Author(s): Ritonummi, Saima; Niininen, Outi

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6 User experience of an e-commerce website

A case study

Saima Ritonummi and Outi Niininen

Introduction

User Experience (UX) consists of the user's perceptions and responses when interacting with a system, such as a website. UX research addresses Human–Computer Interaction (HCI) as a whole, including the user's feelings and thoughts about their experiences, whereas the preceding task-related 'usability paradigm' addressed the user's ability to use an interface, including the efficiency and effectiveness aspects of the interaction (Hassenzahl and Tractinsky, 2006). A positive UX is an essential component of a satisfactory online customer journey on e-commerce websites. Both UX development and customer journey planning aim to support users in working as effortlessly and efficiently as possible by helping them perform tasks to accomplish their goals. The essence of designing for UX and customer journeys is identifying successful and unsuccessful features and touchpoints that guide users towards their desired actions. Addressing both pragmatic and hedonic user needs with intentional UX design on e-commerce websites is necessary to help users optimise the interaction (Garrett, 2011). Identifying the duality of user needs stems from the holistic view of HCI and examining the emotional outcomes and the pragmatic usability aspects of the interaction (Falk, Hammerschmidt, and Schepers, 2009).

This chapter presents relevant academic research on UX and online customer journeys on e-commerce websites. The objective is to outline why thoughtful UX development and customer journey planning is an important, continuous process for e-commerce websites. The study contributes to UX research with a combination of qualitative and quantitative UX research methods, addressing both pragmatic and hedonic aspects of UX and the dual user needs.

What is UX?

Officially established in the 1990s, the concept of UX is largely based on Norman and Draper's work in the 1980s, which advanced the HCI research field significantly. UX is associated with many meanings and aspects of technology use, such as aesthetics, affordances, functionality, responsiveness and the hedonic aspects of interaction (Hassenzahl and Tractinsky, 2006), which include, for example, emotion, fun and flow experiences (Law, 2011). UX research is specifically interested in the user's physical and internal states because UX includes 'all the user's emotions, beliefs, preferences, perception, physical and psychological responses, behaviours and accomplishments that occur before, during and after use' (ISO, 2019, p. 3). Essentially, UX research examines how perception, action and cognition are related to one another and what role emotional user needs plays in UX

(Law, 2011). Per Roto, Joutsela, and Nuutinen (2016), focusing on emotions is important because poor UX and usability problems often cause negative affective reactions (such as frustration), and UX can be improved by reducing those problems.

Many researchers agree that UX consists of three factors: a *user* interacting with a *system* in a specific *context*. A system is defined by the characteristics of the system, including its functionalities and performance. A user is the person who is interacting with the product, and the context of use is where the interaction occurs (Hassenzahl and Tractinsky, 2006; Roto *et al.*, 2011). User-Centered Design (UCD) (also referred to as Human–Centered Design) examines particular people doing particular tasks in a particular context (Ritter, Baxter, and Churchill, 2014), which addresses the three facets of UX (user, system and context). UCD aims to help users work faster, make fewer mistakes and accomplish their goals with minimal effort (Garrett, 2011). Usable systems are more likely to be successful, both technically and commercially. Adopting the UCD approach improves UX and accessibility, including reduced stress and discomfort related to the interaction, which can provide a competitive advantage for the business (ISO, 2019).

Usability, UX and the duality of user needs

Usability is a significant aspect of UX because it measures a user's ability to use an interface in a specific context. Usability is the result of perceived *efficiency*, *effectiveness* and *satisfaction*. While UX addresses the interaction as a whole (including the user's thoughts and feelings about the interaction), usability addresses the extent to which the system can be used to achieve goals effectively, efficiently and satisfactorily (ISO, 2019). Hassenzahl and Tractinsky (2006) refer to the UX paradigm as *going beyond instrumental*, examining non-instrumental quality aspects of the interaction, such as need for surprise, meaningfulness, social setting and voluntariness of use – in addition to the cognitive and taks–oriented aspects. Usability goals are more objective and measure *ease-of-use*, whereas UX goals are more subjective and address the hedonic aspects of interaction, such as engagement and stimulation. The pragmatic and hedonic qualities of interaction are related to the different kinds of needs and goals that users have, and addressing both is important for facilitating positive UX (De Villiers and Van Biljon, 2012; Schmutz *et al.*, 2010).

