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The moderating role of the device type on the online customer experience

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August 23, 2021

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RSM - a force for positive change

Preface

The past eight years I have been working as an online marketer in the affiliate marketing industry. One of the most, if not the most, common assertion people hear about online marketing, is that online marketers measure everything. On dozens of occasions I heard jokes about the ancient offline marketers that all know half of their marketing budget is gone to waste – the only dilemma is that they do not have a clue which half it entails.

In my work I have been occupied with thinking of appropriate attribution models for campaigns, A/B testing different landing pages and setting up cross-device tracking to ensure 'everything' is measured accurately. The prosperity of the campaigns is being measured in metrics that give more insight in the most direct returns, as are the people running these campaigns.

One of the questions that has kept me busy is what amount of benefits of the executed campaigns are not being measured? Not all benefits can be captured by tracking the last clicks before a sale, the holding time on web page or measuring returns, such as the benefits of visibility (impressions that did not convert into a click), brand awareness, brand perception or online customer experience. It remains unclear how these benefits can be influenced by the implementation of design elements.

The understanding of what design elements cause a web page to be successful, often relies on intuition, or at best an A/B test. This also applies to the differences among channels. The difference between personal computer (desktop/laptop) users and mobile users is widely acknowledged, although it remains unclear how practitioners could best approach these differences. The verdict largely remains: 'Test whatever you assume and implement whatever works best'. This research provides more insight into what the online customer experience entails, how the online customer experience mediates the relationship between design elements and purchase intention and if this mediation is moderated by the device type.

Researchers addressed the importance of the online customer experience, but prior research only focussed on the online customer experience on personal computers. This study confirms findings that emerged during conduction of the literature study for this research, suggesting that the online customer experience for mobile users could differ in several ways.

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August, 2021

RSM Erasmus

Abstract

The customer experience is one of the most promising management approaches in consumer industries and it is widely acknowledged that creating a positive customer experience through effectively designed websites is essential for achieving a competitive advantage. Although a growing body of research focused on how design elements influence purchase intention, little is known about the mediating mechanism (i.e., how design elements influence purchase intention?) and moderating mechanism (i.e., when/on what device these design elements have most influence) underlying this relation. In an online experiment, this research explored whether the 4 conceptualised dimensions that together form the online customer experience (the cognitive dimension: informativeness, the affective dimension: entertainment, the social dimension: social presence and the sensory dimension: sensory appeal) mediate the relationship between three design elements (avatars, product videos and customer reviews) and purchase intention, and whether this mediating process was moderated by the device type that was used when visiting the website. These structural relationships are explored by analysing the response of 516 respondents to 8 experiments using structural equation modelling (SEM). This study found that design elements can evoke informativeness, entertainment, social presence and sensory appeal. Furthermore, this study found evidence that informativeness and social presence can positively influence purchase intention. Multigroup analysis reveals that the evoked customer experience does not only depend on the used design element, but also on the device type that is used to visit the website. These findings add to the online customer experience literature and attest to the importance of web design to influence consumer responses.

Chapter 1: Introduction

Among the many factors influencing purchase intention, customer experience has attracted increasing attention over the past few years and has become a leading marketing concept for executives (Harvard Business Review Analytic Services, 2017, 2020; Verhoef et al., 2009). This is mostly attributed to scholars and practitioners recognizing that a customer experience based strategy could provide a superior competitive advantage (Berry, Carbone, & Haeckel, 2002; Berry, Wall, & Carbone, 2006; Carbone & Haeckel, 1994; Gentile, Spiller, & Noci, 2007; Grewal, Levy, & Kumar, 2009; Novak, Hoffman, & Yung, 2000; Pine & Gilmore, 1998; Prahalad & Ramaswamy, 2004; Rawson, Duncan, & Jones, 2013; Schmitt, 1999; Shaw & Ivens, 2002; Vargo & Lusch, 2004; Verhoef et al., 2009). Marketing science is increasingly focusing on the online customer experience as a result of consumers interacting with businesses through countless (online) touchpoints in multiple channels, that lead to more complex customer journeys (Edelman & Singer, 2015; Lemon & Verhoef, 2016). Consumers no longer reach brands in a single linear path but along a myriad of increasingly fragmented and interconnected channels (Brynjolfsson, Hu, & Rahman, 2013; Gallino & Rooderkerk, 2020; Rangaswamy & Van Bruggen, 2005). Every touchpoint a customer has with an organization, leads to a customer experience (Berry et al., 2006; Lasalle & Britton, 2002; Shaw & Ivens, 2002; Voorhees et al., 2017).

The online customer experience located at the centre of this study refers to a customer's psychological response to every online interaction with an organization consisting of four dimensions: the cognitive dimension (informativeness), the affective dimension (entertainment), the social dimension (social presence) and the sensory dimension (sensory appeal; Bleier, Harmeling, & Palmatier, 2018; Novak et al., 2000; Rose, Clark, Samouel, & Hair, 2012). Moving beyond extant research that mainly focussed on the online customer experience as existing of informativeness and entertainment (Novak et al., 2000). This online customer experience can be evoked by design elements. However, there is no one-to-one correspondence between any dimension of experience and a specific design element (Bleier et al., 2018; Brakus, Schmitt, & Zarantonello, 2009).

