



# **Deceptive Designs in UX: Investigating the Impact of Dark Patterns**

University of Oulu  
Information Processing Science  
Bachelor's Thesis  
Kristian Hannula  
2023

# Abstract

Internet and mobile application users often encounter manipulative strategies that lead them to share excessive personal information or trap them into challenging subscriptions. These tactics, referred to as dark patterns, offer commercial advantages to system owners at the user's expense. This research conducts a literature review, examining previous studies on dark patterns, design ethics, and user experience. The purpose of this research is to answer the research question: how the dark design patterns affect the user experience.

Research on dark design patterns is crucial in order to understand how the dark patterns impact the users of different interaction systems, and how to design systems without using such exploitative patterns. This study aims to identify and comprehend prevalent dark patterns recognized by the Human-Computer Interaction (HCI) community. To support the understanding of the impact of the dark patterns, the research also attempts to define what is meant by User Experience and discusses the metrics for defining the quality of the experience.

The findings of this research hold potential value for individuals within the HCI community investigating the impact of dark design patterns on user experience. Despite the limitations of being based on a small number of references and conducted by a single researcher, this study offers an insightful overview of the current dark patterns prevalent on the internet.

## *Keywords*

Dark patterns, user interface design, user experience, design philosophy, usability, privacy, GDPR, design ethics

## *Supervisor*

Ph.D, University Lecturer, Mikko Rajanen

## Foreword

I would like to thank my supervisor Dr. Mikko Rajanen for his guidance with this thesis, and my tutor teacher Dr. Leena Arhippainen for her support and valuable insights.

I would also like to give very special thanks to my beloved wife Heljä for her love and support, and my lovely son Eemeli for banging my keyboard with his sticky little hands while I was working on this thesis.

20.11.2023

Kristian Hannula

## Abbreviations

EU	European Union
FTC	Federal Trade Commission
GDPR	General Data Protection Regulation
HCI	Human-Computer Interaction
UI	User Interface
UX	User Experience
UX	Design Experience

# Contents

Abstract.....	2
Foreword.....	3
Abbreviations.....	4
Contents.....	5
1. Introduction.....	6
2. Research method.....	7
3. Main concepts.....	8
3.1 Dark patterns.....	8
3.2 General Data Protection Regulation.....	8
3.3 User Interface.....	8
3.4 User Experience.....	8
3.5 Privacy.....	8
3.6 Ethics of design.....	9
3.7 Human-Computer Interaction.....	9
4. Previous research.....	10
4.1 Research on User Experience.....	10
4.1.1 The brief history of UX.....	10
4.1.2 Further definitions of UX.....	11
4.2 Research on Design Ethics.....	11
4.3 Research on Dark Patterns.....	12
5. Findings and discussion.....	15
5.1 How to define good 'UX'.....	15
5.2 Dark patterns and their effects.....	16
5.3 Limitations.....	19
5.4 Future research.....	19
6. Conclusions.....	20
References.....	21

# 1. Introduction

Everyday internet users are susceptible to exploitation in various ways. They might click on a post or link, thinking it leads to a valid article or news source, only to find it's a disguised advertisement. Others may mistakenly activate a paid service, falling victim to misleading tactics (Brignull et al., 2023). Additionally, some users with impulsive shopping tendencies can be exploited by the e-commerce industry through persuasive or deceptive design choices. At times, websites employ tactics like sneakily adding extra items to users' shopping carts, resulting in unsuspecting customers being charged for items they never intended to purchase (Brignull et al., 2023. Di Geronimo et al., 2020). Other websites may force users to grant the system full permissions, rather than allowing users to make individual choices about managing their private information or specifying the privileges an application can access on their smartphones.

These ethically concerning and, in some cases, illegal user experience (UX) design patterns, known as Dark Patterns, prioritize profits for shareholders over the user's experience (Brignull et al., 2023, Gray et al., 2018). They are quite common on the internet and are often so ingeniously crafted that the unethical intent behind the user interface (UI) is not immediately apparent to the user (Brignull et al., 2023). A research question arises: *How can the dark design patterns impact UX?* In addition to the question, this research aims to discover what exactly does UX mean, and how to determine whether UX is good or not.

The research methodology used in this study is a literature review (Denney & Tewksbury, 2013). It involves gathering and analyzing existing research and other relevant documents. The primary objective of this research is to offer a summary of recognized dark design patterns and to explore their impact on user experience.

