Project Report: Sidewalk Policy - Urban Management Game

Project Name: Sidewalk Policy

Theme: Urban Management & Social Equity

Platform: Web Browser (HTML5, CSS3, JavaScript)

Date: October 2025

YouTube Demo: https://youtu.be/UNLhxJSxtrw

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1. Executive Summary

Sidewalk Policy is an educational browser-based card game that simulates the real-world challenges of urban management in Vietnamese cities, specifically focusing on sidewalk policy enforcement and the delicate balance between public order, local livelihoods, and community trust.

Key Highlights:

- 🎮 **Genre:** Card-based Strategy/Simulation Game
- 🌍 **Social Impact:** Educates players about policy trade-offs and urban governance
- 🎯 **Target Audience:** Students, policy makers, and citizens interested in urban issues
- ⚡ **Technology:** Pure front-end (HTML/CSS/JavaScript), no backend required
- 🎨 **Visual Design:** Dynamic animations, glass morphism effects, gradient backgrounds

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2. Game Concept & Educational Value

2.1 Core Concept

Players assume the role of an **Urban Policy Officer** responsible for managing sidewalks in a crowded Vietnamese city. The game reflects real tensions between:

- **Public Order** - Safety and sidewalk clearance
- **Local Livelihood** - Street vendor income and jobs
- **Community Trust** - Public support and social harmony
- **Budget** - Management resources

2.2 Real-World Connection

The game is directly inspired by actual sidewalk management challenges in Vietnamese cities like Hanoi and Ho Chi Minh City, where:

- Street vendors are a cultural and economic cornerstone
- Sidewalk congestion affects pedestrian safety

- Enforcement actions can devastate livelihoods
- Community opinions strongly influence policy success

2.3 Educational Impact

Players learn about:

- **Policy Trade-offs:** Every decision has consequences
- **Stakeholder Management:** Balancing competing interests
- **Resource Allocation:** Working within budget constraints
- **Long-term Planning:** Short-term gains vs. sustainable solutions
- **Empathy Building:** Understanding multiple perspectives

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3. Gameplay Mechanics

3.1 Core Gameplay Loop

Turn Structure:

1. **Draw Phase:** Draw 3 random policy cards
2. **Decision Events:** 30% chance of random event requiring immediate choice
3. **Decision Phase:** Play 1-2 cards (costs budget)
4. **Evaluation Phase:** Effects applied to indicators
5. **Objective Events:** Every 3 turns, external events occur
6. **Next Turn:** Repeat or end game

3.2 Policy Cards System

Total Cards: 52 unique policy cards in pool

Categories:

- **Enforcement Cards (70%)** - Increase Order but reduce Livelihood/Trust
- Examples: Sidewalk Clearance, Police Patrols, Fine Vendors, Demolish Stalls
- **Livelihood Support (15%)** - Support vendors but may reduce Order
- Examples: Vendor Zones, Microfinance, License Programs
- **Community Engagement (10%)** - Build trust and cooperation
- Examples: Public Forums, Volunteer Programs, Cultural Events
- **Balanced Approaches (5%)** - Win-win solutions (rare but valuable)
- Examples: Hybrid Model, Phased Relocation, Heritage Protection

Budget Generation: 50% of cards include +10 budget revenue (fees, fines, grants)

3.3 Indicators System

Indicator	Starting Value	Win Condition	Lose Condition
🏛️ Public Order	50	≥ 100	= 0
🛒 Local Livelihood	50	≥ 100	= 0
❤️‍🩹 Community Trust	50	≥ 100	= 0
💰 Budget	100	-	= 0 or can't afford any card

3.4 Random Events

Decision Events (30% per turn):

- Media Spotlight
- Vendor Family Appeal
- Business Owner Complaint
- Pedestrian Accident
- Foreign Investor Visit
- Student Volunteer Offer
- Rainy Season Challenge
- Social Media Backlash

Objective Events (Every 3 turns):

- Storm Damage
- Economic Boom
- Election Season
- Health Inspection
- Cultural Festival
- Construction Project
- Budget Allocation
- Documentary Feature
- New National Law
- International Recognition

3.5 Win/Lose Conditions

Win Condition:

- ALL three indicators reach 100 simultaneously
- Displays result image based on final score ranking

Lose Conditions:

- ANY indicator drops to 0
- Budget reaches 0
- Cannot afford any available cards

3.6 Scoring System

- **Base Score:** Each indicator change × 10 = score points
- **Turn Bonus:** +10 points per turn survived
- **Speed Bonus:** +500 if won in ≤5 turns
- **Budget Bonus:** Remaining budget × 5
- **Excellence Bonus:** Indicators above 100 × 3
- **Perfect Balance:** 1.5× multiplier if all indicators ≥80

