Somaiya Vidyavihar University

UED IA-2

UI Dark Patterns and Their Impact on
User Perception in Mobile Applications

by

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Problem Definition

The use of Dark Patterns in mobile applications has been increasing, where user interfaces are deliberately designed to manipulate users into unintended actions such as making unwanted purchases, sharing personal data, or subscribing to services. These practices exploit cognitive biases, leading to ethical concerns in UX design, where user awareness about these deceptive practices remains low.

Methodology

This study aimed to analyze the presence of Dark Patterns in popular mobile applications and assess user perception through experiments. The methodology consisted of three main steps: app selection and analysis, categorization of Dark Patterns, and a user perception experiment.

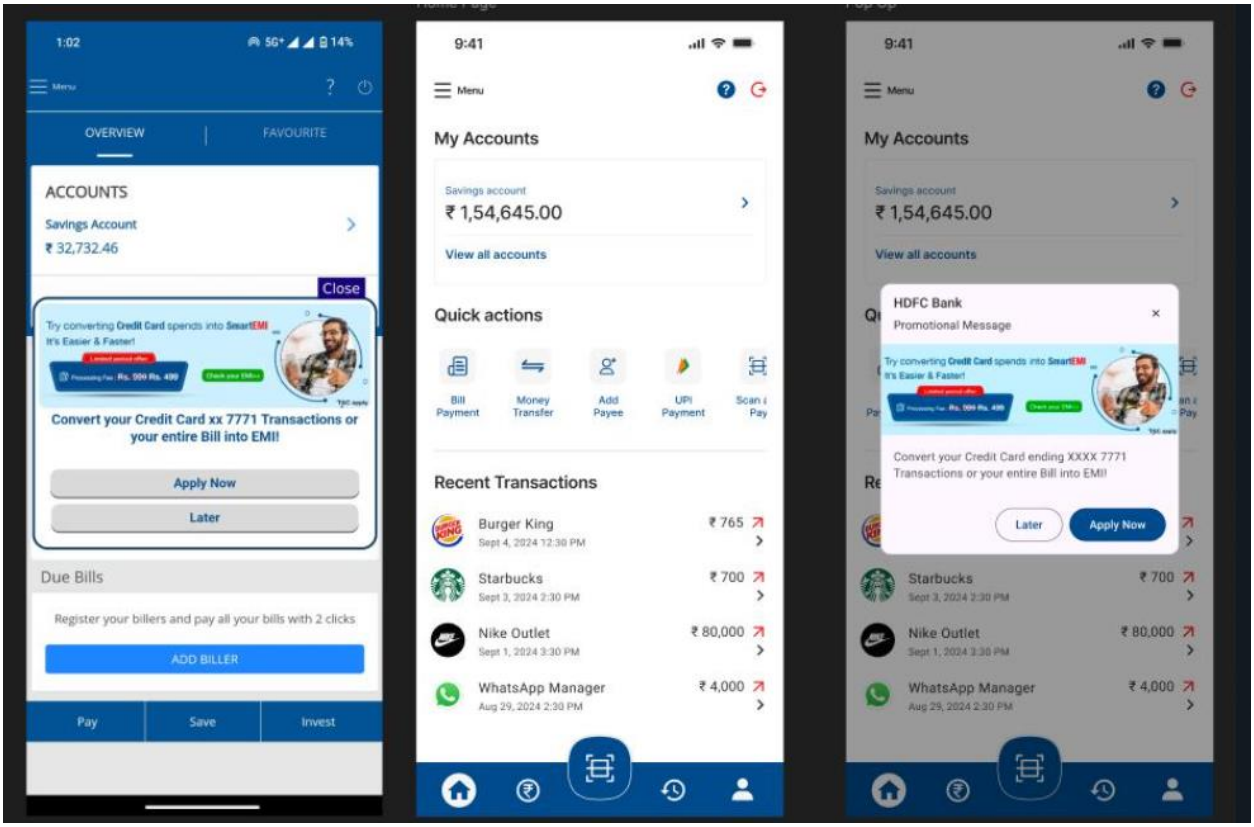
1. App Selection and Analysis

- **App Sample**: A total of 240 popular mobile applications were selected for analysis across different categories, including social media, e-commerce, gaming, and productivity. The selection was based on app store rankings and user base size to ensure a representative sample.
- **Analysis Process**: Each app was carefully evaluated to identify and document the presence of Dark Patterns. This involved a thorough examination of the user interface (UI) and user flows, particularly in areas like account creation, purchases, subscriptions, and privacy settings.