Chapter 2 gives an overview of the research methods employed, and explains the process of collecting reference documents. Chapter 3 introduces the key concepts and abbreviations of this research. In chapter 4 the prior research is introduced in relevant sub-chapters, with each reference document receiving examination. Chapter 5 presents and deliberates on the outcomes of the literature review, with reflections on the research question and the supporting questions that surfaced during the study. Additionally, this chapter describes the limitations of this research and discusses the themes for future research. Finally, chapter 6 serves as a concluding summary.

## 2. Research method

This study, a literature review (Denney & Tewksbury, 2013) focused on the concept of dark patterns in UX design, was initiated based on prior research received from the supervisor. The initial set of reference documents, obtained in response to a query on 'design ethics', guided the study towards dark patterns of UX. Most notably, the paper 'The Dark (Patterns) Side of UX Design' by (Gray et al., 2018) emerged as a pivotal reference, influencing the further selection of reference documents.

A systematic search on Scopus.com, with search terms *"dark pattern" AND ui AND design*, resulted in 8 relevant documents. The first iteration produced a reference by (Tiangpanich & Nimkoompai, 2022). Similarly, searches on terms *'ux AND design AND ethics'* and *"user experience" AND hci AND "dark patterns"* provided additional references, including a paper by (Beattie et al., 2023) and (Young & Young, 2020).

Out of the 10 references cited in this document, articles by (Narayanan et al., 2020), (Hassenzahl & Tractinsky, 2006), and (Fitton et al., 2021) unfortunately lost their sources during the skimming process. Most likely they were cited in documents not selected as references. During the reference search period, the reference documents were managed with a spreadsheet that helped to keep record of the essential characteristics of the documents.

This study focuses into the dark patterns of UX design, excluding universally unethical business practices and aesthetically poor design choices. The study confines its scope to websites and mobile apps, excluding other user interfaces. Additionally, only open-access reference documents were considered.

## 3. Main concepts

This chapter briefly describes the central concepts and keywords of this study.

### 3.1 Dark patterns

Dark Patterns form the central concept of this study within the realm of UX design. They can be defined as a series of design choices that deliver value to shareholders at the expense of the user (Beattie et al., 2023; Bösch et al., 2016; Di Geronimo et al., 2020; Gray et al., 2018; Moser et al., 2019; Narayanan et al., 2020; Rajanen, 2022; Soe et al., 2020; Tiangpanich & Nimkoompai, 2022; Young & Young, 2020). This often entails encouraging users to share more information about themselves than intended or directing their actions in a manner more favorable to the service owner than the user (Di Geronimo et al., 2020).

### 3.2 General Data Protection Regulation

GDPR (General Data Protection Regulation) is an EU regulation initiated in 2016, designed to significantly influence the collection and processing of personal data within the EU (Koch, n.d.). Among various privacy-related regulations, GDPR mandates businesses to inform users when personal data is being collected. This requirement has led to the widespread use of cookie consent pop-ups on websites across the internet. As later explained in this study, this phenomenon is influenced by dark patterns, enabling some businesses to exploit these pop-ups to gather more data from users.

### 3.3 User Interface

The term "*user interface*" (UI) refers to the space where human-computer interaction takes place, thus allowing users to control the system they are using (Shashoua, 2023). In the context of this study, UI specifically refers to graphical user interfaces on websites or applications, encompassing the visible and interactive elements on the screen.

### 3.4 User Experience

Briefly put, the term "*user experience*" is employed to describe how users *feel* about a system, how they *experience* it, or the *environments* in which they use the system (Hassenzahl & Tractinsky, 2006). The connection between UX and UI is inherent as it is through the interaction with the UI that the user experiences UX.

### 3.5 Privacy

Privacy, in the context of this study, refers to the security of users' personal information while using a UI. Ensuring the safety of user information in websites and applications can be approached with a set of questions: Does the service handle users' personal data in accordance with GDPR? Can the user control how much of their data is presented to the service? Does the user feel secure when providing information about themselves to the service?



### 3.6 Ethics of design

In this context, ethics involves the moral choices designers make when crafting the design of the system (Rajanen, 2022). The designers UI and UX can be held ethically responsible of their design choices (Rajanen, 2022). Design that is poor from the users' perspective can be made intentionally or not, but in both cases the designers do break their ethical responsibilities towards the users (Rajanen, 2022). The ethical perspective of design is closely tied to dark patterns in UX, as they are intentionally created with moral questions surrounding them due to their inherently questionable nature.