How effective design elements evoke the dimensions of the online customer experience, and how effective dimensions of the online customer experience elicit purchases, however, may vary depending on the device type that is used to visit the website as mobile devices have become ubiquitous and have fundamentally changed interactions between customers and retailers (Grewal, Roggeveen, Runyan, Nordfält, & Vazquez Lira, 2017; Hennig-Thurau et al., 2010; Ko, Kim, & Lee, 2009; Shankar, Venkatesh, Hofacker, & Naik, 2010; Wang, Malthouse, & Krishnamurthi, 2015; Xu, Chan, Ghose, & Han, 2017). This is due to mobile devices generally having smaller screen sizes than personal computers and mobile devices are more portable (Ghose, Goldfarb, & Han, 2013). Prior academic research focussing on the online customer experience has

neglected the different device types and limit their research a priori to personal computers - which are no longer necessarily the consumers primary device as more users around the world access the internet from a mobile devices instead of a personal computer (Bleier et al., 2018; eMarketer, 2020; Novak et al., 2000).

The increasingly complex landscape along with the importance of customer experience to organizational performance, calls for an urgent understanding of how to create an optimal online experience across device types. The goal of this study is therefore to gain a better understanding of how the four dimensions of the online customer experience mediate the relationship between design elements and purchase intention, and the moderating role of the device type in this mechanism (figure 1 shows the conceptual model of this study and appendix 1 shows all possible mediation and moderation relationships that are being researched). Obtaining answers to these questions is crucial for gaining insights into the etiology of online purchase intention and understanding how purchase intention can be evoked by displaying design elements. The following research question has been drawn up:

How does the online customer experience mediate the relationship between design elements and purchase intention and is this mediation moderated by the device type?

This study identifies three design elements (avatars, product videos and customer reviews) that are ubiquitous on the web and may shape dimensions of the online customer experience (Dellarocas, Zhang, & Awad, 2007; Lee & Choi, 2017; Roggeveen, Grewal, Townsend, & Krishnan, 2015; Schuetzler, Giboney, Grimes, & Nunamaker, 2018; Verhagen, Van Nes, Feldberg, & Van Dolen, 2014). In this study an online experiment is conducted for which eight web pages were created on which these three design elements were manipulated. A total of 516 participants were randomly assigned to one of these pages using their personal computer or mobile device. The resulting data is used to test the conceptualised model using SEM to gain more insights into the online customer experience on mobile devices and personal computers.

The findings of this study add contributions to the online customer experience literature and attest to the importance of differentiating between device types when creating and researching the online customer experience. By conducting an online experiment, this study broadens the current literature with insights into four dimensions of the online customer experience that mediate the relationship between three design elements (avatars, product videos and customer reviews) and purchase intention. Preliminary studies often limit their research by focusing only on informativeness and entertainment. However, this study finds that design elements can evoke informativeness, entertainment, social presence and sensory appeal. Results show that informativeness and social presence can positively influence purchase intentions. Additionally, findings reveal that the evoked customer experience does not solely depend on the used design elements, but also on the device type that is used to visit the web page.

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Chapter 2: Literature review and research hypotheses

**Approaching the concept of the online customer experience**

Customer experience lies at the center of this research and increasingly gained attention from academic research over the past decade. The attention it gained likely derived from the practitioners' conviction that customer experience is one of the most encouraging management approaches for consumer industries (Homburg, Jozić, & Kuehnl, 2015). It is widely acknowledged that providing a positive customer experience is essential for achieving a competitive advantage (Berry et al., 2002; Berry et al., 2006; Bolton, Lemon, & Verhoef, 2004; Carbone & Haeckel, 1994; Gentile et al., 2007; Grewal et al., 2009; Maklan & Klaus, 2011; Novak et al., 2000; Pine & Gilmore, 1998; Prahalad & Ramaswamy, 2004; Rawson et al., 2013; Schmitt, 1999; Shaw & Ivens, 2002; Vargo & Lusch, 2004; Verhoef et al., 2009).

Although the benefits of a positive customer experience are widely acknowledged, there is no consensus among researchers of what the scope of customer experience entails or what customer experience implies. Verhoef et al. (2009) and Grewal et al. (2009) limit the scope of the customer experience to the retail environment, Teixeira et al. (2012) to service design and Novak et al. (2000) to the online environment. Abbott (1955) already emphasised the importance of satisfying experiences by stating: 'What people really desire are not products but satisfying experiences' (p. 39). Experiential theorists furthered this path by broadening the traditional information processing model by postulating that the consumer is not merely a logical thinker who solves problems and that prior research has neglected the importance of the consumption experience (Holbrook & Hirschman, 1982). From this consumer research perspective, the customer experience is a supplement on the prevailing perspective of information processing. Pine and Gilmore (1998) stated that staging experiences is a new source of value creation and that the economic value is gradually shifting from commodities to goods, from goods to services and from services to experiences. In this study on 'experiential marketing', experiences are therefore distinguished from goods and services and reflect an organization's staged offering. However, other studies define the customer experience as the customer response to all interactions with an organization (Berry et al., 2006; Lemon & Verhoef, 2016; Lasalle & Britton, 2002; Shaw & Ivens, 2002; Voorhees et al., 2017).

The online customer experience is often seen as considerably more simplistic than the offline customer experience. This is because some researchers believe that the online retail environment lacks the opportunity to evoke certain dimensions of the customer experience, and is often limited to the informativeness and entertainment of a website (Novak et al., 2000). Recent studies try to solve this lack of unified view by focussing on conceptualizing and measuring the online customer experience (Brakus et al., 2009; Helkkula, 2011; Lemon & Verhoef, 2016; Verhoef et al., 2009).

This study agrees with the view that the online customer experience goes beyond the typical conceptualization of the customer experience as only containing the cognitive dimension (informativeness) and the affective dimension (entertainment) and adds the social dimension (social presence) and the sensory dimension (sensory appeal) to the online customer experience (Bleier et al., 2018; Novak et al., 2000; Wang, Baker, Wagner, & Wakefield, 2007; Jiang and Benbasat, 2007). These dimensions can also be found in the in the conceptual model of this study in figure 1.