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4. Technical Implementation

4.1 Architecture

```
game_app/
├── index.html # Main HTML structure
├── css/
│ ├── style.css # Core styles (700+ lines)
│ ├── animations.css # Dynamic effects (500+ lines)
│ ├── result-fullscreen.css # Result screen layout
│ ├── result-images.css # Image effects
│ └── fix-turn-number.css # UI fixes
├── js/
│ ├── config.js # Game configuration
│ ├── gameState.js # State management
│ ├── cards.js # Card system (52 cards)
│ ├── indicators.js # Indicator display
│ ├── events.js # Random events
│ ├── ui.js # UI management
│ ├── gameLogic.js # Core game logic
│ └── main.js # Entry point
└── assets/
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└── images/

├── suffering.png # Lose result

├── megacity.png # Top 5 win

└── cantwalk.png # Win but not top 5

4.2 Technology Stack

Front-end Only:

- HTML5 - Semantic structure
- CSS3 - Modern styling with animations
- Vanilla JavaScript - No frameworks, pure ES6+

Key Technologies:

- **LocalStorage** - High score persistence
- **CSS Animations** - 50+ keyframe animations
- **CSS Grid & Flexbox** - Responsive layout
- **Glass Morphism** - Backdrop blur effects
- **Gradient Animations** - Dynamic backgrounds

4.3 Code Statistics

Component	Lines of Code	Files
JavaScript	~2,500	8 files
CSS	~2,000	5 files
HTML	~250	1 file
Total	**~4,750**	**14 files**

4.4 Key Features Implemented

✅ Card-based gameplay with 52 unique policy cards

✅ Dynamic indicator system with color-coded progress bars

✅ Random event system (Decision + Objective events)

✅ Scoring & achievements with 9 achievement types

✅ High score system with top 10 leaderboard

✅ Result images (suffering/megacity/cantwalk) based on performance

✅ Advanced animations - Gradient shifts, card flips, modal bounces

✅ Glass morphism UI - Modern frosted glass effects

✅ Responsive design - Works on desktop, tablet, mobile

✅ Accessibility - Reduced motion support

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5. Visual Design & User Experience

5.1 Design Philosophy

- **Modern & Clean:** Glass morphism, gradients, shadows
- **Dynamic & Engaging:** 50+ animations, smooth transitions
- **Intuitive:** Clear visual hierarchy, iconography
- **Accessible:** High contrast, readable fonts, motion control

5.2 Color Palette

- **Primary:** Purple gradient (#667eea → #764ba2)
- **Success:** Green (#4CAF50)
- **Warning:** Orange (#FF9800)
- **Danger:** Red (#f44336)
- **Gold:** Achievement highlights (#FFD700)

5.3 Animation Effects

Background:

- Gradient shift animation (15s cycle)
- Floating particles effect
- Wave animations

Cards:

- Hover: Lift + glow + scale (1.03x)
- Select: Rotate + scale animation
- Unaffordable: Shake effect
- Effects: Individual hover with slide

Progress Bars:

- Pulse animation
- Shine effect (light sweep)
- Color transitions

UI Elements:

- Button ripple effect
- Modal bounce-in

- Result screen 3D rotate
- Achievement pop-in (staggered)

5.4 User Flow

Menu Screen

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How to Play (optional)

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Game Start

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[Draw 3 Cards] → [Select 1-2 Cards] → [End Turn]

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Decision Event? Apply Effects Objective Event?

↓ ↓ ↓

Win/Lose Check ——————┴——————┘

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Result Screen (with image + stats + high scores)

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Play Again / Menu

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6. Game Balance & Difficulty

6.1 Design Challenges

- **High difficulty:** ~70% cards have negative trade-offs
- **Resource scarcity:** Budget management is critical
- **Multiple objectives:** Must balance 3 competing indicators
- **Random events:** Add unpredictability and challenge

6.2 Balance Mechanisms

- Cards cost 10-35 budget
- Starting budget: 100
- Budget generation cards: 50% of pool
- Win requires ALL indicators at 100 (strict)
- Lose if ANY indicator hits 0 (punishing)

6.3 Strategy Tips

- Prioritize budget-generating cards early
- Balance enforcement with support
- Use community engagement for trust recovery
- Plan for long-term sustainability
- React adaptively to random events

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7. Educational Outcomes

7.1 Learning Objectives

After playing, students should understand:

- **Complexity of urban governance**
- **Stakeholder perspectives** (vendors, residents, businesses, government)
- **Resource constraints** in public policy
- **Unintended consequences** of single-focus policies
- **Value of inclusive decision-making**

7.2 Discussion Topics

- Is strict enforcement always the answer?
- How can cities balance order and livelihoods?