### 3.7 Human-Computer Interaction

HCI, which stands for Human-Computer Interaction, is the study and practice of the interaction between humans (the users) and information technology (IxDF, 2023). While the term initially implied a focus on computer interfaces, the HCI community has since evolved to encompass various forms of information technology (IxDF, 2023). HCI emerged in the 1980s when personal computers became widely available in offices and homes. Over the years, it expanded to include contributions from fields such as computer science, cognitive science, and human-factors engineering, eventually giving rise to the field of UX design (IxDF, 2023).

## 4. Previous research

This chapter introduces the existing literature on the topics of UX, design ethics, and dark patterns in UX design. It aims to bring light on the historical development and contemporary understanding of UX within the HCI community. Design ethics is briefly examined with the assistance of two reference documents. The section on dark patterns explores the distinction between dark patterns and anti-patterns, and subsequently discusses the significant findings in the realm of dark patterns.

### 4.1 Research on User Experience

The literature review on UX is divided into two chapters. The first chapter explores the historical evolution of UX. Once the historical timeline of UX is established, the second chapter introduces literature discussing the contemporary understanding of UX, providing a more precise definition of the term.

#### 4.1.1 The brief history of UX

The discussion regarding the user experience of information systems, beyond a solely task-oriented perspective of usability, appears to have its roots in the early 1980s. Carroll and Thomas introduced a vocabulary for describing software quality in their 1988 article titled '*FUN*' (Carroll & Thomas, 1988). Rajanen (2021) further clarified in their article, '*De gustibus non est disputandum, but usability is not a matter of taste,*' that the early 1980s marked the emergence of a need for methodologies to collect and process objective user information related to context and work practices. The goal was to translate this information into effective design. This brought into question what average users mean when they describe software as 'easy' to use, as they likely lacked the technical understanding of what constitutes 'good' or 'easy' software. Additionally, the article '*FUN*' suggested that early popular user interfaces possessed an element of likability and were somewhat more enjoyable '*fun*'. Carroll and Thomas concluded their article by proposing that '*fun*' and '*motivation*' should be the focus of dedicated research programs distinct from the domain of '*usability*'.

The dawn of UX writings was traced back to 1996 (Hassenzahl & Tractinsky, 2006). These early writings sought to prompt the HCI community to move beyond a solely task-oriented focus and take more profound considerations into account. Notably, the concept of beauty was recognized as a significant quality aspect when defining UX (Alben, 1996, Hassenzahl & Tractinsky, 2006). Furthermore, these early discussions delved into other non-instrumental human needs, including surprise, diversion, and intimacy.

In the article "*The New Good: Exploring the Potential of Philosophy of Technology to Contribute to Human-Computer Interaction*" by Fallman (2011), the evolution of UX was divided into three phases:

1. Originally, the HCI community, primarily focusing on usability, advocated for the design of systems that were instrumental and useful.
2. In the late 1980s, the HCI community shifted its focus from single users operating single applications to the study of work settings, usage contexts, and how teams collaborated using multiple applications.
3. In the late 1990s and early 2000s, the HCI community developed an interest in more subjective aspects, such as meaning, complexity, emotion, motivation, and lived experience.

To conclude the brief history of UX, the evolution of UX can be traced back to the early 1980s, marking a shift within the HCI community. This shift transitioned the focus from purely instrumental usability to the exploration of more subjective dimensions, including how users perceive and interact with systems, as well as the contextual aspects of use. The next step involves a more detailed attempt to define the essence of UX.

#### 4.1.2 Further definitions of UX

According to Fallman (2011), the concept of usability still holds influence over the thinking surrounding UX. However, Rajanen (2021) argued for the necessity of removing subjective taste from the context of usability, marking a more precise separation of the two concepts. As previously discussed in the previous chapter, the study of UX finds its roots in usability, but it extends into more subjective realms.

Hassenzahl and Tractinsky (2006) introduced three key perspectives to help define UX:

1. Beyond instrumental: This perspective views UX as holistic, aesthetic, and hedonic, going beyond the mere functionality of a system.
2. Emotion and affect: UX is subjective, evoking positive emotions and yielding meaningful consequences for users.
3. Experiential: UX is dynamic, complex, unique, and situated, highlighting the contextual nature of user experiences.

The article acknowledges the challenge in distinguishing UX from other forms of experience, given its multidimensionality. Nonetheless, it contributes to the definition of UX by asserting that it revolves around the idea of enhancing our quality of life through design that prioritizes pleasure over the mere absence of pain.

