Design Thinking Approach to Develop a User-Centric Solution

1. EMPATHIZE

- **Conduct surveys and interviews with residents, waste collectors, and municipal authorities.**
- **Observe how people interact with smart bins and note their struggles.**

2. DEFINE THE PROBLEM

- **Sensor malfunctions prevent proper waste disposal.**
- **Unclear indicators lead to confusion.**
- **Resistance to adoption from certain groups.**

3. IDEATE

- **Improve Sensor Reliability: Use advanced motion sensors with AI calibration.**
- **Enhance Indicators: Implement clear, color-coded LED lights and audio cues.**
- **User Education: Provide simple instructions via posters, videos, and city campaigns.**
- **Gamification: Introduce incentives like rewards for proper waste disposal.**
- **Mobile App Integration: Allow real-time updates and alerts for residents and collectors.**

4. PROTOTYPE

- **Upgrade sensors and test for efficiency.**
- **Implement new LED and sound indicators.**
- **Design educational materials and conduct workshops.**
- **Develop a mobile app prototype for better interaction.**

5. TEST AND ITERATE

- **Deploy improved bins in test areas and gather user feedback.**
- **Monitor usage patterns and sensor performance.**
- **Make necessary refinements before city-wide implementation.**

Empathy Map and Design Thinking Approach for Smart Trash Bins

User (City Residents, Waste Collectors, and Municipal Authorities)

SAYS	THINKS	FEELS	DOES
• "The bin doesn't always open when I approach." • "I don't understand what the LED signals mean." • "Why should I switch to this when traditional bins work fine?" • "Some bins overflow because they don't alert the system properly."	• "Will this really make waste disposal easier or just complicate things?" • "The technology seems unreliable; maybe I should just use regular bins." • "Are my tax dollars being wasted on a system that doesn't work well?" • "This could be good if it actually worked as intended."	• Frustrated by malfunctioning sensors and unclear indicators. • Confused about the purpose and functioning of the smart bins. • Skeptical about new technology replacing a simple, traditional system. • Concerned about hygiene and overflowing bins.	• Avoids using smart bins due to uncertainty. • Reverts to traditional bins, leading to inefficient waste collection. • Complains about overflowing bins to city authorities. • Struggles to understand or adapt to the smart bin system.

CONCLUSION:

A user-centric approach using the Design Thinking process can address challenges in smart trash bin adoption. By improving reliability, communication, and education, cities can encourage widespread use and optimize waste management systems.