# (Compiled) Developing a Commute Planning and Optimization App for Students in Metro Manila

*Komyut – a proposed app for a competition that I participated in*

I. Project Background
   A. Problem Statement
      1. Students in Metro Manila face significant challenges with daily commutes, including long travel times, unpredictable traffic, and high transportation costs, leading to stress, reduced study time, and financial strain.
   B. Problem Definition
      1. Traffic congestion, unreliable public transport, limited real-time information, safety concerns (especially for female students), and affordability.
      2. Tardiness, fatigue, decreased academic performance, increased stress, and financial burden on students and families.
      3. Average commute time, transportation expenses as a percentage of allowance, student attendance rates, and self-reported stress levels.
   C. Context and Justification
      1. Metro Manila's traffic crisis stems from rapid population growth (+1.8M since 2020), underinvestment in road infrastructure, and 1.76M unregulated motorcycles/tricycles clogging road "arteries" like España Ave and EDSA.
      2. Competitors like Waze fail to address local needs:
         a) Why are students late?
            (1) Jeepneys stuck in traffic
         b) Why traffic?
            (1) Poor road networks
         c) Why poor road networks?
            (1) Substandard repair materials
         d) Why substandard materials?
            (1) Corruption in infrastructure contracts
         e) Why corruption?
            (1) Lack of auditing systems
   D. Research Objectives
      1. Define 3-5 objectives using the SMART framework:
         a) Specific
            (1) Reduce average student commute time from 90 to 72 minutes via route optimization
         b) Measurable
            (1) Achieve 85% accuracy in predicting jeepney arrival times using MMDA APIs

c) Achievable
    (1) Prototype testing with 50 students at UP Diliman/DLSU Manila/ADMU within 10 weeks
d) Relevant
    (1) Aligns with MMDAs 2025 Intelligent Transport System goals
e) Time-bound
    (1) Implement beta features by November 2025

II. Methodology

A. Research Questions

1. How do students prioritize cost vs. time when choosing between jeepneys, buses, trains, and ride-sharing?
2. What safety features (e.g., emergency SOS, route anonymity) are most critical for female commuters?
3. What information would be most helpful for students to plan and optimize their commute in real-time (e.g., traffic updates, jeepney routes, P2P bus schedules, ride-sharing options)?
4. How does real-time crowd density data influence route choices during monsoon floods?
5. How willing are students to use ride-sharing services or carpooling to reduce transportation costs and commute time?

B. Research Methods

1. Contextual shadowing
    a) Observe students during their actual commutes to understand their experiences, challenges, and decision-making processes
    b) Uncover hidden piano pints, identify unmet needs, and gain a deep understanding of the commuting context
2. Focus group
    a) Facilitate discussions with groups of students to gather insights on their shared experiences, attitudes, and preferences related to commuting
    b) Explore different perspectives, identify common themes, and generate ideas for potential solutions
3. Surveys
    a) Collect data from a larger sample of students to quantity their commuting habits, challenges, and preferences
    b) Identify trends, measure the prevalence of specific problems, and assess the potential impact of proposed solutions

C. Characteristics

1. Target audience
    a) Students in Metro Manila (specifically focusing on students from different economic backgrounds and transportation habits)

2. Sample Size
    a) Aim for 3-5 students for contextual shadowing, 2-3 focus groups with 6-8 participants each, and 100+ for surveys
3. Scope
    a) Focus on the core commuting challenges faced by students in Metro Manila, including travel time, cost, safety, and convenience
    b) Exclude features related to academic planning or social networking

III. User Persona

https://www.figma.com/board/yzdnx4YvbxbHZ0nzI3W44l/%5BUXS-UNI%5D-User-Persona?node-id=0-1&t=RP5KvkhY1lKTiAzk-1

IV. UX Solution Ideation

Impact and Feasibility Matrix

| **Solution** | **Impact (1-10)** | **Feasibility (1-10)** | **Quadrant** |
|---|---|---|---|
| Real-time jeepney route prediction | 9 | 7 | High impact, high feasibility |
| Transport optimization | 8 | 5 | High impact, medium feasibility |
| Alternative routing (no flood constraints) | 7 | 6 | Medium impact, medium feasibility |
| Safety score for night commutes | 6 | 8 | Medium impact, high feasibility |
| Fare comparison calculator | 7 | 9 | Medium impact, high feasibility |

| Why did you choose this framework and how did it support your process? |
|---|
| The Impact and Feasibility Matrix was selected because Metro Manila's traffic problem demands solutions that balance effectiveness with practicality. With limited resources and the severity of congestion (worst globally according to the 2023 TomTom Traffic Index), solutions must be prioritized based on their potential impact on commute times (currently averaging 25.5 minutes per 10km) and the technical/resource constraints of implementation in the Philippine context. |

This framework forced critical evaluation of proposed solutions against two crucial dimensions: potential time savings for commuters and realistic implementability given local infrastructure limitations (e.g., poor road quality rated 44.8/100). It helped identify “quick wins” that could deliver immediate value while acknowledging the entrenched, complex nature of Metro Manila traffic that requires both short and long-term strategies.