#### 4.2 Research on Design Ethics

The exploration of ethics in the field of HCI design was constrained by limited research time, and as a result, this chapter draws from two key reference documents. While Davis's article (2009) predominantly centered on persuasive technology, it highlighted six unique ethical concerns in the context of computers and persuasion:

1. The potential for a computer system's novelty to mask the designers' persuasive intentions from users.
2. Designers can exploit computers' reputation as intelligent, and fair.
3. Computers can be far more ubiquitous and persistent compared to humans.
4. Computers cannot be negotiated with. Computers only do what they are programmed to.
5. Computers can affect emotions, without having emotions themselves.
6. Computers are not morally responsible for the harmful outcomes they may cause.

Additionally, the article stressed the significance of being mindful about persuasive technology due to its substantial impact on people's lives. For instance, it can encourage users to become more physically active or support them in quitting smoking.

In a broader examination of HCI design ethics, Rajanen (2022) emphasized that when designers neglect to create good UI or UX, they overlook their inherent ethical responsibilities toward users, system stakeholders, and society as a whole. The article also sounded a warning about the emergence of a "*dark side of design*" and called upon the HCI community to respond to this challenge to maintain its credibility and legitimacy.

Both articles underscore the rising ethical concerns in UX design. Rajanen (2022) takes into account the moral compass of designers, noting that designers are continually faced with ethical decisions, whether consciously or not, and that ethical design should be regarded as an evolutionary process. Designers should strive to guide the evolution of their creations in an ethical and sustainable manner. Rajanen (2022) concluded their article by proposing a golden rule for designers: "*Design as easy to use, honest, sustainable, and safe human-technology interactions as you would want others to design for you.*".

### 4.3 Research on Dark Patterns

During the literature search on dark patterns, the term '*anti-patterns*' emerged in several instances. It's important to highlight that '*anti-pattern*' and '*dark pattern*' relate to separate phenomena. In their article, Tiangpanich & Nimkoompai (2022) define anti-patterns as unintended poor design choices. Additionally, Bösch et al. (2016) point out that anti-pattern solutions might seem obvious to developers when addressing a specific problem but can lead to less evident negative consequences. A classic example of this is the singleton design pattern.

The term '*dark patterns*' first came to attention during the course of this research, originating from the article '*One Design To Rule Them All*' by Rajanen (2022). As previously discussed in the preceding chapter, Rajanen issued a warning about the growing '*dark side of design*.' From this article, a reference was made to '*The Dark (Patterns) Side of UX Design*' by Gray et al. (2018), which proved to be a significant reference work on dark patterns. It has since been cited in numerous other articles on the subject. In the abstract of Gray et al.'s paper, '*dark patterns*' are defined as follows: "... *an ethical phenomenon, where user value is supplanted in favor of shareholder value.*" In simpler terms, when designers intentionally employ dark patterns, they exploit their knowledge of human behavior to create deceptive functionality. Similar description was found on various other articles (Soe et al., 2020), (Narayanan et al., 2020).

The article by Gray et al. (2018) compiled a corpus of recognized dark pattern examples from various sources, including practitioners, articles, personal websites, and media outlets. They categorized these patterns into five primary design categories: nagging, obstruction, sneaking, interface interference and forced action.

Gray (2018), along with several others, highlighted the significance of a foundational resource in this field, the website Deceptive Design (formerly known as darkpatterns.org), (Brignull et al., 2023).

The article by Narayanan et al. (2020) provides several examples of the utilization of dark pattern strategies. For instance, TurboTax concealed its government-mandated free tax-filing program for low-income users on its website, instead directing these users towards the paid program. In another case, Facebook collected users' phone numbers under the pretext of enabling two-factor authentication but ended up using these numbers to deliver targeted advertisements. Furthermore, the

article pointed out that many of these dark patterns in commercial practices may already be in violation of the Federal Trade Commission (FTC) Act in the U.S.

Several research studies have examined dark patterns used in e-commerce websites that cater to the marketing and sale of goods to customers. A study by Moser et al. (2019) conducted a systematic evaluation of 200 e-commerce sites, revealing various design strategies aimed at encouraging impulse buying. These strategies included making perceived risks associated with purchases seem lower, leveraging social influence (e.g., showcasing what others have bought), and enhancing the perceived proximity of products. It's worth noting that this study was restricted to non-paid membership accounts and limited to one product per web store, with no actual purchases being made.

In a different study by Young and Young (2020), a face-to-face experiment was carried out involving 100 male and female South Korean participants to examine how dark design patterns influence customers' willingness to repurchase. The study found that dark patterns like nagging, obstruction, and interface interference had the most significant impact on repurchase intentions, whether used visually or procedurally. Additionally, sneaking and forced action patterns influenced repurchasing, particularly when employed in conjunction with an emotional experience.

