The Girl Code

SMART INDIA HACKATHON 2025

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- **Problem Statement ID** – SIH25009
- **Problem Statement Title** - Gamified Environmental Education Platform for Schools and Colleges
- **Theme** - Smart Education
- **PS Category** - Software
- **Team ID** - 24
- **Team Name** - The Girl Code

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ABOUT THE PROBLEM STATEMENT

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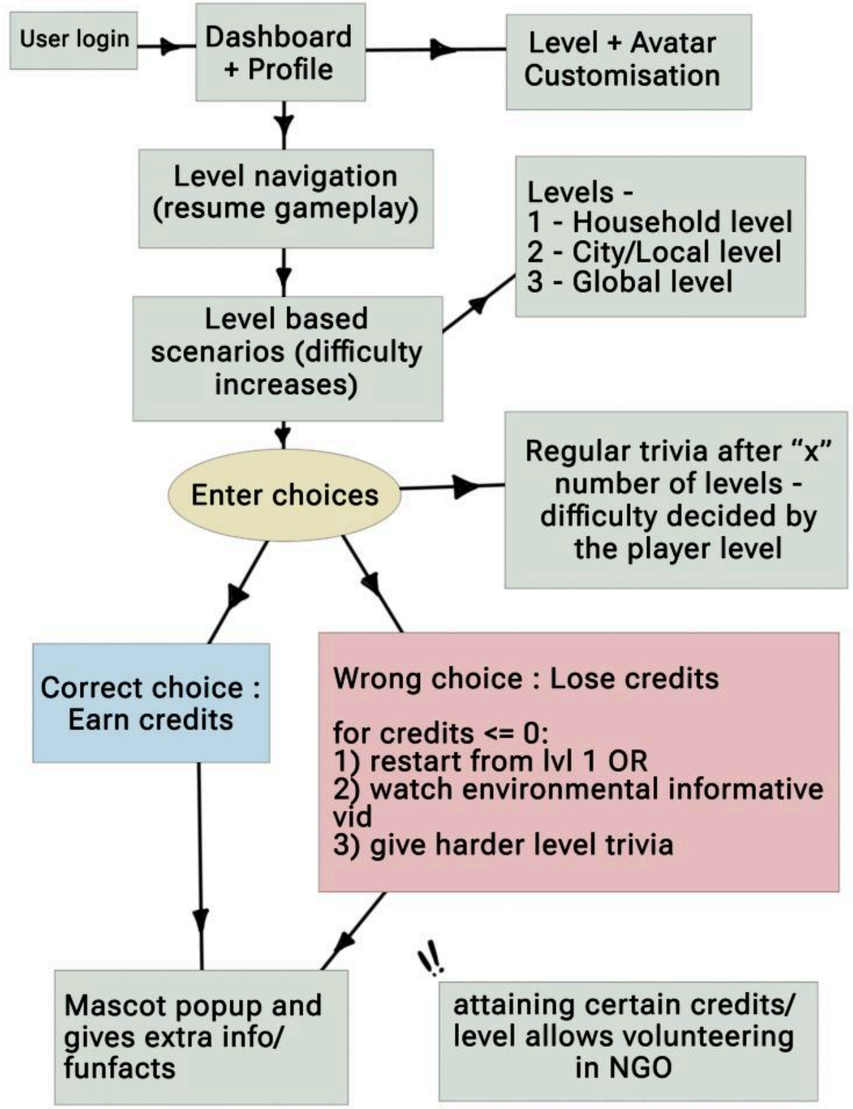
SOLUTION AND EXPLANATION



HOW IS THE PROBLEM ADDRESSED

- Educates users about **sustainable habits** [3]
- Real-time feedback -> how **daily life decisions** affect ecosystem.
- Drop of eco-points teaches users about bad sustainable decisions.
- **Fun** learning via gaming instead of textbooks [1]
- Game includes **real-life scenarios** for users to relate [3]
- **Periodic quests/trivia** to test and expand knowledge

INNOVATION & UNIQUENESS

- Allows players to relate to day-to-day activities
- Promotes sustainable habits : **not just awareness.**
- **Customizable avatar** based on Eco-points collected [2]
- Real time **'Pollution contribution tracker'** based on choices made
- **Cognitive Skill Development**:- critical thinking and decision making skills [1]
- Use Eco-points to **volunteer** in **NGOs**
- Color changes (to grey) upon a bad choice

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TECHNICAL APPROACH

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1. Frontend (UI)

- **React.js** → Responsive & Interactive website.
- **Tailwind CSS** → Quick and clean styling + visually engaging user interface. .

2. Backend

- **Node.js + Express.js** → Handles game logic, level progression, Eco-points, and user management.

3. Database

- **MongoDB** → Stores user profiles, game progress, Eco-points, vouchers, and community activity data.