## Solution Summary

1. Real-time jeepney route prediction
    a. A mobile application that uses historical traffic patterns, current road conditions, and crowdsourced data to predict jeepney arrival times and suggest optimal boarding locations. Unlike Google Maps, which fails to incorporate informal transportation routes, this solution would:
        i. Track and predict routes for the 1.7M+ motorcycles and tricycles operating in Metro Manila
        ii. Incorporate data from known congestion hotspots like EDSA (C-4) and Shaw Boulevard (M-2)
        iii. Adjust predictions based on day/time (e.g., Fridays 5-6 PM when 10km trips take 35.5 minutes)
        iv. Allow users to report route deviations in real-time
2. Alternative routing (no flood constraints)
    a. A specialized feature that integrates with Manila’s flood monitoring systems to suggest dry routes during monsoon season, particularly relevant for flood-prone areas like Quirino Avenue (I-7):
        i. Incorporates elevation data to suggest routes less likely to flood
        ii. Provides real-time notifications when common routes become impossible
        iii. Suggest alternative transportation modes when primary routes are flooded
        iv. Allows community reporting of flood depths and road passability

| Core Features | Functionality | User Benefit | Evidence |
|---|---|---|---|
| Predictive departure times | Analyzes historical traffic data to suggest optimal departure times | Reduces waiting time at congested points like Philcoa (I-2) | Could potentially reduce the 117~ hours annually lost to traffic congestion |
| Jeepney route monitoring | Tracks actual jeepney routes versus scheduled routes in real-time | Eliminates uncertainty during commute planning | Addresses unpredictability caused by poor traffic management |
| Flood alert system | Integrates with | Prevents getting | Directly addresses |

| | | | |
|---|---|---|---|
| | weather data to warn of potential flooding on routes | stranded during monsoon season | issues caused by Manila's flood-prone geography |
| Alternative route generator | Suggests backup routes when primary paths experience unexpected congestion | Reduced commute variability | Helps navigate around 11 identified traffic hotspots in Metro Manila |

V. IA Recommendation Narrative

The proposed Commute Planning and Optimization App aims to help Metro Manila students efficiently plan their daily travel by addressing delays, flooding, traffic unpredictability, and safety concerns. The information architecture of this solution is designed around the student commuter's needs, routines, and pain points, providing clear and task-focused access to the most critical features.

➔ **Top-Level Structure and Grouping**

The app is structured into five primary modules, each serving a key aspect of a student's commuting experience:

1. Home Dashboard
    a. Overview of commute status, predictive departure times, and weather/flood alerts
    b. Highlights real-time recommendations tailored to the user's saved routes
2. Route Planner
    a. Users input their origin and destination
    b. Features a jeepney route predictor, alternative route generator, and fare comparison tool
    c. Integrates with MMDA APIs, flood monitoring data, and community reports
3. Live Map & Alerts
    a. Real-time map showing vehicle routes, congestion zones, and flooded areas
    b. Color-coded overlays (e.g., red = high congestion, blue = flooded)
    c. Users can tap to see updates, report issues, or view travel alternatives
4. Safety & Community
    a. Safety score ratings for routes at different times (e.g., night travel)
    b. Option for verified carpooling or SOS reporting
    c. Crowdsourced features allow students to report delays, traffic anomalies, and flooded zones

5. Profile & Preferences
    a. Saved routes, transportation preferences (e.g., avoid flood zones or night rides)
    b. Notifications, language settings, and commute history

➔ **Navigation Flow and User Journey**

The IA is designed to reflect the flow of a student's day:

- Upon opening the app, the Home Dashboard shows current road conditions and whether it's an ideal time to leave.
- When planning a trip, the student navigates to the Route Planner, enters trip details, and receives optimized options.
- During the commute, the Live Map keeps users updated and adjusts the plan based on live inputs.
- For added security or cost-efficiency, users can access the Safety & Community tab to explore carpooling options or share alerts.
- All personal preferences and travel history are stored under the Profile section for ease of access and customization.

This task-oriented flow minimizes distractions and allows users to focus on actionable steps that directly impact commute efficiency and safety.

➔ **Labeling and Usability**

Labels within the app are intentionally local, clear, and culturally relevant. For instance:

- "Jeepney/bus wait time" instead of "public transit forecast"
- "Flood-free route" instead of just "alternative route"

This ensures alignment with the mental models of student commuters in Metro Manila. Additionally, the design avoids technical jargon, opting instead for labels based on real-world problems and goals (e.g., "Avoid Night Travel," "Fastest Jeepney Option").

➔ **Accessibility and Visual Structure**

The app's IA prioritizes clarity and visual hierarchy. High-contrast colors are used for alerts (e.g., yellow for mild delay, and red for major congestion), while clean icons and tab layouts guide users efficiently through each feature.

Community and safety features are clearly demarcated to help female students and vulnerable groups find secure options during sensitive time frames. Key buttons and features are designed with mobile-first responsiveness in mind.

➔ **Overall Evaluation**

The app's information architecture is built to mirror the everyday decision-making process of student commuters. It emphasizes predictability, responsiveness, and personalization, ensuring that students can quickly access the tools they need to

adapt to Metro Manila’s complex and often stressful commuting landscape. Features are grouped by intent (plan, monitor, respond, personalize), supporting usability and mental clarity while on the move.