Another branch of research delved into privacy-related dark patterns. In their article, Bösch et al. (2016) compiled a corpus of previous literature on privacy strategies and patterns, subsequently reversing them to identify malicious patterns. Their research also involved an investigation of popular websites and mobile applications, where they reported the dark design patterns they encountered. Moreover, their study presented a template for documenting and collecting privacy dark patterns.

In a different study, Soe et al. (2020) analyzed 300 data collection consent notices from Scandinavian news outlets, revealing a variety of dark patterns designed to bypass the original intent of the GDPR. This study underscored the need for the Human-Computer Interaction (HCI) community to further refine the concept of dark patterns, enabling regulators to more efficiently identify violators. Furthermore, the article proposed a consent pop-up design that the authors believe could meet GDPR requirements without resorting to dark patterns.

In another research effort, Utz et al. (2019) underscored the importance of regulation for consent notifications. They partnered with a German e-commerce website and conducted experiments involving over 80,000 unique users, revealing that seemingly minor design decisions significantly influenced how people interacted with these notifications.

The importance of regulation was also emphasized in a study by Beattie et al. (2023). This research involved interviews with UX practitioners, revealing that designers are driven to uphold ethical standards because of their '*moral compasses*'. However, they often feel constrained by commercial pressures. The practitioners are advocating for an official or legal framework that would empower them to incorporate stronger ethical and privacy measures into their work.

The investigation into dark patterns extended beyond websites, encompassing studies related to dark patterns in smartphone applications. A study conducted by Di Geronimo et al. (2020) unveiled that over 95 percent of popular Android applications integrated dark patterns into their design. Notably, this study focused on free applications available on the Google Play store.

Another research conducted by Fitton et al. (2021), shifted the focus to popular free-to-play mobile games targeted at children. The study uncovered evidence of '*commerce risks*' within all 12 of the reviewed games, such as in-app purchases. Additionally, 9 of the reviewed apps contained '*content risk*', including the promotion of age-restricted products.

On a master's thesis by Helamo (2023) the dark patterns were researched with a scoping review. The research suggested that while there is no specific weapon to "*fight*" against dark patterns, various tactics can be used to mitigate them: regulation, research, raising awareness, providing tools for users, educating designers, designing for the well-being of users, and company actions.

## 5. Findings and discussion

This chapter aims to discuss the results of the literature review and to answer the research question: How can the dark design patterns impact UX? To support the understanding of UX, literature on UX was reviewed to study what exactly does UX mean, and how to determine whether UX is good or not.

The first chapter presents the findings from the literature on UX and concludes with a set of proposed questions to assess the quality of a system's UX. The following chapter discusses findings on dark patterns and portrays a list of the most common ones based on the previous research.

### 5.1 How to define good 'UX'

To assess the impact of dark patterns on UX, it's essential to establish UX metrics. This research employed five reference documents to explore the origins of UX and the practitioners' interpretation of UX.

All the cited studies converged on the idea that UX is primarily a subjective concept, distinct from a mere description of 'usefulness' or 'instrumentality'. Early works in this field delved into characteristics like 'likability' and 'fun' (Carroll & Thomas, 1988), while also beginning to investigate the contextual aspects of usage during the 1980s (Fallman, 2011, Rajanen, 2021).

**Table 1.** The quality of experience of interaction criteria by Alben (1996).

Criteria	Description
Understanding of users	How well the product reflects on the design team's understanding of the users.
Learnable and usable	How easy it is to learn and use the product.
Needed	What need does the product satisfy.
Mutable	How well does the design allow the product to change and evolve.
Effective design process	How well-thought and well-executed was the design process of the product.
Appropriate	Does the product solve the right problem, at the right level.
Aesthetic experience	How aesthetically pleasing the product is.
Manageable	How well the product takes into consideration tasks beyond "use", such as installation, maintenance or costs.

Alben (1996) defined "experience" as all aspects of how people use interactive products: how the product feels in their hands, or how the users feel about the product while using it. Furthermore,

Alben (1996) introduced the interaction design awards criteria, which can be helpful when defining a quality of experience (Table 1).

Although the study's examination of UX was brief, it yielded insights that can contribute to the definition of good UX. The perspectives introduced by Hassenzahl and Tractinsky (2006) divided the discussion of UX into three significant perspectives, which can serve as a foundation for defining quality metrics for UX. Interestingly, the third perspective, '*experiential*', was also highlighted in the early study by Carroll & Thomas (1988), which suggested that software preferred by users over alternatives might not necessarily be easier to learn and use, but it tends to be more enjoyable and, in essence, experientially successful. (Table 2)

**Table 2.** UX characteristics based on articles by (Hassenzahl & Tractinsky, 2006; Carroll & Thomas, 1988).

Category	Goal
Beyond the instrumental	The user interface is aesthetically pleasant, meeting users' intrinsic needs for beauty. The system also provides stimulation, whether by promoting personal growth or increasing users' knowledge.
Emotion and affect	The system promotes positive emotions and experiences and helps users to manage their frustrations during the use of the system.
Experiential	The system offers an experience with a clear beginning and end, facilitating the interaction between the system and users' mental states. This interaction results in a genuine, immersive experience.

