Assignment 1 - Ideation and Prototype

Developing ideas for **technologies to learn waste management**

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Brainstorming

30 ideas for using technology in waste management and increasing knowledge on managing waste

1. RFID tags to track waste and ensure correct disposal
2. Smart bins (garbage chutes) that automatically sort and segregate waste using machine learning
3. A computer game that shows the consequences of improper waste management (post-apocalypses, fallout-style)
4. Mobile app with locations for batteries/plastic recycling bins
5. A predictive analysis software to analyse and display trends in waste management
6. Use blockchain technology to keep track and record waste management transactions with potential benefits for proper disposal
7. An engine that runs on some sort of waste-created fuel
8. AR/VR set that helps user to sort waste
9. A cryptocurrency of "Carbon Credits" that is rewarded for proper waste management (potential integration with #6)
10. Subscription-based service for waste collection to encourage regular recycling
11. A mobile/web game that teaches players proper waste management and encourages users to compete, earn rewards, share achievements (potential integration with #9)
12. Sensors and monitors network for landfills to monitor emissions
13. QR-codes on packaging material with info on recycling instructions
14. Marine and submarine robots that collect ocean waste
15. Embedded RFID tags with magnets? to help automatize sorting and recycling
16. A technology to create interactive waste art installations in public spaces
17. Smart trucks/robots/drones that collect waste and garbage
18. Biodegradable RFID tags and sensors (to use in #1 and #15)
19. Automated waste-collection points with embedded sorting technology

20. Smart benches, coffee tables, bus stops with integrated waste/recycling bins and solar-powered charging stations
21. Nano-coating technologies for waste containers to improve odor and cleaning experience
22. Illegal dumping surveillance drones
23. Community/local/neighbors dashboard/forum for waste management discussions and posts (possible integration with #11)
24. Technology to use waste particles for water filtration
25. IoT composting bins that monitor/regulate composting processes and/or reduce odors
26. Recycling device that transforms plastic into material for 3D printers
27. Smart trash compactors that compress waste, increasing bin capacity and reducing the frequency of collections
28. Use real-life waste collection and recycling data for digital game rewards (either #11 or other popular games)
29. A technology that uses waste heat as an energy source
30. Food waste monitoring technology that rewards businesses for not throwing away food/notifies people of good-to-use food thrown away in their area

High achievability and low impact idea

Idea #3, a computer game that shows the consequences of improper waste management in a post-apocalyptic or fallout-style scenario. While it may be relatively easy to develop a game, its impact on actual waste management practices might be limited. The game could serve as an educational tool, but its direct influence on real-world waste management may not be significant.

Low achievability and high impact idea

Idea #7, an engine that runs on some sort of waste-created fuel. While the idea of using waste as a fuel source has a high environmental impact potential, the practical challenges and technical complexities associated with developing an efficient and scalable engine that runs on waste-created fuel may make it a low achievability idea. The infrastructure, technology, and regulatory hurdles involved in implementing such a solution on a large scale could be substantial.

New idea built on the idea from the list

Building on the idea of "Smart Bins (garbage chutes) that automatically sort and segregate waste using machine learning" (#2), a new idea could be the integration of robotic arms

within these smart bins to further enhance waste sorting efficiency.

New idea: **Robotic Arms in Smart Bins for Precise Waste Sorting**

In this concept, the smart bins are equipped with robotic arms that can extend into the bin to identify and pick out specific items for sorting. The robotic arms use advanced machine learning algorithms to recognize different materials, such as plastics, paper, glass, and metals. Once identified, the robotic arms can autonomously deposit each item into the corresponding compartment within the bin.

How this new idea builds on the old one: **Smart Bins -> Robotic Arms**

The addition of robotic arms takes the smart bin concept to the next level by introducing physical automation for precise waste sorting. While machine learning helps identify materials, the robotic arms provide a hands-on approach to ensure accurate sorting. This innovation minimizes the risk of contamination and improves the overall efficiency of the waste sorting process within the smart bins.

New idea by jumping from the idea from the list

Jumping from the idea of "Smart Trucks/Robots/Drones that collect waste and garbage" (#17), a new idea could be the development of a collaborative swarm of waste-collecting drones that work together seamlessly to cover larger areas efficiently.

New Idea: **Collaborative Swarm of Waste-Collecting Drones**

In this concept, instead of individual drones operating independently, a swarm of specialized waste-collecting drones collaboratively navigates through urban areas. Each drone is equipped with sensors and cameras for waste detection, and they communicate with each other in real-time to optimize collection routes.

How it represents the jump: **Robot -> Swarm**

The initial idea of smart trucks, robots, or drones focused on individual units collecting waste. The jump here involves the concept of collaboration and swarm intelligence, where multiple drones coordinate their efforts to cover larger territories in a synchronized manner. This collaborative approach increases the efficiency of waste collection, especially in densely populated or expansive urban environments.