Figure 1. The conceptual model.

Web Design Elements   Online Customer Experience
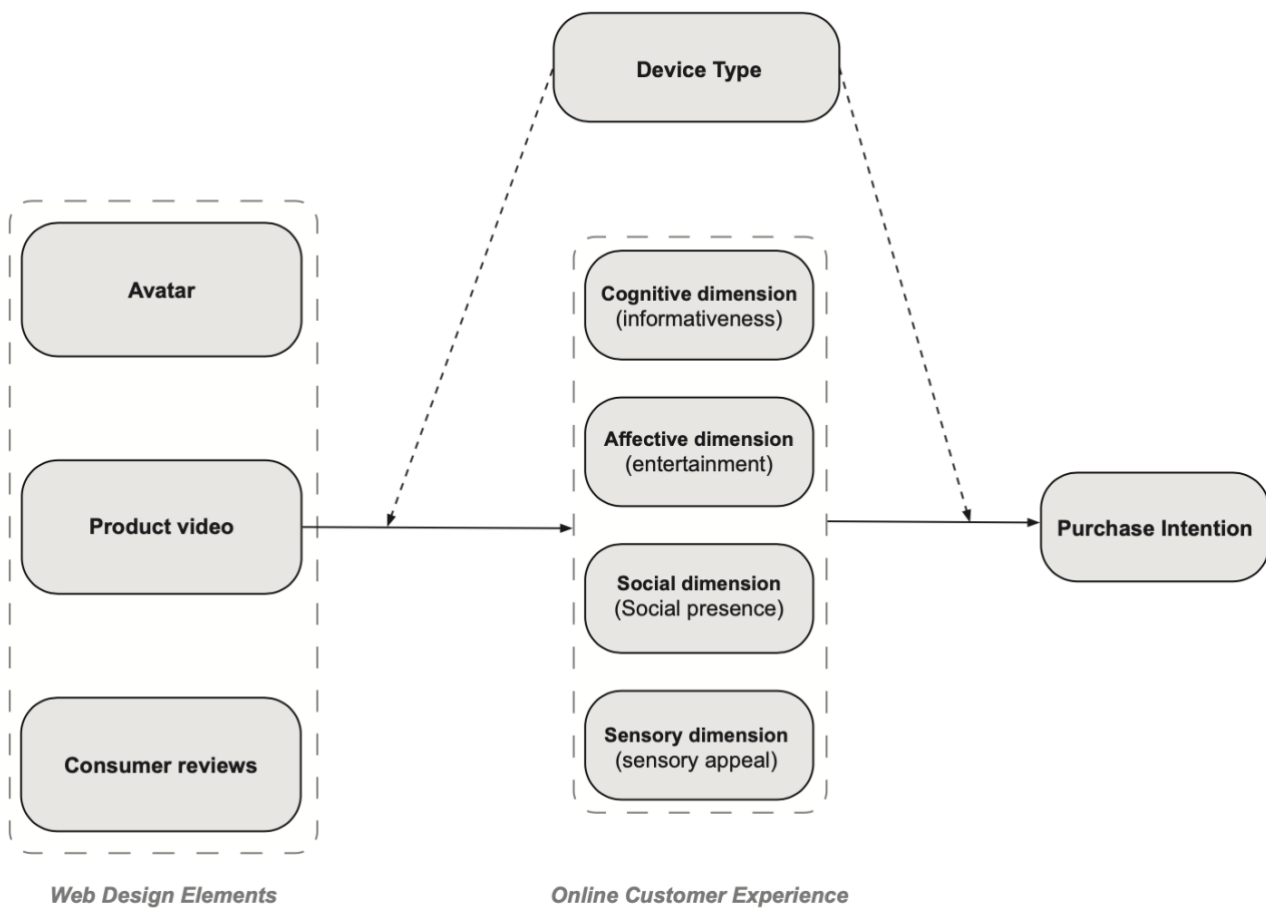
Lim and Ting (2012) define the *cognitive dimension* of the customer experience as the degree to which a web page provides resourceful and helpful information. The primary cognitive dimension of the online customer experience is also defined as the **informativeness** of a web page (Bleier et al., 2018). A related definition is that this dimension encourages customers to use creativity and engage in problem solving or other conscious mental processes (Brakus et al., 2009; Gentile et al., 2007). Customers use these conscious mental processes to gather information about products and services, compare alternatives, or find a better price (Noble, Griffith, & Weinberger, 2005). Prior research mainly focused on how informativeness can influence customer behaviour (Cooke, Sujan, Sujan, & Weitz, 2002; Shi & Zhang, 2014; Urban, Hauser,

Liberali, Braun, & Sultan, 2009). Furthering the path of the *uses and gratifications theory* in media research, informativeness, or the idea that customers appreciate provided information, can be seen as one of the perceived satisfactions, needs, wishes or motives derived from media usage (McQuail, 2010; Wright, 1960). Informativeness revolves around the utilitarian value of the customer experience and captures the contribution of a web page to help the user to make a purchase decision (Addis & Holbrook, 2001; Bleier et al., 2018).