Because usability and UX are interrelated but distinct concepts, they are measured with slightly different methods. Their research methods do overlap in general, but usability tests are more focused on task–related performance, while UX studies address the affective qualities of the interaction. UX measures usually measure the *outcome* of the interaction (e.g. level of fun), while usability measures can help identify the source of a problem (what users struggle with) and offer possible solutions (Law, 2011). In other words, usability studies measure the pragmatic quality of the interaction (what is happening), and UX studies measure the hedonic quality of the interaction (a user's subjective evaluation about what is happening) (De Villiers and Van Biljon, 2012).

Pragmatic and hedonic user needs can also be seen in the strategies on which users rely when navigating e-commerce websites. Per Harley (2018), the two most common strategies are *searching* and *browsing*. When users are searching, they are looking for a specific product or specific information. When users are browsing, they are experientially browsing to discover what products are available and if the available products suit their needs. Hence, it could be said that searching is related to pragmatic goals, whereas browsing is related to hedonic goals. Because users have different kinds of needs and they arrive at websites via different routes, UX must be positive on all relevant pages of a website. If

a user has a clear understanding of what the website is about, what they can find there and how to operate within it, conversion is much more likely (Harley, 2018). Likewise, Schmutz *et al.* (2010) argue that because user needs are two-fold and users toggle between searching and browsing strategies, it is important to support both goal-oriented and exploratory behaviour by clearly showing what tasks can be accomplished on the website.

The level of experience that a user has with a particular interface (in this case, a website) affects their needs and evaluation of the interaction. Per Falk, Hammerschmidt, and Schepers (2009), the less experienced a user is with the interface, the more important it is to present well-organised product information and content, such as guided tours. The more experienced a user is, the more hedonic needs and expectations they have, which could be addressed in various ways, such as by offering customisable content. Ariely (2000) states that a user's control over the information flow in the e-commerce context has been shown to have a positive effect on their decision-making. Hence, e-commerce websites should strive to meet pragmatic quality attributes for inexperienced users and hedonic quality attributes for experienced users (Falk, Hammerschmidt, and Schepers, 2009).

Context of the study: UX and online customer journeys

Customer journey is the sequence of contacts and experiences at various touchpoints between the consumer and the brand (Micheaux and Bosio, 2019). It is also sometimes termed either *customer decision journey* or *customer purchase journey* (Lemon and Verhoef, 2016). Customer journey mapping is a continuous, long-term tracking of customer interactions at different touchpoints. The focus of this study is UX on an e-commerce website, and the scope of the customer journey is the journey that happens at this single touchpoint (i.e. the website).

Similar to UX, the customer journey is also affected by the customer's previous experiences and their current experience, which will impact their future experiences (Lemon and Verhoef, 2016). Roto *et al.* (2011) state that the UX timespan comprises anticipated UX, which affects momentary UX, and ultimately cumulative UX. For e-commerce websites, journey analysis is important because it helps identify the choices and options that the customer encounters along the journey and, most importantly, the triggering moments that nudge them into a decision to either continue or discontinue the journey (Lemon and Verhoef, 2016). One way to approach journey analysis is by creating buyer personas and *jobs-to-be-done* for the personas. These jobs-to-be-done describe the circumstances in which the customer operates and what kind of tasks they have. Because the goal is to gather information about the customer's *experience*, jobs-to-be-done is also used in UX development and usability testing. However, the UX personas differ from buyer personas used in customer journey analysis. A buyer persona represents a typical customer and their demographic, behavioural and motivational features, forming a base for customer journey design (Micheaux and Bosio, 2019), whereas UX personas define the requirements for the design, such as what functionalities and what kind of content should be included (Garrett, 2011).

Customer journey analysis can help improve UX. By providing a smooth experience, an e-commerce website can help users find what they are looking for and support them in decision-making. Good design and UX are facilitators of positive customer experiences on e-commerce websites (Lemon and Verhoef, 2016). For example, the conversion rate is a widely used metric in measuring the effectiveness of both UX (Garrett, 2011) and e-commerce websites' performance.

Research method

This study used a combination of qualitative and quantitative methods. A cognitive walk-through was used for usability testing, and a UX questionnaire was used for UX measurement. Although a cognitive walkthrough can give insights on UX, a separate UX questionnaire supplemented the task performance-oriented walkthrough to capture subjective evaluations of the participants' UX.

