

Tech, Media Democracy: Final Report and Documentation

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The Problem Area and Big Idea

Our final project, *Pattern Trap*, is a multi-task game and simulated hotel booking platform designed to educate users about dark patterns, which are deceptive design strategies embedded in digital interfaces that manipulate users into taking actions they might not otherwise choose. These patterns exploit cognitive biases through mechanisms like preselection, trick wording, and visual interference, often maximizing corporate gain while undermining user autonomy. The problem is not merely one of poor design—it reflects deeper tensions between technological power and democratic values, where interface architecture can subtly distort consent, limit informed choice, and erode trust in digital systems.

Research has shown how such manipulations affect real-world outcomes in areas like political donations and financial services, often leading users to unknowingly surrender privacy, money, or agency. Recognizing the societal risk, institutions like the UK's Competition and Markets Authority have launched formal investigations into online choice architecture, underscoring its impact on consumer rights and market fairness.

This project critically examines how interface design choices—particularly dark patterns—shape user behavior and undermine informed consent in digital spaces. It reveals the subtle ways in which technology can distort transparency, limit user autonomy, and prioritize corporate interest over public good. In doing so, the project explores urgent questions at the intersection of tech, media, and democracy: How is power encoded into digital interfaces? Who benefits from user confusion? And what safeguards are necessary to ensure that digital platforms uphold democratic values like fairness, choice, and accountability in the attention economy?

Link to the Working System (the working prototype):

<https://bhoomikamehta.github.io/PatternTrap/>

Overview of the System's Main Features

Pattern Trap is built based on a hotel booking platform. The hotel booking platform is designed to simulate a realistic, multi-page booking experience layered with dark patterns. Its main features include interactive cookie consent popups, form-based data entry with required and recommended fields, hotel and room selection interfaces, and deceptive add-on services during checkout. Pattern Trap embeds common dark patterns into an interactive hotel booking simulation. Users are challenged to detect manipulative elements through active engagement, with a point-based system rewarding awareness. By experiencing and identifying these patterns

firsthand, players develop critical digital literacy and become better equipped to recognize and resist unethical interface design in everyday life. A built-in point system gamifies detection of these patterns, encouraging critical engagement. The system ultimately highlights how subtle design choices can shape decisions and extract user data under the guise of convenience and personalization.

Technical Flow and Implementation

Our final implementation of *Pattern Trap* was as a multi-page web application, user journey mimicking real-world UI/UX deception, using HTML, CSS, and JavaScript, with React.js managing state across pages and integrating behavioral scoring logic into each interaction. Each page features scripted deceptive interface elements—such as preselected checkboxes, visual interference, obstructive modals, and mislabeling—implemented using conditional DOM manipulation and event listeners.

A custom scoring system was developed to evaluate user awareness and resistance to dark patterns. Scores are logged based on subtle user actions (e.g., hovering over misleading tooltips, identifying concealed buttons, or unchecking bundled service add-ons). Conditional logic determines which interactions are rewarded, reinforcing awareness of manipulative design and stored as JSON objects in a tracking log. This system emulates a gamified audit of user susceptibility, providing feedback and tips on actions recorded and generating a final report.

The design references a formal taxonomy of 16+ dark pattern types (e.g., confirmshaming, trick wording, untranslation) and incorporates novel patterns like “Alphabet Soup” and “Linguistic Dead-Ends.” The final implementation not only demonstrates technical fluency in frontend development and behavioral logging but also highlights the real-world consequences of deceptive digital design practices.

Link to detailed description of every dark pattern implemented, lit review and research on dark patterns available here: [☰ TMD Project Research](#)

Key Technical Challenges

One of the key technical challenges we addressed was designing an interaction flow that felt both authentic and educational, not simply a quiz. We had to ensure that users weren’t just guessing the “right” answer but were genuinely learning to identify and resist dark patterns through natural engagement. This required careful crafting of interactions—such as preselected options, fake urgency alerts, or visual obfuscation—that mirrored deceptive interfaces found in the wild while maintaining narrative and thematic coherence.

To maintain immersion, we built a custom scoring system that tracked nuanced behaviors, like tooltips hovered or misleading links avoided, and logged them using JSON-based structures without requiring server-side storage.

Accessibility was another consideration — the dark pattern designs had to remain interpretable for users with different abilities, which required adapting deceptive tactics in ways that remained fair and inclusive. These challenges were addressed by our team through iterative design and testing cycles, incorporating user feedback to refine both the deceptive elements and the explanatory mechanisms embedded in the *Pattern Trap* system.

Theory of Change and Plausibility of Contribution

Our theory of change rests on the premise that increased user awareness leads to more informed digital decision-making and greater resistance to manipulative design. By embedding dark patterns in an interactive hotel booking experience and providing real-time feedback, users learn to identify deceptive practices through firsthand experience. This experiential learning model is more engaging and memorable than traditional didactic approaches. The system also bridges the knowledge gap between abstract academic definitions and real-world applications of dark patterns, making the issue tangible and personal.

The plausibility of our contribution lies in its replicability and adaptability also that it leverages behavioral psychology and interaction design principles to foster reflection, not just reaction. The simulation is designed to simulate the emotional and cognitive load users face in actual booking scenarios, which strengthens its real-world relevance. The modular structure of our simulation can be extended to other domains—such as e-commerce, finance, and social media—where dark patterns frequently influence behavior. Furthermore, our taxonomy-informed implementation provides a concrete reference point for regulators, designers, and educators to identify and audit deceptive interface patterns systematically. It could also support longitudinal studies on how awareness impacts user behavior over time or serve as a foundation for educational modules in UX design and digital ethics courses.

Looking ahead, *PatternTrap* can evolve into an educational toolkit, a browser plugin, or even a dataset source for machine learning models detecting dark patterns. Our work contributes to ongoing efforts to make digital platform owners and designers more accountable and user-centric by combining technical insight with democratic values and helping them become aware of such design tricks and learn how to create product interfaces that are more user-friendly—not just for users with low technological literacy, but for everyone. We see this project as a step toward a more transparent, ethical, and rights-respecting digital future.

Our Team:

Bhoomika – Project Lead & Developer, Final Report Main Author

Led the project planning and coordination, developed core application features and dark pattern simulations, and authored the final project report.

Ariel – Front-end Developer and Designer

Contributed to development of a dark pattern simulation, focusing on frontend and UI aspects.

Sal – Full Stack Developer and Designer (Backend Focus)

Designed the initial look and theme as well as developed a framework for the backend, enhancing performance.

Marquis – Full Stack Developer (Backend Focus)

Worked on implementation of interactive dark pattern simulations and contributed to UI/UX design, which upgraded the site's user experience

Shaw – Content/Data Researcher

Conducted thorough research and synthesized findings to inform accurate, relevant in-game design and narrative.

Kexin – Tester and Test Evaluation Report Analyst

Designed and executed test cases, analyzed results, and compiled findings into a detailed evaluation report.