The affective dimension of the customer experience entails moods, feelings, sentiments and emotions toward a brand or retailer (Brakus et al., 2009; Gentile et al., 2007). The consumer is not merely a logical thinker who is solely aimed at solving problems (Holbrook & Hirschman, 1982). Consumer interactions with brands, firms or organizations can evoke affective responses for their own good, while functional considerations are not being taken into account. **Entertainment** can be described as the immediate pleasure the experience offers and is a key dimension of the online customer experience (Bleier et al., 2018). Besides experiencing enjoyment when achieving a prespecified end goal, shopping can be experienced as entertaining and the fun and play arising from the experience itself (Holbrook & Hirschman, 1982). Mathwick, Malhotra, and Rigdon (2001) describe entertainment as an appreciation for the retail 'spectacle'. The level of entertainment consumers perceive, influences online customers attitudes and involvement towards these websites positively (Richard, Chebat, Yang, & Putrevu, 2010; Richard, 2005).

The third dimension of the online customer experience is *the social dimension*, which is defined as the extent to which a web page conveys feelings of human contact, warmth, sociability and sensitivity and is a direct antecedent leading to marketing relevant outcomes as buying intentions (Gefen & Straub, 2003). Eroglu, machleit, and Davis (2001) have argued that the online retail environment lacks the social dimension, because there is no visible presence of employees or other shoppers. Wang, Baker, Wagner and Wakefield (2007) find that the extent to which consumers detect social presence on a website, influences consumers arousal, pleasure, flow and experiential value. Darke, Brady, Benedicktus and Wilson (2016) found that **social presence** can improve customer trust and purchase intention by reducing psychological distance and by increasing tangibility of online retailers. Besides improving purchase intention, adding social presence can also enhance effectiveness of a website by positively influencing attitude toward the online retailer and product (Holzwarth, Janiszewski, & Neumann, 2006). The social response theory may offer an explanation about the effectiveness that social presence has on online user behaviour. This theory suggest that people tend to mindlessly apply social rules and expectations to computer technology and thus react to it as if it is a social entity (Nass & Moon, 2000; Reeves & Nass, 2002).

The last dimension of the online customer experience is *the sensory dimension*. This dimension can be described as the component that stimulates the senses, such as: sight, hearing, smell, touch and taste (Gentile et al., 2007). Steuer (1992) describes it as the extent to which information is presented to the senses or **sensory appeal**. The sensory dimension can be used by organizations to differentiate themselves or their products and to add value (e.g., through aesthetics or excitement; Schmitt, 1999). Improving the sensory dimension of the online customer experience can be challenging, because of the 'intangible' nature of the online environment. Senses such as smell and taste can be assessed in bricks-and-mortar stores, but not in the online environment. In the online environment, where one is deprived of physical interaction with the product, mental images evoked by the representation of a product can serve as an indication of the sensory experience with a product (Bone & Ellen, 1992; Schlosser, 2003). Weathers, Sharma, & Wood, 2007 suggest that online retailers should focus on displaying images of their goods to increase the sensory dimension. Presenting information through object interactivity, which is the virtual interaction with a product, also increases sensory appeal and purchase intention (Schlosser, 2003).

The relationship between design elements and customer experience

Where customers in brick-and-mortar stores assess products through physical interaction, are customers in the online environment limited to design elements being displayed on the web page, due to physical separation between customer and product. Design elements entail the verbal and visual stimuli which serve as the basic components of a website (Bleier et al., 2018). The online customer experience is evoked by design elements, but there is no one-on-one correspondence between any experience dimension and a specific design element (Bleier et al., 2018; Brakus et al., 2009). By effectively orchestrating design elements, companies can send out an observable signal that can be used to communicate their capabilities as well as influence the purchasing behaviour of visitors (Schlosser, White, & Lloyd, 2006). Consumers can differentiate between expensive and cheap marketing tactics and, based on these alleged marketing expenditures, draw conclusions about an organizations credibility and its ability to produce quality products (Kirmani & Wright 1989). Findings from a large-scale study suggest that design elements are most noted when evaluating the credibility of the website (Fogg et al., 2003). The quality of a particular product purchased online is generally not observable by the consumer before purchase. This inherent asymmetry of relevant information between retailers and consumers makes that design element are particularly important in an online environment (Schlosser et al., 2006).

Effectively orchestrated design elements also evoke customer experiences that go beyond purely conveying factual information, by also being entertaining, mimicking sensory experiences from the offline world, and implying human interactions (Bleier et al., 2018). The experience dimensions are evoked by design

elements and although some design elements usually result in sensory experience, they may also shape other dimensions of the customer experience (Brakus et al., 2009).

To identify which design elements are most important, all papers on the subject of web design published in *Journal of Marketing* during the last fifteen years have been reviewed. This review focused on design elements related to the presentation of products, structural design elements were excluded. These structural design elements consist of the overall organization, the navigation and the footer (the section located at the bottom of web page that can be seen over all pages of a website containing the same content) and are often not customizable by merchants using marketplaces such as Amazon, eBay, Mercado Libre, Rakuten or AliExpress.

One element that has been examined by prior research is the use of an avatar, which is defined as a digital entity with anthropomorphic appearance. This digital entity is controlled by a human or software and gives it ability to interact (Miao, Kozlenkova, Wang, Xie, & Palmatier, 2021). Avatars can increase customer satisfaction and have the potential to provide the consumer with a more interpersonal shopping experience (Holzwarth et al., 2006). Extant research uses multiple terms interchangeably referring to avatars, such as chatbots (Ho, Hancock, & Miner, 2018), virtual customer service agents (Verhagen et al., 2014), online shopping assistants (Al-Natour, Benbasat, & Cenfetelli, 2011) or digital assistants (Chattaraman, Kwon, Gilbert, & Ross, 2019). The presence of an avatar's anthropomorphic characteristics elicits consumers simplistic social scripts (e.g. flattery, reciprocity, politeness), which in turn induces varying degrees of cognitive, affective, and social responses to avatars (Al-Natour et al., 2011; Holzwarth et al., 2006; Miao et al., 2021; Wang et al., 2007). This could be explained by the social response theory. According to this theory, people may adopt social behaviours and treat computers as social actors, despite the fact that people know computers do not possess feelings, intentions, human motives or other human traits (Moon, 2000).