2. Categorization of Dark Patterns

- **Classification**: Dark Patterns identified in the apps were classified into five main categories based on established literature:
  - **Nagging**: Repeated interruptions (e.g., pop-ups) designed to divert user attention.
  - **Obstruction**: Making essential tasks more difficult (e.g., hiding account deletion options).
  - **Sneaking**: Deceptively adding items or costs without clear user consent (e.g., preselected options).
  - **Interface Interference**: Manipulating UI elements to obscure important actions (e.g., small or hidden checkboxes).
  - **Forced Action**: Forcing users to perform specific actions to proceed (e.g., watching ads to unlock features).

Below are the examples of Nagging and Sneaking in our selected app with the proposed solution for the same.

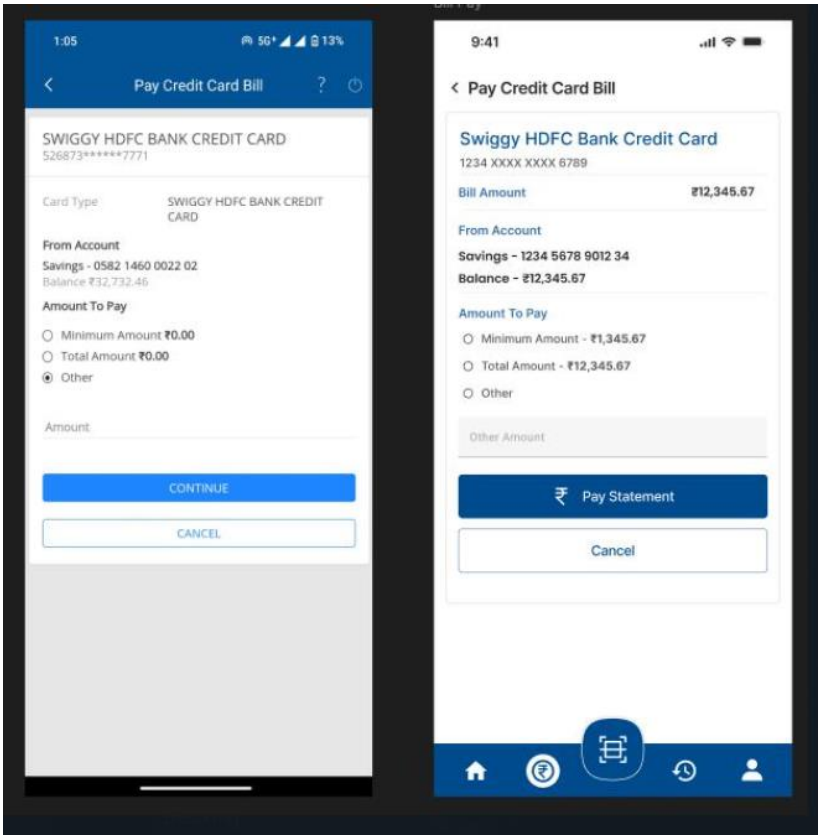


Nagging

Observed Issue (Left Image): The above left image depicts a classic example of the nagging dark pattern in user interfaces. It shows a pop-up that appears on the screen, urging users to convert their credit card transactions into EMI. This pop-up is interruptive and diverts the user's attention from their primary task, which is to manage their accounts or view transactions. The design of the pop-up does not offer a straightforward way to dismiss it, forcing the user to interact with the options provided.

Proposed Solution (Right Image): In the above right image, the user interface has been improved to minimize disruption. The promotional message is still present, but it appears less intrusively in the context of the application's flow. It is positioned in a way that allows users to focus on their main tasks without being forced to engage with the offer immediately. This approach reduces the frequency and intrusiveness of interruptions, creating a more user-friendly experience while still displaying the promotional content.