Cognitive walkthrough is a usability testing method for examining user interfaces. It is a theory-based evaluation method that has been adapted from many walkthrough techniques, such as Learning by Exploration and the Theory of Action. The idea is to create a realistic task scenario for the user and observe the ease with which they perform the given tasks with minimal or no instructions by using system cues. An important part of cognitive walkthrough evaluation is analysing the possible goal problems and action problems users might have encountered during the walkthrough. Goal problem refers to user *trying to do a wrong thing*, whereas action problem refers to user *having problems doing the right thing* (Polson *et al.*, 1992).

Adding UX evaluation to a usability test is a common practice because usability testing is often more focused on task performance and detecting usability issues than on the *subjective experience* of the user (Quiñones, Rusu, and Rusu, 2018). This study combined a cognitive walkthrough with a User Experience Questionnaire (UEQ). The UEQ by Schrepp, Hinderks, and Thomaschewski (2017) supplemented qualitative data from the walkthroughs and gave insights regarding the participants' subjective experiences. The UEQ measured UX on the pragmatic quality dimension (goal-directed behaviour), the hedonic quality dimension (non-goal-directed behaviour) and the attractiveness of the subject. UEQ includes 26 items, which are categorised into six scales: *attractiveness*, *perspicuity*, *efficiency*, *dependability*, *stimulation* and *novelty*. *Attractiveness* is a pure valence dimension and refers to the overall impression. Of the pragmatic quality scales, *perspicuity* refers to the ease with which the user can understand the website, *efficiency* is how fast and effortlessly a user can accomplish a task and dependability is the *predictability* of the interaction and the user's feeling of control. Regarding the hedonic quality scales, *stimulation* refers to motivation and excitement during use, while *novelty* is related to the creativity and innovativeness of the website (Schrepp, Hinderks, and Thomaschewski, 2017).

Data collection

The case company is a consumer electronics brand. Their website was redesigned in 2019 to improve its performance, including especially UX, conversion rate and sales revenue. The company also considers its website as an important platform for introducing its brand and products to new and existing customers. This study examined UX on the redesigned website via both a cognitive walkthrough and a UX questionnaire.

The procedure was established with three pilot respondents. Six respondents (n=6) participated in the study, as in UX and usability testing practice it is often suggested that about 85%–90% of usability problems can be discovered with six users (Goh *et al.*, 2013). To match the case company's target audience, all participants were aged 26–35 and had over 10 years' experience of online shopping. For the purpose of this study (i.e. to simulate a normal online shopping situation), respondents were observed interacting with the website on their own computer at their home.

In this study, the cognitive walkthrough consists of six main tasks: *go to the brand's website*, *evaluate the product's attributes*, *add the product to the shopping cart*, *proceed to the checkout*,
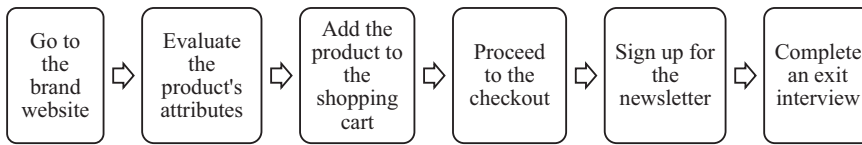
Figure 6.1 Cognitive walkthrough task flow.

sign up for the newsletter and *complete an exit interview*. The task flow is presented in Figure 6.1. Each main task includes sub-tasks, such as 'enter homepage', 'navigate to product pages' and 'examine product offering'.

The participants performed tasks on their computers and the walkthroughs were recorded as screen recordings with audio. Before starting the walkthrough, the participants were briefed about the procedure and informed that the usability of the website is what is being evaluated, not their IT skills. To capture first-time users' impressions, it was ensured that participants had not visited the website before. After the walkthrough, participants completed an exit interview, which included UEQ and demographic background questions.

Findings

The cognitive walkthrough findings are introduced to provide background information for UEQ results and insights on the participants' evaluation of their UX.

Cognitive walkthrough findings

The cognitive walkthrough task analysis was conducted using the 'Four Questions for Cognitive Walkthrough' (Interaction Design Foundation, 2018 – see Further reading), which are based on the original four questions for cognitive walkthrough (Wharton, Rieman, and Lewis, 1994). The questions examine whether the user tries to achieve the correct outcome, notices the actions that will help them achieve that outcome and understands whether they are progressing towards it.