The use of product videos on websites has also been the subject of prior research (Grewal et al., 2017). Retailers can present themselves and their products through the use of product videos, which can increase the informativeness of a website (Roggeveen et al., 2015). Incorporating videos can increase the revenue and profit of online retailers and it increases the sensory dimension of a website because of the ability to mimic real experiences (Bleier et al., 2018; Roggeveen et al., 2015) which affects the consumers purchase intention positively (Flavián, Gurrea, & Orús, 2017). Product videos that contain persons or animated characters (social cues), can increase customer perceptions of a website's social value, which can also be explained by the social response theory (Wang et al., 2007).

The last design element that will be discussed in this research, is the use of online consumer reviews, especially the use of consumer reviews as a design element. Consumer reviews have become an important source of information to consumers and is an effective predictor of product sales (Chevalier & Mayzlin, 2006; Dellarocas et al., 2007; Godes & Mayzlin, 2004; Mayzlin, 2006). Zhu and Zhang (2010) found that the extent to which consumer reviews influence product sales is moderated by product characteristics and consumer characteristics as product reviews have more influence on less popular products and on consumers who have relatively more internet experience. Huang, Lurie and Mitra (2009) also found that presence of consumer reviews affects purchase intention positively.

The relationship between online customer experience and purchase intention

A superior customer experience is acknowledged to increase marketing relevant outcomes and provide a superior competitive advantage (Berry et al., 2002; Berry et al., 2006; Bolton et al., 2004; Carbone & Haeckel, 1994; Gentile et al., 2007; Grewal et al., 2009; Maklan & Klaus, 2011; Novak et al., 2000; Pine & Gilmore, 1998; Prahalad & Ramaswamy, 2004; Rawson et al., 2013; Schmitt, 1999; Shaw & Ivens, 2002; Vargo & Lusch, 2004; Verhoef et al., 2009). Novak et al. (2000) argue that the online customer experience is characterised by the cognitive and affective dimension and suggest that a compelling online customer experience is positively correlated with interactivity metrics (longer website stay times and more frequent usage). This study moves beyond the view that conceptualises the online customer experience as existing of the cognitive dimension (informativeness), the affective dimension (entertainment), but includes also the social dimension (social presence) and the sensory dimension (sensory appeal; Bleier, Harmeling, & Palmatier, 2018; Novak et al., 2000; Rose, Clark, Samouel, & Hair, 2012). Research found that by effectively evoking the social dimension in online environments, responses can be elicited that are similar to responses induced by customer-employee interaction in brick-and-mortar stores, which positively influence purchase intention (wang et al., 2007). Sensory appeal can also influence purchase intention positively (Jiang & Benbasat, 2007; Schlosser, 2003).

Moderators of the customer experience

Customer experiences arise in a variety of settings, such as when consumers shop, buy and consume products. Every encounter with a web page also evokes a multidimensional experience that exceeds the mere conveyance of factual information (Bleier et al., 2018; Brakus et al., 2009). Academic research has primarily concentrated on exploratory attempts of conceptualization and measurement of the customer experience (Brakus et al., 2009; Helkkula, 2011; Lemon & Verhoef, 2016; Verhoef et al., 2009). Research on customer experience management is rather limited (Lemon & Verhoef, 2016). The vast majority of existing research on customer experience creation has been conducted in the context of brick-and-mortar retailers (Grewal et al., 2009; Palmer, 2010; Verhoef et al., 2009). Few academic studies researched the customer experience in the

online environment using online retailers to contextualise the analysis (Bleier et al., 2018; Novak et al., 2000; Rose et al., 2012; Trevinal & Stenger, 2014). This online research context is largely represented by personal computers. Whereas knowledge on mobile channels is still limited, consumers increasingly use mobile devices (smartphones and tablets) as primary devices for shopping in the online environment (De Haan, Kannan, Verhoef, & Wiesel, 2018; Lemon & Verhoef, 2016).

Mobile devices have become ubiquitous and have fundamentally changed the interactions between customers and retailers (Grewal et al., 2017; Ko et al., 2009; Shankar et al., 2010; Wang et al., 2015; Xu et al., 2017). The vast number of adopters of these devices can be reached through text messages, audio messages or video messages. These consumers cannot just obtain information from organizations, but also initiate interaction by proactively sending out requests or information to organizations (Shankar et al., 2010). The traditional retail model is based on consumers physically entering the retailing environment, however internet accessed devices now enable retailers to enter the consumer's environment through these devices (Shankar et al., 2010). Previous research into the online customer experience has mainly focused on users of personal computers, which already facilitates retailers to serve consumers without a physical encounter (Lemon & Verhoef, 2016). Mobile devices take this a step further and now enable retailers to enter the consumer environment anywhere and at any time, because these devices remain with the consumer (Shankar et al., 2010).