New idea by combination of two ideas

Combining the ideas of "Blockchain Technology to Keep Track and Record Waste Management Transactions with Potential Benefits for Proper Disposal" (#6) and "A Cryptocurrency of 'Carbon Credits' that is Rewarded for Proper Waste Management (Potential Integration with #6)" (#9) can lead to a powerful and comprehensive waste management solution.

Combined Idea: **Blockchain-Backed Waste Management and Carbon Credit System**

In this integrated concept, blockchain technology is utilized to create a transparent and immutable ledger for recording waste management transactions. Each step of the waste lifecycle, from collection to disposal, is recorded on the blockchain. Simultaneously, a cryptocurrency system is established, issuing "Waste Tokens" as carbon credits to individuals, businesses, or municipalities that engage in proper waste management practices.

By building on two concepts this new idea is better because it not only addresses the need for transparent and efficient waste management (through blockchain) but also introduces a tangible incentive (cryptocurrency) that motivates individuals and entities to actively participate in sustainable waste practices.

Storyboard Construction

For this part I will pick 3 ideas that meet a different need or solve a different problem.

Idea #6: Blockchain-based Waste Management Tracking

Utilizing blockchain for waste management transactions addresses the need for **transparent and accountable waste disposal**. The technology ensures an immutable and decentralized ledger, reducing the risk of fraudulent or improper waste handling. This **promotes environmental responsibility and compliance** with waste disposal regulations

Idea #9: Carbon Credits Cryptocurrency for Waste Management

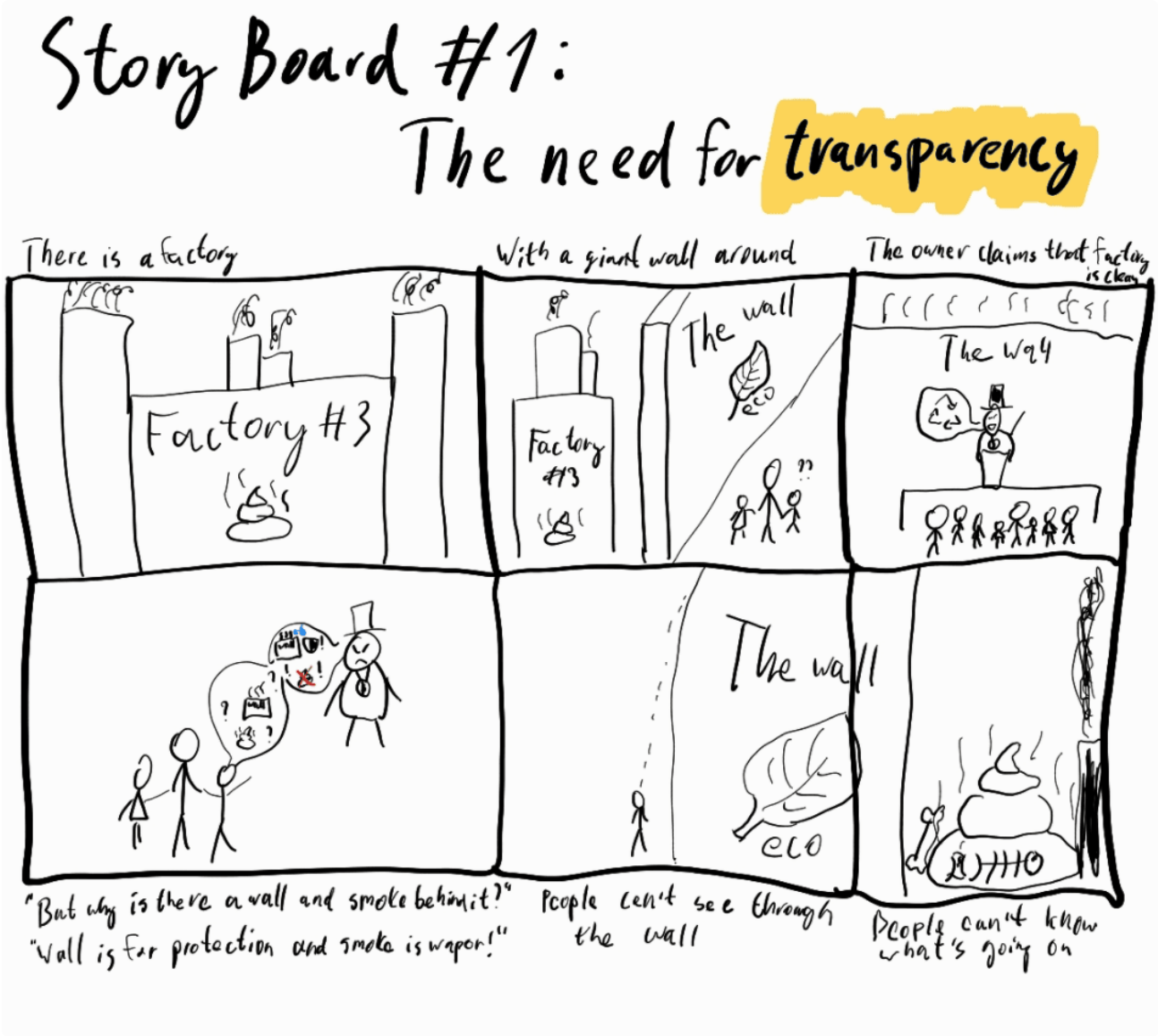
Introducing a cryptocurrency tied to carbon credits for proper waste management addresses the need for **incentivizing eco-friendly practices**. By rewarding individuals or businesses with a digital asset directly linked to their waste reduction efforts, this idea aims