The most common usability problem identified in this study was finding specific product information. Five out of six participants had problems locating compatibility information, which indicates the compatibility of the chosen product with their own device (smartphone). More specifically, four participants had an action problem trying to locate the information; one found it but concluded that the information was not specific enough for a purchase decision. For all other tasks, the completion rate was 100%, and participants had no problems completing them. Other identified minor problems included low contrast in buttons and links, small fonts and inconspicuous secondary navigation. Although these minor problems did not prevent the participants from accomplishing their goals (i.e. finishing the shopping process), they did affect the intuitiveness and ease of the experience. Conversely, the product comparison feature, overall clearness of the website and simple checkout process were praised by the participants.

User Experience Questionnaire findings

The UEQ was used to evaluate the pragmatic and hedonic qualities of the website. However, the sample size for the quantitative UEQ evaluation is only indicative because

Table 6.1 Website performance of the UEQ

Dimension	Scale	Mean	Variance
Pragmatic quality	Dependability	0.875	0.67
	Efficiency	0.792	1.21
	Perspicuity	0.750	1.05
Hedonic quality	Stimulation	0.375	2.64
	Novelty	−0.458	0.77
Pure valence	Attractiveness	0.444	3.66

the smaller the sample, the harder it is to draw indisputable conclusions about the data (Schrepp, Hinderks, and Thomaschewski, 2017).

In the UEQ, values over 0.8 represent a positive evaluation, values between −0.8 and 0.8 represent a neutral evaluation and values less than −0.8 represent a negative evaluation. The scale ranges between +3 (extremely good) and −3 (extremely bad), but because participants tend to avoid extreme answers on questionnaires, values in the UEQ normally range between +2 and −2 (Schrepp, 2019). On average, the pragmatic quality of the website was evaluated as positive by the participants, while both hedonic quality and attractiveness were considered neutral. The website scored the highest in pragmatic quality (0.81) and the lowest in hedonic quality (0.06–0.04), while attractiveness scored in the middle (0.44). On the pragmatic quality scales, the website scored highest in dependability, followed by efficiency and perspicuity. On the hedonic quality scales, the website scored better in stimulation than in novelty. The performance on each UEQ scale is presented in Table 6.1.

Based on their experience with the website, the participants evaluated the *dependability* of the website as its best quality (i.e. they felt in control of the interaction). Dependability also had the least variance in answers. *Novelty* – the website's innovativeness and ability to catch the user's interest – scored towards the lower end of neutral and had the highest variance in answers among the participants.

On the individual item level, the website scored highest in *easy to learn* (1.7), followed by *efficient* (1.5) and *predictable* (1.3). All three items measure pragmatic quality. Notably, on e-commerce websites, predictability can be a positive quality; websites can benefit from following conventions, such as commonly known navigation structures and iconography (Schrepp, 2019). The website scored lowest in *inventive* (−1.0), *leading edge*, (−0.5), *innovative* (−0.2) and *creative* (−0.2). Hence, the website was evaluated higher on the *conventional*, *usual*, *conservative* and *dull* items, which describe the design's novelty. The results per item are presented in Figure 6.2.

The UEQ findings suggest that the pragmatic quality of the website is good: it is easy to learn, efficient and predictable. However, hedonic quality (i.e. innovativeness and catching the user's interest) and attractiveness could be improved.