Mobile devices exhibit four prominent characteristics that distinguish them from other electronic devices such as personal computers. These four characteristics are: location-specificity, portability, untetheredness and the personal nature (Larivière et al., 2013; Shankar & Balasubramanian, 2009; Shankar et al., 2010). Most mobile devices contain GPS capabilities, which identify the physical location of the mobile device. This characteristic offers marketers the opportunity to target mobile devices with location-sensitive offers (Shankar & Balasubramanian, 2009). These devices are also characterised by their small size, which makes the device easy to carry. The handheld nature of devices make that users are able to use mobile devices on a continuous basis, but the small screen size also makes the entry of data more effortful and the decipher of information more complicated (Bruner & Kumar, 2005; Shankar & Balasubramanian, 2009). Mobile devices are, unlike other frequently used devices such as desktop computers, not connected through cables. This leads to enhanced mobility that allows users to engage with retailers in a broad range of spatial and temporal situations (Shankar & Balasubramanian, 2009). The personal nature of the mobile phone makes it a cultural object that is part of everyday traditions and customs, including carrying out transactions, searching for information, communicating and listening to music (Bell, 2006; Shankar et al., 2010).

Mobile devices present retailers with an important marketing opportunity: to establish a pervasive electronic presence alongside their customers anytime, anywhere (Scharl, Dickinger, & Murphy, 2005;

Varnali & Toker, 2010). However, mobile devices also pose a number of challenges such as device and display limitations and interface challenges (Shankar & Balasubramanian, 2009). Although mobile devices offer temporal and spatial flexibility, the screen size and functionality of mobile devices are limited compared to personal computers (Barnes, 2002; Kleijnen, de Ruyter, & Wetzels, 2007; Scharl et al., 2005; Wang et al., 2015). When the capabilities of mobile devices are effectively exploited, these devices offer consumers convenient access which can transform an organization's competitive advantage, help consumers make more informed buying decisions and increase customers brand loyalty (Jih, 2007; Wang et al., 2015; Yang, 2010). To effectively exploit the capabilities of mobile devices, its increasingly important for retailers to be able to convert web page visitors into customers by effectively orchestrating design elements (Bleier et al., 2018; Wolfinbarger & Gilly, 2003).

Prior research has studied differences between consumer behaviours and perceptions of users browsing on personal computers and mobile devices found that search costs are higher on mobile devices due to smaller screen sizes (Ghose et al., 2013). Chae & Kim (2004) also found that screen size influences a user's subjective perception and navigation activities. Because consumers often use their mobile devices while they are on the go, the usage of mobile devices while multitasking leads to more distraction, decreasing cognitive resources (Grewal, Ahlbom, Beitelspacher, Noble, & Nordfält, 2018). The higher levels of distraction and limited available information on the screen, also cause mobile users to rely more heavily on the affective dimension of the online customer experience than on the cognitive dimension of the online customer experience (Grewal et al., 2018).

In this study, the influence of design elements on purchase intention through the online customer experience is examined. Empirical evidence, however not directly linked to the online customer experience, suggested the likelihood of a moderating relationship. Specifically, literature has confirmed that mobile devices have changed the interactions between retailers and consumers. The online customer experience x device type interaction might, at least in part, be attributable to the device characteristic, which present retailers with important marketing opportunities and challenges. During the conduction of the literature study for this paper, no research was found that examined the influence of the device type on the relationship between design elements and the online customer experience or on the relationship between the online customer experience and purchase intention.

The conceptual model (<u>figure 1</u>)

In conclusion, the current research combines hitherto unconnected research areas (customer experience literature and mobile marketing literature) to examine the conditional nature of the mechanism through which design elements influence the purchase intention also called a 'moderated mediation' model (<u>Baron & Kenny, 1986</u>; <u>Edwards & Lambert, 2007</u>; <u>Hayes, 2018</u>; <u>Muller, Judd, & Yzerbyt, 2005</u>; <u>Preacher, Rucker, & Hayes, 2007</u>). The purpose of this study is twofold: (1.) to analyse whether the online customer experience will mediate the relationship between design elements and purchase intention, and (2.) to examine whether the indirect effect of design elements on purchase intention through the online customer experience depends on the device type. The proposed conceptual model of this study is illustrated in <u>figure 1</u>, addressing mediation (i.e., how design elements relate to purchase intention) and moderation questions (i.e., when/on what device do these design elements have the most influence). The following section will explain how the data for this study is gathered in order to test the conceptual model which is analysed using SEM.

Chapter 3: Methodology

To assess the effects of the design elements on the dimensions of the online customer experience for different device types, a one factor between-groups design was used. An online experiment was conducted in which participants who were recruited via Amazon Mechanical Turk (MTurk) were exposed to a web page using their mobile phone or personal computer. Subsequently, participants were asked to complete a questionnaire on how they experienced the presented web page. Following Habel, Alavi and Linsenmayer (2021), Nunes, Ordanini and Giambastiani (2021), Rosengren, Eisend, Koslow and Dahlen (2020) and Stremersch, Winer and Camacho (2021), this research used SEM: a collection of statistical techniques that allows complete and simultaneous tests of relationships between latent independent and dependent variables and is hailed as a more comprehensive and flexible approach to research design and data analysis than any other statistical model (Hoyle, 1995; Ullman & Bentler, 2012). This data was analysed testing the specified conceptual model that represents predictions of the online customer experience theory (appendix 1; Hayduk, Cummings, Boadu, Pazderka-Robinson, & Boulianne, 2007).

This research utilised SEM, because it has several benefits as outlined by Steenkamp and Baumgartner (2000): First, the online customer experience located at the heart of this research has many facets and cannot be directly observed which makes SEM's uncompromising focus on construct operationalization of great value to this study. Second, any observed variable contains measurement error and SEM makes it possible to identify errors of measurement and remove them from the data. Lastly, models are a simplified representations of the real world and before any conclusions are derived from a model, the degree to which the model is in agreement with the data has to be ascertained. Besides using SEM to examine the relationships of a system of variables, this study also uses multigroup SEM to assess similarities and differences between website visitors using a personal computer or mobile device (Deng & Yuan, 2015).