The categories by Alben (Table 1) and Hassenzahl & Tractinsky (Table 2) do serve satisfying metrics for defining what is meant by UX. In general, UX appears to encompass experiences that extend beyond fulfilling users' instrumental needs. However, defining precise quality evaluation metrics for UX can be challenging due to the inherent subjectivity involved. Consequently, there are limitations on the level of specificity that researchers can achieve when assessing the quality of these subjective experiences.

## 5.2 Dark patterns and their effects

Several researchers in various reference documents (Gray et al. 2018, Tiangpanich & Nimkoompai, 2022, Soe et al., 2020, Narayanan et al., 2020, Moser et al., 2019, Di Geronimo et al., 2020) provided similar descriptions of the dark patterns they recognized. These papers seemed to have a consensus on the characteristics of these patterns. However, one particular pattern introduced in the reference by Tiangpanich & Nimkoompai (2022), known as '*Suddenly Not Mobile*' presented an unclear description, and its relevance was likely lost in translation. As a result, this pattern was intentionally omitted from Table II.

The utilization of dark design patterns appears to originate from the objectives and motivations of organizations that are willing to pursue their goals through morally questionable means. It seems that the designers of information systems are well aware of the dark patterns and their impact on users, yet they face pressure from their superiors to employ such designs (Beattie et al., 2023).

This situation raises a fundamental question: What is the designer's responsibility when it comes to the use of dark patterns? An attempt to address this question was made in the paper by Rajanen (2022), which suggested that courses on design ethics and designer responsibility should be integrated into relevant educational programs. The proposed golden rule, '*Design as easy to use, honest, sustainable, and safe human-technology interactions as you would want others to design for you*', from the same paper emphasizes the individual designer's responsibility in this context. Additionally, Rajanen



(2022) argued that the designers of information systems and user interfaces are ethically responsible towards their users and society in general, supporting the claim by examples of consequences (even deaths) caused by bad design.

However, if the pressure to use dark designs originates at the organizational level, it becomes evident that a broader change is necessary. The discourse on design ethics should not be solely the responsibility of the HCI community, as the demand for employing dark patterns is closely tied to business objectives.

The research question driving this study was to understand how dark patterns affect the UX. It proved advantageous for the study that the dark patterns discovered in previous research were documented in a way that outlined their potential effects. The study's findings revealed that integrating the effects of dark patterns into the definitions of UX uncovered in this study was challenging. It became apparent that a system could be beautifully designed, yet simultaneously lead users to make unfavorable decisions. Conversely, a system might offer users positive emotions through gamified elements or congratulations for their achievements, all the while employing dark patterns to benefit the system owner.

**Table 3.** The dark patterns of UX.

<b>Type of Dark Pattern</b>	<b>Description</b>
Aesthetic manipulation	Some elements of the UI, often close buttons on ads, are purposefully designed to be too small to use, or the buttons are moving to make the interaction more difficult.
Bait and Switch	The users' action causes unexpected, undesired outcomes.
Confirm Shaming	The system makes the user shame for their choices, often opting out from something.
Disguised Ad	Content in form of news, social media post etc. that is actually an advert.
Do-or-Die Permissions	The system forces user to accept the permissions.
Ethical and Legal Design	The user is forced to revisit the website or application because the user was inadvertently signed up.
False Hierarchy	Several options are displayed to the user, but the option most beneficial to the system owners is highlighted.
Forced Continuity	After a free trial period ends, the subscription to the system continues automatically and the user is silently being charged money.
Friend Spam	The system collects the users' contact information under some pretense and sends invitations to the service under the users' name.
Hidden Costs	The user is charged with unexpected costs that were not apparent to the user.
Misdirection	The users' attention is purposefully drawn somewhere else using some UI element.
Notification Fatigue	The mobile application shows exhaustive amounts of notifications to the user, distracting their focus.
Price Comparison Prevention	The system purposefully makes it difficult for the user to compare prices between items to prevent the user from making informed decisions.
Privacy Zuckering	The user is tricked into sharing more information about themselves than they intend to. The pattern is named after Mark Zuckerberg, the CEO of Meta.
Roach Motel	The system makes it easy for the user to get in, but hard to get out. Notably: a subscription.
Sneak into Basket	The system adds unwanted items to the shopping cart or download, often using a preselected radio button.
Too Much Local Information	The mobile application asks the user for information of their precise whereabouts even if it is unnecessary.
Toying with emotions	The system displays countdown offers, rushing the user to make decisions.
Trick Question	The system offers a deceptive question that in reality addresses something other than what the user believed.

