data daily were actually reactive only when notifications appeared. Combining observation, surveys, and interviews gave a balanced understanding of behavior, perception, and motivation. The main challenge was maintaining privacy while collecting behavioral data in shared environments.