Participants

A total of 516 participants were recruited via MTurk, a crowdsourcing marketplace for recruiting participants. The past decade the crowdsourcing platforming MTurk has gained popularity among researchers for recruiting participants for experiments conducted in an online environment. Prior studies have conducted research on the quality of data that is gathered using this crowdsourcing platform. These found that MTurk workers are often more representative of the U.S. population than in-person convenience samples which often use undergraduate college students (Berinsky, Huber, & Lenz, 2012; Buhrmester, Kwang, & Gosling, 2011; Paolacci, Chandler, & Ipeirotis, 2010; Rand, 2012). Besides this representative value, MTurk also offers many practical advantages that make the recruitment of participants easier and more cost efficient (Paolacci et al., 2010).

Despite the advantages of using MTurk, there are some aspects of MTurk that should engender caution (Berinsky et al., 2012; Rand, 2012). Caution is advised through the use of comprehension questions to ensure that participants understood the instructions. If participants did not meet this criterium, and did not correctly answer the comprehension question within three attempts, they were excluded from the data used for this research. Participants that did not complete the full experiment, and thus quitted mid-experiment, are also excluded from the data used for this research. Lastly, only workers that were performing tasks on a personal computer or mobile device were recruited. Participants that completed the experiment on any other device (e.g. game consoles, smart televisions), were also excluded from the data used for this research.

A total of 516 respondents were included in this study. Participants' ages ranged from 20 to 71 years (M = 36.7 SD = 9.8) with 63.4% identified as male, 35.9% identified as female, 2 participants preferred to self-describe (0.4%) and 2 participants (0.4%) preferred not to say their gender. The participants were randomly assigned to one of the eight designed conditional treatments. The experiment including survey was advertised as taking about 10-15 minutes and the respondents were paid $1.30 each, hovering above the United States minimum wage. The HIT was restricted to U.S. citizens who had not participated in the HIT before with at least a 98% approval rating and 1.000 or more approved hits.

Table 1. *Descriptive statistics of the participants per condition*

| Condition | N | Age | | | | Gender | | | |
		Min	Max	Mean	Std. Dev.	Men	Women	PNTS*	PTSD*
Customer reviews (personal computer)	64	22	65	39.3	9.7	40 (62.5%)	24 (37.5%)		
Customer reviews (mobile)	66	20	68	34.1	8.8	44 (66.7%)	20 (30.3%)	2 (3%)	
Product Video (personal computer)	66	21	62	37.8	10.3	42 (63.6%)	24 (36.4%)		
Product Video (mobile)	65	24	71	37.9	11.3	38 (58.5%)	26 (40%)		1 (1.5%)
Avatar (personal computer)	63	24	69	38.3	10.9	41 (65.1%)	21 (33.3%)		1 (1.6%)
Avatar (Mobile)	64	22	65	35.8	9.9	36 (56.3%)	28 (43.8%)		
Control condition (personal computer)	62	23	67	35.5	8.6	41 (66.1%)	21 (33.9%)		
Control condition (mobile)	66	22	53	34.8	7.6	45 (68.2%)	21 (31.8%)		
Total									

PNTS = Prefer not to say, PTSD = Prefer to self-describe

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Materials and procedures

Once participants were recruited through the crowdsourcing platform MTurk, a complete description of the study was presented wherein assurances were given that all responses would be handled confidentially and completely anonymous. Thereafter, participants were linked to an external website that hosts LIONESS software. Lioness is a web-based platform developed to run online experiments (Giamattei, Yahosseini, Gächter, & Molleman, 2020). Participants on all devices with an internet connection can use LIONESS Lab to complete the experiment. This platform provides researchers of online experiments with solutions for methodological challenges, such as methods for dealing with participant dropout and ensuring participants can only participate once. Lastly, LIONESS enables researchers to implement features such as timers (that prevent participants finishing the experiment in unrealistic timespans) and comprehension questions to ensure participant attention.

This research used a between-groups factorial design, in which the exposure to a control condition or three design elements were experimentally manipulated (avatars, product videos and consumer reviews) on two types of devices (mobile-phones or personal computers). One of the 8 designed responsive web pages (including a control web page) were randomly presented to the participants which were instructed to explore the web page for a minimum of 45 seconds (Appendix 4 and 5 show all design elements on one page). After the participants explored these web pages, they were asked to complete a questionnaire with questions about their demographics, checks to control realism, manipulation checks and pre-existing scales to measure the four dimensions of the online customer experience and purchase intention (these scales are included in Appendix 2). Participants were also asked what device type was used to explored the website, to examine the extent to which the device type moderates the relationship of design elements on the online customer experience and the relationship of the online customer experience dimensions on purchase intention.

Measures

Different scales were adapted to measure the four dimensions of the customer experience. A scale to measure the cognitive dimension was adapted from Luo (2002). To measure the affective dimension a scale was adapted from Hausman and Siekpe (2009). To measure the social dimension, a scale formed by Gefen and Straub (2003) was adapted. Lastly, to examine the sensory dimension, a scale formed by Jiang and Benbasat (2007) was adapted. These constructs were measured using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) to indicate participants' agreement or disagreement with the items. The Juster scale (Mcomposite score = 5.98, SD = 2.95) was used to measure the purchase intention (Juster, 1966). This 11-point scale appears to be reasonably reliable of actual purchase rates (Clawson, 1971; Day, Gan, Gendall, & Esslemont, 1991).