### 5.3 Limitations

The number of references used in this thesis was relatively small. The set of research questions demanded a more extensive review. Conducting this thesis independently may have introduced opportunities for errors or incomplete conclusions.

### 5.4 Future research

The users' experiences on the dark patterns should be studied more, for example, by forming groups of users and making them interact with interfaces with dark patterns and ones without them. The article by Young & Young (2020) was the only one in this study to conduct face-to-face experiments with user groups, but the result was limited on studying the impact of dark patterns to the users' willingness to repurchase items.

Additionally, it would be interesting to conduct studies where the designs using dark patterns would be redesigned in ethically sustainable manner, and to see how the users perceive the changes. The study by Soe et al. (2020) introduced a cookie consent pop-up that was designed to follow GDPR guidelines without any dark patterns, but no further attempts to '*fix*' dark patterns were discovered when searching for reference documents to use in this literature review.

Moreover, the examination of design ethics in this research was relatively brief, and it also demands more extensive study. A deeper understanding of design ethics would aid in discussing the positive and negative effects of dark design patterns. Furthermore, it would illuminate the subject of the responsibilities of organizations and designers who incorporate dark patterns into their designs.

## 6. Conclusions

In this thesis, the dark patterns of UX were researched to learn about their impact on UX. To support the question, the thesis also studied what exactly is meant by the term UX, and how to determine whether the quality UX is good or bad.

The research resulted in a comprehensive list (see table II) of the most prevalent dark patterns found in web and mobile applications. The list of dark patterns also highlights how these patterns impact UX. However, the broader effects of these patterns on UX remain undiscovered and would require a more in-depth investigation. Additionally, to support the study on dark patterns, the nature of UX was examined in order to explain what UX means in satisfactory details. The metrics for 'good' UX were also discussed.

While this study has provided a comprehensive understanding of dark patterns in UX design, there are aspects that require more detailed examination. The characteristics of UX and the discourse on design ethics should be subjects of more profound study, as certain questions remain open and invite further exploration in this research field. This literature review highlights the need for additional literature reviews to understand the consequences of dark patterns and to answer whether all cases of dark pattern design choices are simply 'bad'. Additionally, this review calls for studies to examine how the users perceive dark patterns compared to user interfaces without them, and how the designers can satisfy the commercial goals of their employers without resorting to dark patterns.

## References

- Alben L. (1996.) Quality of experience: Defining the criteria for effective interaction design. *Interactions* 3(3): 11–15.
- Beattie., Lacey, C., Caudwell, C. (2023). “It’s like the Wild West”: User Experience (UX) Designers on Ethics and Privacy in Aotearoa New Zealand. *Design and Culture*, 1(2023). DOI: <https://doi.org/10.1080/17547075.2023.2211391>
- Brignull, H., Leiser, M., Santos, C., & Doshi, K. (2023, April 25). *Deceptive patterns – user interfaces designed to trick you*. Deceptive.design. Retrieved October 26, 2023, from <https://www.deceptive.design/>
- Bösch, C., Erb, B., Kargl, F., Kopp, H., Pfattheicher, S. (2016). Tales from the Dark Side: Privacy Dark Strategies and Privacy Dark Patterns. *Proceedings on Privacy Enhancing Technologies*, 2016(4), 237-254. DOI: <https://doi.org/10.1515/popets-2016-0038>
- Carroll, J., Thomas, J. (1988). FUN. *ACM SIGCHI Bulletin*, 19(1988), 21-24. DOI: <http://dx.doi.org/10.1145/49108.1045604>
- Davis, J. (2009). Design methods for ethical persuasive computing. In *Proceedings of Persuasive Technology, Fourth International Conference (2009)1*, 1-8. DOI: <https://doi.org/10.1145/1541948.1541957>
- Denney, A.S. & Tewksbury, R. (2013) How to Write a Literature Review, *Journal of Criminal Justice Education*, 24:2, 218-234, DOI: [10.1080/10511253.2012.730617](https://doi.org/10.1080/10511253.2012.730617)
- Di Geronimo, L., Braz, L., Fregnan, E., Palomba, F., Bacchelli, A. (2020). UI Dark Patterns and Where to Find Them: A Study on Mobile Applications and User Perception. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI 2020)*. DOI: <https://doi.org/10.1145/3313831.3376600>
- Fallman, D. (2011). The New Good: Exploring the Potential of Philosophy of Technology to Contribute to Human-Computer Interaction. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (SIGCHI 2011), May 7-12, Vancouver BC, Canada*.
- Fitton, D., Bell, B., Read, J. (2021). Integrating Dark Patterns into the 4Cs of Online Risk in the Context of Young People and Mobile Gaming Apps. *Lecture Notes in Computer Science*, 2021, 701-711. DOI: [https://doi.org/10.1007/978-3-030-85610-6\\_40](https://doi.org/10.1007/978-3-030-85610-6_40)
- Gray, C. M., Kou, Y., Battles, B., Hoggatt, J., & Toombs, A. L. (2018). The Dark (Patterns) Side of UX Design. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (ICBIR 2018), May 19-20*.
- Hassenzahl, M., Tractinsky, N. (2006). User experience – A research agenda. *Behaviour and Information Technology*, 25(2), 91-97. DOI: <https://doi.org/10.1080/01449290500330331>
- Helamo, A. (2023). Fighting the dark side : a scoping review of dark pattern mitigation. Master’s Thesis. University of Oulu. Retrieved November 16, 2023 from <http://jultika.oulu.fi/files/nbn-fioulu-202306212722.pdf>