Implications

The findings of this study support UX research and identify both pragmatic and hedonic user needs. The participants accomplished most of the tasks in the cognitive walkthrough with ease and the website scored well in pragmatic quality. The customer journey on the
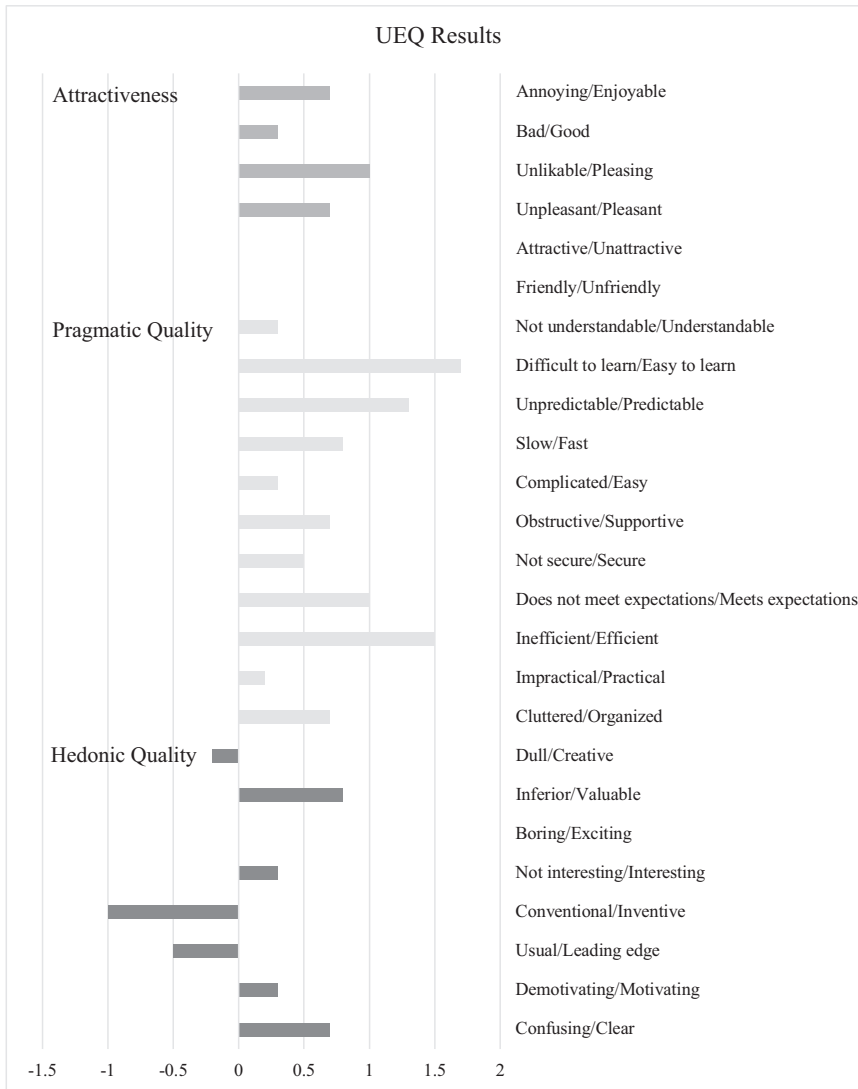
UEQ Results

Attractiveness	Annoying/Enjoyable
	Bad/Good
	Unlikable/Pleasing
	Unpleasant/Pleasant
	Attractive/Unattractive
	Friendly/Unfriendly
Pragmatic Quality	Not understandable/Understandable
	Difficult to learn/Easy to learn
	Unpredictable/Predictable
	Slow/Fast
	Complicated/Easy
	Obstructive/Supportive
	Not secure/Secure
	Does not meet expectations/Meets expectations
	Inefficient/Efficient
	Impractical/Practical
	Cluttered/Organized
Hedonic Quality	Dull/Creative
	Inferior/Valuable
	Boring/Exciting
	Not interesting/Interesting
	Conventional/Inventive
	Usual/Leading edge
	Demotivating/Motivating
	Confusing/Clear

Figure 6.2 UEQ results.

website also seemed to please the participants. However, per the UEQ findings, hedonic quality could be improved.

User-friendly website design

Determining *which changes could improve UX* cannot be accomplished directly with quantitative UX measurement, but this measurement does provide insight regarding general areas of improvement (Schrepp, Hinderks, and Thomaschewski, 2017). The cognitive walkthrough task analysis helped identify usability problems that can be easily addressed when the website is redesigned. Although the participants evaluated the customer journey

and shopping process on the website as clear and easy, one usability problem was identified that might affect a customer's purchase intention in a normal setting: problems locating product information during the shopping process (i.e. ensuring that they choose a product that is compatible with their smartphone). Not finding the relevant product information could have immediate consequences (e.g. shopping cart abandonment) and/or establish more long-lasting beliefs about the retailer and their integrity (Hasan, 2016). Low contrast in buttons and links, small fonts and inconspicuous secondary navigation were identified as minor usability problems that were affecting more subjective UX, whereas trouble locating specific product information also affected the website's usability to an extent.

Two-fold user needs (pragmatic and hedonic) call for website design that supports both pragmatic and hedonic needs. Supporting both goal-oriented behaviour (searching) and exploratory behaviour (browsing) is extremely important for e-commerce websites because users have different needs, goals and strategies for accomplishing their objectives (De Villiers and Van Biljon, 2012; Schmutz *et al.*, 2010). The UEQ findings indicate that the pragmatic quality of the website is good. However, this might have resulted from the participants focusing on tasks they needed to accomplish and they were paying more attention to the pragmatic aspects of the interaction (Quiñones, Rusu, and Rusu, 2018). To gain insights on UX, the participants were also encouraged to explore the website and browse the product selection before evaluating their experience on the UEQ. Hence, the findings indicate either that, to improve UX, the website should support hedonic needs more or the participants happened to be more focused on accomplishing tasks and found it challenging to evaluate the *experience* itself.