to **encourage a more sustainable approach** to waste disposal and carbon footprint reduction.

Idea #11: Use of blockchain to track and reward proper waste management

The mobile/web game for waste management education meets the need for **increased awareness and education on proper waste disposal** practices. By gamifying the learning process and encouraging friendly competition, users are **motivated to adopt and share best practices for waste management**, contributing to a cleaner environment.

Storyboard #1: The need for transparency



Question: What is a possible drawback for having transparency?

Storyboard #2: The need for incentive

Question: Should there be an incentive for everything?

Storyboard #3: The solution

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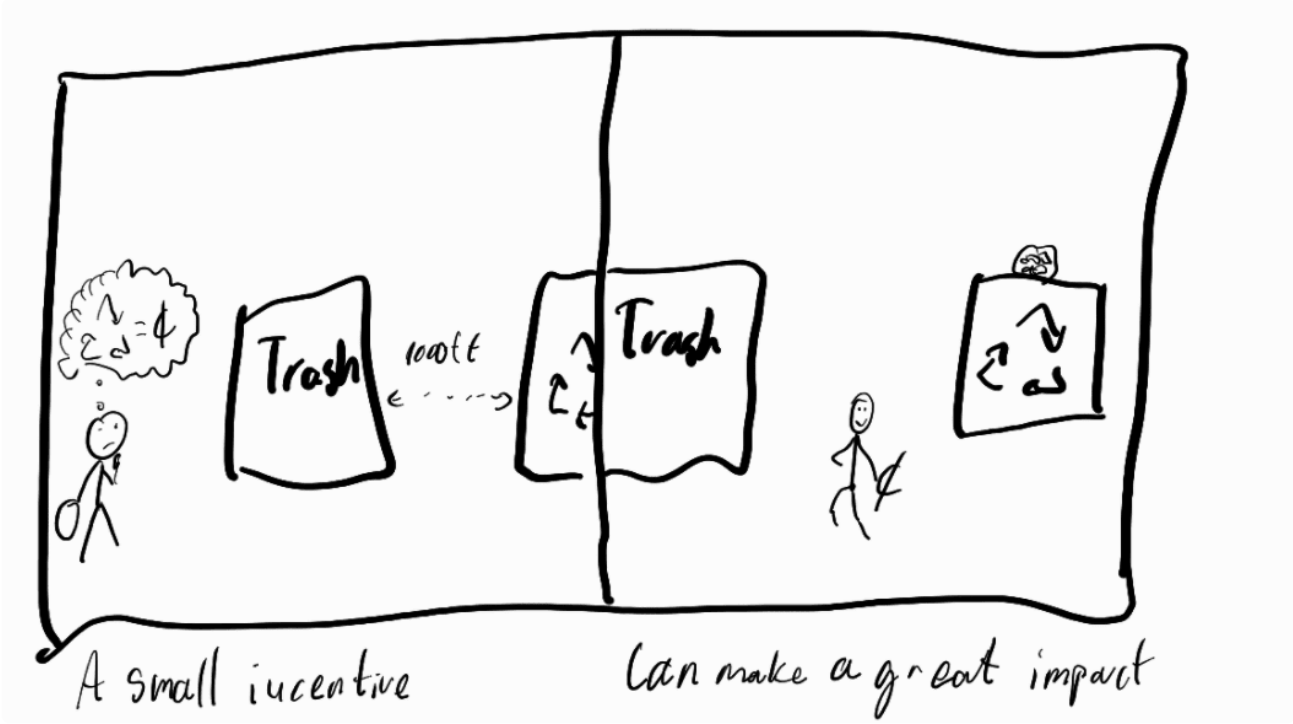
The solution

The app that shows the score/credit of the companies waste management

may make them do the better job at it and make the life transparent



Question: Do you think that the lack of transparency and incentive are the only things that prevent people from proper waste management?