4. OPEN AI GPT API

- To generate dynamic hints or interactive prompts

5. Hosting / Deployment

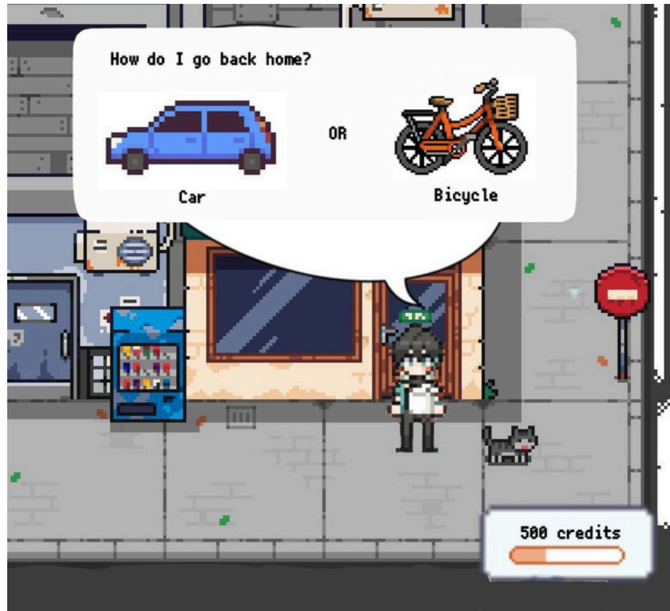
- **Vercel** → Host frontend
- **Render / Railway** → Host backend + MongoDB

7. Digital pixel art

- **IBIS paint/Procreate →** To make visually appealing backgrounds/mascot etc

- **LV-1 : Sustainability at home**
- Navigate through room to complete eco-friendly tasks
- Each action teaches energy conservation

- **LV-2 : Sustainability in streets (society)**
- Player chooses option which will impact the background (surrounding)
- This encourages users to make sustainable choices



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FEASIBILITY AND VIABILITY

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FEASIBILITY AND VIABILITY

TECHNICAL FEASIBILITY :

- Frontend (React.js, Tailwind CSS) creates an interactive, responsive, and animated interface.
- Backend (Node.js + Express.js) with MongoDB manages game logic, Eco-points & user data

OPERATIONAL FEASIBILITY :

- **Simple**, **intuitive** design with clear visual cues.
- **Minimal** technical support needed; user-friendly design.

SOCIAL FEASIBILITY :

- Educates users about **eco-friendly decisions**
- Can be **integrated** into schools, colleges to raise environmental awareness

POTENTIAL CHALLENGES

- Ensuring game runs smoothly on all devices (**compatibility**)
- Keeping players **motivated** to play the game on regular basis
- **Storing** user choices, eco-points, and progress reliably
- Managing backend performance if multiple users play simultaneously (aka **avoiding traffic**)

Ensuring smooth gameplay across all platforms

Reliable storage of player choices and progress

OVERCOMING CHALLENGES

Sustaining Player Motivation

Leaderboards, badges, streaks, and milestones

DATA SECURITY

Secure user data and progress

Cross-Platform Compatibility

Responsive web design and progressive web app features

BACKEND SCALABILITY

Plan for high traffic and use cloud services

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IMPACT AND BENEFITS

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POTENTIAL IMPACTS

- Increased **environmental awareness**
- **Small decisions** contribute to environment on **large scale** [1]
- **Long term benefits** and habits induced in routine
- Creates a sense of shared **responsibility** [2]
- Promotes **growth of NGOs** and volunteers

SOCIAL BENEFITS

- Educates users about **eco-friendly choices** in an **interactive** way.
- **Redeemable vouchers** linked to NGOs create social value by supporting NGO programs

ECONOMIC BENEFITS

- Teaches players about energy, transport, and waste choices hence **encourages resource efficiency.**
- Increased **eco-engagement** may inspire users eco-startups contributing to the green economy.

ENVIRONMENTAL BENEFITS

- Raises **awareness** about environmental issues and motivates sustainable decision-making in daily life. [1]
- Supports **real-world impact** through eco-friendly choices. [1]

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REFERENCES

[1] A. Iscenco and J. Li, “The Game with Impact: Gamification in Environmental Education and Entrepreneurship,” in *Proc. Innovation, Competitiveness and Resource Efficiency. World Resources Forum, Arequipa, Peru*, 2014. **https://www.researchgate.net/publication/363014083_The_Game_with_Impact_Gamification_in_Environmental_Education_and_Entrepreneurship**

[2] U. Kramar and M. Knez, “Gamified Learning for Sustainability: An Innovative Approach to Enhance Hydrogen Literacy and Environmental Awareness Through Simulation-Based Education,” *Sustainability*, vol. 17, no. 6, 2694, Mar. 2025. **https://www.mdpi.com/2071-1050/17/6/2694**

[3] I. Thamarasseri and V. Chandran, “Educating for Sustainability through Gamification: Exploring Challenges and Opportunities,” *i-manager’s Journal of Educational Technology*, vol. 21, no. 4, pp. 1-9, Jan.-Mar. 2025. **https://www.imanagerpublications.com/article/21580**