This shift from a nagging approach to a more passive presentation demonstrates a balanced design that respects user attention and choice.



Sneaking

Observed Issue (Left Image): The above left image illustrates a sneaking dark pattern, where the user interface subtly influences the payment decision. The layout and design focus on pushing the user to choose specific payment options without clearly indicating the amounts due. This can lead to confusion or unintended actions by the user, especially if the amounts aren't presented transparently. The interface's lack of clear guidance can result in users unknowingly opting for selections they didn't initially intend.

Proposed Solution (Right Image): The above right image shows a more transparent and user-friendly design. It clearly displays the minimum and total payment amounts, ensuring that users have all the necessary information to make informed choices. The payment options are structured in a way that highlights the relevant amounts prominently, reducing the likelihood of accidental selections. This straightforward presentation of options aligns with the principles of clarity and transparency, thereby minimizing the chances of sneaking behavior in the user interface.

This change fosters a more honest interaction between the app and the user, emphasizing clear communication and allowing the user to make deliberate decisions without hidden influences.

3. User Perception Experiment

- **Participant Selection**: A total of 589 participants were recruited for the experiment, covering a wide demographic range to provide diverse perspectives. Participants were regular mobile app users who interact with apps daily.
- **Experiment Setup**: Participants were asked to use selected mobile apps and were monitored to observe how they interacted with various Dark Patterns. After the interaction, they were prompted to identify any manipulative design elements they noticed.
- **Survey**: Following the app interaction, participants were given a survey that asked specific questions about their perception of the user interface, including whether they felt tricked into performing actions like making purchases or sharing data.
- **Data Collection and Analysis**: User responses were analyzed to determine their level of awareness regarding Dark Patterns. The percentage of users who could successfully identify manipulative design practices was recorded, and trends in user recognition were mapped across different app categories.

Objectives

The objectives focus on identifying and categorizing the types of Dark Patterns present in popular mobile applications, followed by an analysis of user perception through an experiment. The ethical impact of these patterns should also be evaluated, providing insights into how such manipulative designs affect user experience and proposing solutions to reduce their prevalence in future UI/UX practices.

Key Focus Areas :

1. **Identification of Dark Patterns:** Analyze popular mobile applications and classify the types of Dark Patterns present.
2. **User Perception Study:** Conduct an experiment to gauge user awareness and perception of Dark Patterns.
3. **Ethical Impact Analysis**: Evaluate the ethical implications of these patterns on user experience and propose solutions to reduce their prevalence.

Tools Description

In order to gather relevant insights, we employed a variety of tools and resources to inform the design process:

1. **Research Papers**: We conducted an extensive literature review by analyzing research papers focused on Dark Patterns and their impact on user perception. This helped us understand various manipulative design practices and provided a solid foundation for our analysis.
2. **Inspiration from Pinterest**: Pinterest was a valuable resource for gathering visual inspiration. We explored various design elements and patterns shared by the design community, which aided in brainstorming ideas for our own user interface designs. The platform's wide range of design content allowed us to compare and identify ethical design practices as well as common Dark Patterns used in popular apps.

Once we had collected enough information and inspiration, we used Figma to create our UI designs. **Figma** provided a range of functions that facilitated the design process:

1. **Auto Layout**: Helped in creating responsive designs by automatically adjusting the layout based on the content size.
2. **Components and Variants**: Allowed us to create reusable components, ensuring consistency across different screens in the UI.
3. **Prototyping Tools**: Enabled us to create interactive prototypes, simulating user interactions to test the flow of the UI before finalizing it.
4. **Design Systems**: We established a design system to maintain consistency in typography, colors, and spacing, ensuring a cohesive user experience throughout the interface.