- Interaction Design Foundation - IxDF. (2016, June 6). *What is Human-Computer Interaction (HCI)?*. Interaction Design Foundation – IxDF. Retrieved October 27, 2023 from <https://www.interaction-design.org/literature/topics/human-computer-interaction>
- Knijnenburg, B. P., & Kobsa, A. (2014). Increasing Sharing Tendency Without Reducing Satisfaction: Finding the Best Privacy-Settings User Interface for Social Networks. *Proceedings of IS Security And Privacy (ICIS 2014)*. <https://aisel.aisnet.org/icis2014/proceedings/ISSecurity/4/>
- Koch, R. (n.d) *What does GDPR stand for? (And other simple questions answered)*. <https://www.gdpr.eu>
- Moser, C., Schoenebeck, S., Resnick, P. (2019). Impulse buying: Design practices and Consumer Needs. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI 2019), May 4-9, Glasgow, Scotland, UK*.
- Narayanan, A., Mathur, A., Chetty, M., Kshirsagar, M. (2020). Dark Patterns: Past, Present, and Future. *ACM Queue*, 18(2), 67-92. DOI: <https://doi.org/10.1145/3400899.3400901>
- Rajanen, M. (2022). One Design Rule to Rule Them All: Towards a Universal Golden Rule for Designers of Human-Technology Interaction. *Complex Systems Informatics and Modeling Quarterly (CSIMQ)*, 33(2022), 1-13. DOI: <https://doi.org/10.7250/csimq.2022-33.01>
- Rajanen, M. (2021). De gustibus non est disputandum, but usability is not a matter of taste. *Proceedings of the 7th International Workshop on Socio-Technical Perspective in IS Development (STPIS 2021), October 11-12, Trento, Italy*.
- Shashoua, M. (2021, September 15). *What Is User Interface Design?* Codecademy. Retrieved October 26, 2023, from <https://www.codecademy.com>
- Soe, T. H., Nordberg, O. E., Guribye, F., & Slavkovik, M. (2020). Circumvention by design - dark patterns in cookie consent for online news outlets. *In Proceedings of the 11th Nordic Conference on Human-Computer Interaction: Shaping Experiences, Shaping Society (NORDICHI 2020), October 25-29, Tallinn, Estonia*.
- Tiangpanich, P., Nimkoompai, A. (2022). An Analysis of Differences between Dark Pattern and Anti-Pattern to Increase Efficiency Application Design. *2022 7th International Conference on Business and Industrial Research (ICBIR 2022), May 19-20*.
- Utz, C., Degeling, M., Fahl, S., Schaub, F., Holz, T. (2019). (Un)informed Consent: Studying GDPR Consent Notices in the Field. *ACM SIGSAC Conference on Computer and Communications Security (CCS 2019), November 11-15, London, United Kingdom*.
- Young, K., Young, Y. (2020, August). The effect of ‘dark patterns’ of UX design on user experience and willingness to repurchase. *Archives of Design Research*, 33(3). 191 – 209. DOI=<https://doi.org/10.15187/adr.2020.08.33.3.191>