Visual attractiveness also affects a user's evaluation of a website. It is a powerful tool for improving UX on e-commerce websites and increasing the fulfilment of hedonic needs (Djamasbi, Siegel, and Tullis, 2010). The studied website scored neutral on both attractiveness and hedonic quality. In the UEQ scale structure, attractiveness is a pure valence dimension (i.e. the user's like or dislike towards the subject). Participant feedback included comments about the website's clear appearance but also about its slightly conservative look and muted colour scheme. This could indicate that if the studied website scored better in attractiveness, it could score better in the hedonic quality of UX as well.

Satisfying online customer journeys

Good website design and good UX facilitate positive customer experiences (Lemon and Verhoef, 2016), which is why investing in UX design is an important consideration for e-commerce websites. A significant part of the customer journey on an e-commerce website is the path to products, (i.e. the *happy path*). The path should be thoughtfully designed and should indicate the hierarchy of content as well as how to navigate it (InVision, 2020 – see Further reading). The idea is to help the user locate sought products or what best suits their current needs. The findings of this study indicate that navigating the website (from the homepage to the online shop, between category pages and product pages and finally to the checkout) was easy for the participants, and they felt in control of the interaction. The simple, smooth checkout process was especially appreciated. To improve the customer journey on the website, the company could consider increasing the colour and contrast in the design and content (e.g. to the background and foreground colours, calls to action and text elements). This could also increase the website's accessibility.

Consistent UX design and development are essential throughout the design and redesign processes of a website. An informed UX design process includes understanding the user's needs and desires (Garrett, 2011), and it requires much more than usability testing alone. This study examined how well this particular e-commerce website facilitates positive UX and smooth online customer journeys. The findings will help the company continue UX development and customer journey mapping on its website with insights from the usability test and the UEQ.

Conclusions

This study examined UX as well as the pragmatic and hedonic user needs that drive users on their customer journey on an e-commerce website. Studying UX and customer journeys determined a common goal: UX research is conducted to identify successful and unsuccessful features from the user perspective, and customer journey mapping is conducted to identify successful and unsuccessful touchpoints. Essentially, both UX design and customer journey mapping are about helping users accomplish their goals more efficiently, effectively and satisfactorily. Good usability is a predictor of positive UX, and positive UX is a predictor of adoption. Positive UX can also predict a trusting customer–company relationship, which is more likely to result in purchase intention. Understanding that UX and the online customer journey are intertwined helps identify possible problems and pain points that users may encounter in the e-commerce context to help solve any problems that could prevent them from accomplishing their goals.

Future research could broaden the scope of UX from a single user interface to multiple-touchpoint customer experiences (Roto, Joutsela, and Nuutinen, 2016). Additionally, addressing both pragmatic and hedonic user needs is important for serving a wider range of users. For example, experienced and inexperienced users have different needs for browsing an e-commerce website: less experienced users need more well-organised content and product information, whereas experienced users have more emotional and experiential needs for the interaction (Falk, Hammerschmidt, and Schepers, 2009). This is why addressing usability and UX as well as the customer journey on an e-commerce website are extremely important. UX is always a result of the user, the system and the context of the interaction (ISO, 2019). However, 'a design is not usable or unusable per se'. On a pragmatic level, the most important interaction outcomes from the user perspective are that the interface becomes familiar quickly, it is easy to learn and it helps them accomplish their goals. Providing pragmatic, *useful content* for informed decision-making is important, but providing *desirable content* that fills hedonic, emotional user needs is equally important (Interaction Design Foundation, 2019 – see Further reading).

Key lessons for future research

- Thoughtful UX development and customer journey planning for an e-commerce website is a continuous process, and regular user research can reveal surprising findings on pain points, successful features and solutions.
- Combining qualitative and quantitative methods in UX studies is an effective way to address the dual user needs and the pragmatic and hedonic aspects of UX.
- UX research should broaden its scope from single-user interfaces to addressing multiple-touchpoint customer experiences because UX and online customer

journeys do not exist in a vacuum; they include all customer–company interaction before, during and after use.

Disclaimer

The research presented in this chapter was collected for my thesis; Saima Ritonummi, the University of Jyväskylä Master's thesis *User experience on an ecommerce website: a case study* (2020). The copyright for this JYU thesis belongs to me as the Author. Research presented here has not been otherwise previously published.

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