Design Principles Achieved

When designing user interfaces, it is essential to ensure that the design not only meets functional goals but also adheres to ethical principles that prioritize user well-being. By avoiding deceptive design practices, such as Dark Patterns, designers can foster trust and create positive user experiences. Ethical UX design should aim to empower users, providing them with clear and intuitive choices that reduce confusion and frustration. Below are key design principles achieved in this study, which aim to enhance transparency, prioritize user needs, and simplify decision-making processes for a more user-friendly experience:

1. **Transparency and Clarity**: Ethical design should ensure that users are fully aware of actions they are taking, without being misled. The study revealed that 55% of users failed to detect Dark Patterns, emphasizing the need for clearer UI designs.
2. **User-Centered Design**: Empathy toward user needs and preferences must be at the core of UX design. Avoiding manipulative tactics ensures a respectful interaction, prioritizing user autonomy.
3. **Minimization of Cognitive Load**: Designs that overload users with decisions (such as hidden terms or pre-selected options) violate ethical principles. Clear and straightforward decision-making enhances the user experience.

Results

1. **Prevalence of Dark Patterns**: The study revealed that **95% of the analyzed mobile applications** contained at least one type of Dark Pattern. This demonstrates the widespread use of manipulative design practices across popular apps. On average, each app had **7.4 Dark Patterns**, indicating that these deceptive designs are deeply embedded within the user experience. These tactics, such as nagging, sneaking items into shopping carts, or hiding critical actions like account deletion, have become a common feature in app design. This high prevalence shows that many apps prioritize engagement and monetization strategies that intentionally mislead users, raising significant concerns about the integrity of digital products.
2. **User Perception**: One of the most striking findings from the experiment was that only **25% of users** were able to correctly identify Dark Patterns when prompted. This highlights a major **lack of awareness** among users about these manipulative tactics. Despite interacting with these designs on a daily basis, most users fail to recognize that they are being tricked into performing unintended actions. This "Dark Pattern blindness" poses a serious challenge, as it means that many users are unaware of how their behaviors are being influenced, potentially leading to unwanted purchases, privacy violations, and diminished trust in the app.
3. **Ethical Concerns**: The study emphasizes the **ethical concerns** surrounding the use of Dark Patterns. By prioritizing business objectives, such as increasing conversion rates or retaining users through manipulative means, apps often compromise user trust. This unethical approach to UX design not only violates the principles of transparency and user-centered design but also creates negative long-term effects for users. As apps exploit cognitive biases to deceive users into actions they might not otherwise take, it becomes clear that many apps sacrifice user satisfaction for short-term business gains. Ethical UX practices must ensure that users are fully informed and empowered to make decisions, rather than being manipulated into actions that serve the app’s business interests.

Conclusion

The study clearly illustrates the **widespread prevalence of Dark Patterns** in mobile applications, showing that these deceptive design techniques have become common in the digital landscape. Dark Patterns, which are deliberately crafted to manipulate users into actions they might not consciously agree to, contribute to **negative user experiences**. Whether it's tricking users into making unintended purchases, sharing more personal data than they realize, or making it difficult to unsubscribe or cancel services, these practices exploit cognitive biases and create frustration.

One of the key findings is that **users often remain unaware** of the manipulative nature of these designs. This lack of awareness is concerning because it means that many users are not in control of their online interactions and decision-making processes. The invisible nature of these manipulations prevents users from making informed choices, thus compromising their autonomy. As a result, the widespread use of Dark Patterns raises **serious ethical concerns**. By prioritizing business objectives—such as driving sales or maximizing user engagement—over user well-being, companies undermine user trust and the integrity of their products.

To address these issues, **designing interfaces that promote transparency and user control** becomes essential. Transparent design ensures that users are fully informed of the consequences of their actions, allowing them to make conscious, deliberate decisions. For example, clear labeling of options, avoiding pre-selected choices, and simplifying cancellation processes help build trust between the user and the platform. Such design choices encourage ethical practices in UX, ensuring that users feel respected and not tricked into actions that only benefit the app’s creators.

Moreover, **education and awareness-raising** play a crucial role in combating the harmful effects of Dark Patterns. By educating users on how to recognize these manipulative tactics, designers and developers can empower users to make better choices online. Ultimately, creating a user experience that values transparency, ethical practices, and user empowerment will foster greater trust and satisfaction in digital products, benefiting both users and businesses in the long run.