- What role should community input play?
- Are there win-win solutions?
- How does culture affect policy implementation?

7.3 Use Cases

- **Urban Planning Classes:** Policy simulation
- **Government Training:** Decision-making practice
- **Public Awareness:** Civic education tool
- **Research:** Data collection on player choices

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8. Future Enhancements

8.1 Potential Features

- 🌍 **Multiplayer mode** - Compete or cooperate
- 📊 **Statistics dashboard** - Detailed analytics
- 🎨 **More themes** - Different cities/countries

- 🏆 **Campaign mode** - Progressive difficulty
- 🔊 **Sound effects & music** - Audio feedback
- 📱 **Mobile app version** - Native iOS/Android
- 🌐 **Internationalization** - Multiple languages
- 🤝 **Social sharing** - Share results on social media

8.2 Technical Improvements

- Save/load game state
- Tutorial mode with tooltips
- Difficulty settings
- Custom card creation
- Backend integration for global leaderboards
- Data analytics and player behavior tracking

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9. Development Process

9.1 Tools & Workflow

- **Code Editor:** Visual Studio Code
- **Version Control:** Git
- **Testing:** Browser Developer Tools
- **Design:** CSS-based (no external design tools)
- **AI Assistance:** Used for code generation and iteration

9.2 Development Timeline

- **Concept & Design:** 2 hours
- **Core Mechanics:** 4 hours
- **Card System:** 2 hours
- **UI/UX & Animations:** 3 hours
- **Testing & Polish:** 2 hours
- **Total:** ~13 hours

9.3 Challenges Overcome

- ✅ Managing complex state across multiple systems
- ✅ Balancing game difficulty
- ✅ Creating 52 realistic policy cards

- ✅ Implementing smooth animations without frameworks
- ✅ Ensuring responsive design across devices

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10. Installation & Usage

10.1 Requirements

- Modern web browser (Chrome, Firefox, Edge, Safari)
- JavaScript enabled
- No installation required

10.2 How to Run

1. Open game_app/index.html in any web browser
2. No server needed - runs entirely client-side
3. Game state saved to browser LocalStorage

10.3 Browser Compatibility

- ✅ Chrome 90+
- ✅ Firefox 88+
- ✅ Safari 14+
- ✅ Edge 90+
- ✅ Mobile browsers (iOS Safari, Chrome Mobile)

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11. Credits & Acknowledgments

11.1 Development

- **Game Design:** AI-assisted design based on real Vietnamese urban challenges
- **Programming:** Pure HTML/CSS/JavaScript implementation
- **Art Assets:** Custom images for result screens
- **Sound:** None (future enhancement)

11.2 Inspiration

- Real-world sidewalk management issues in Vietnam
- Card-based strategy games (Reigns, Card Crawl)
- Serious games for social impact
- Urban planning simulations

11.3 Educational Value

This game contributes to:

- Public awareness of urban governance challenges
- Empathy building between different stakeholders
- Critical thinking about policy trade-offs
- Understanding of Vietnamese urban culture

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12. Conclusion

Sidewalk Policy successfully demonstrates how games can be powerful educational tools for exploring complex social issues. By placing players in the role of a policy officer, the game creates an experiential learning environment where abstract concepts become tangible challenges.

The game's emphasis on trade-offs mirrors real-world governance - there are no perfect solutions, only choices with consequences. This nuanced approach encourages players to think critically about urban management and appreciate the difficulties faced by policy makers.

Through engaging gameplay, dynamic visuals, and meaningful choices, **Sidewalk Policy** achieves its goal of educating while entertaining, proving that serious topics can be explored through playful interaction.

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13. Appendix

13.1 Game Statistics

- **Total Policy Cards:** 52 (with duplicates for frequency)
- **Unique Card Types:** 29
- **Random Events:** 13
- **Achievements:** 9
- **CSS Animations:** 50+
- **Lines of Code:** ~4,750

13.2 Card Distribution

- Enforcement (Order+): ~38% frequency
- Livelihood Support: ~15% frequency
- Community Engagement: ~12% frequency
- Infrastructure: ~15% frequency
- Economic Incentives: ~10% frequency
- Technology: ~5% frequency
- Balanced Approaches: ~5% frequency

13.3 Contact & Links

- **Demo Video:** https://youtu.be/UNLhxJSxtrw
- **Project Files:** See game_app/ directory
- **Screenshots:** See screenshots/ directory
- **Prompts:** See prompts/ directory

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This project was created for educational purposes to demonstrate the intersection of game design, urban policy, and social impact.