To ensure relevance, participants were asked to evaluate the realism of the website by answering the following questions: 'The website I just explored was realistic' and 'I would believe that the website I just explored could be an actual website in reality' (*a* = 0.76; Siponen & Vance, 2014). A seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used to measure the realism perceptions of the participants, providing reasonable assurance that the presented websites were realistic (Mcomposite score = 5.67, SD = 1.13).

Following the steps outlined by Anderson and Gerbing (1998), a confirmatory factor analysis (CFA) was conducted to investigate the construct validity to test the conceptual framework derived from the literature study, which is shown in appendix 6 (Schreiber, Nora, Stage, Barlow, & King, 2006). The main goal of CFA is to provide evidence of whether the specified measurement model, in which multiple indicators of each latent construct are used to reduce measurement error, demonstrates an acceptable fit to the data. The measurement model of this study was specified to capture the four latent constructs (i.e., informativeness, entertainment, social presence and sensory appeal) with their associated multiple indicators. The CFA was performed using Mplus and robust maximum likelihood estimator (MLR). The model fit indices had acceptable values (comparative fit index [CFI] = 0.941, Tucker-Lewis index [TLI] = .910, root mean square error of approximation [RMSEA] = 0.060; Kline, 2015; Hu and Bentler, 1999). Thus, the measurement model fit was deemed acceptable.

The reliability of the measures was investigated using Cronbach's alpha (α) and composite reliability (ω) analysis. All the values of Cronbach's alpha ranged from 0.78 to 0.87 (Table 2) exceeding the recommended level (0.70) indicating reliable internal consistency (Taber, 2017).

Table 2. Descriptive statistics and correlation matrices

Variable	M*	SD*	N	CR(ω)	CA(α)	1	2	3	4
Informativeness	5.61	1.059	516	0.84	0.825	(0.64)			
Entertainment	5.46	1.095	516	0.80	0.784	.679	(0.56)		
Social Presence	5.19	1.227	515	0.87	0.865	.617	.647	(0.68)	
Sensory Appeal	5.24	1.161	516	0.81	0.806	.667	.709	.727	(0.59)

*Notes: *Calculated using composite scores; M = Means; SD = standard deviation; CR = Composite reliability; CA = Cronbach's alpha*
The AVE (Average variance extracted) values are stated within the parentheses.

All the values of omegas were changed insignificantly and were higher than 0.7 supporting construct reliability (Hair, Black, Babin, & Anderson, 2013). Then, the validity of the scales was investigated using convergent validity, construct validity, and discriminant validity (Awang, 2014). Convergent validity was

investigated by the average variance extracted (AVE) and values of factor loadings. All constructs had AVE values higher than acceptable level 0.5 (Hair et al., 2013). All loadings were higher than 0.6 indicating that the model contains no problematic items (Appendix 6; Awang, 2014). Only one of the 12 loadings had values less than 0.7 indicating more than 90% 'ideal items' (Hair et al., 2013).

To estimate possible multicollinearity issues, the variance inflation factor (VIF) values were calculated for each experience dimension. All VIF values (informativeness = 2.19, entertainment = 2.47, social presence = 2.36, sensory appeal = 2.85) were below the critical threshold of 10 (Hair et al., 2013). Then, the eigenvalues of their correlation matrix were investigated. All condition numbers (maximum value of 20.81) were below the critical value of 30 (Kim, 2019). Several values were above 10 indicating possible presence of multicollinearity, however the regression coefficient variance-decomposition matrix did not have any values above 0.9, indicating an absence of problems with multicollinearity between any predictors (Hair et al., 2013).

To explore the extent to which the device type moderates the effect of the design elements on the online customer experience dimensions, and the effect of the online customer experience dimensions on the purchase intention, multigroup analysis using Mplus was conducted. The use of multigroup models is an often adopted method to investigate group differences with SEM (Jöreskog, 1971; Sörbom, 1974). The exact same model was fitted with data from the two groups (personal computer users and mobile users) to compare fit indices and thus provide information to gain more insights into the comparability of causal processes in the different populations. In the first model paths were free across both groups. In the second model, all corresponding paths were constrained equal for both group. To test whether the comparisons between these two groups are valid, the equivalence of measures were compared using Multigroup confirmatory factor analysis (MCFA; Baumgartner & Steenkamp, 1998; Cheung & Rensvold, 1999; Milfont & Fischer, 2010; Steenkamp & Baumgartner, 1998). MGCFA is the most widely used method to test for measurement invariance (Jöreskog, 1971; Steinmetz, Schmidt, Tina-Booh, Wieczorek, & Schwartz, 2008). The indices indicate that instruments measure the same psychological constructs in both groups as thresholds were accepted: ΔCFI < .01, ΔTLI < .01, ΔRMSEA < .015 (see table 6; Milfont & Fischer, 2010). In addition, the Chi-square test was conducted with Satorra-Bentler's correction to account for the effect of possible nonnormality (Satorra & Bentler, 2009).

Extant literature provides evidence that the product type and trustworthiness of a brand may moderate the effect of the online customer experience dimensions on purchase intention (Dimoka, Hong, & Pavlou, 2012; Gefen, Karahanna, & Straub, 2003; Gefen & Straub, 2003; Huang et al., 2009; Jarvenpaa, Tractinsky, & Vitale, 2000; Lim, Sia, Lee, & Benbasat, 2006; Pavlou, Liang, & Xue, 2007; Pavlou, 2003; Weathers et al., 2007). For this reason this study collected additional data and controlled the following

variables: product type (search and experience goods) and trustworthiness. Additionally this study controlled the demographic factors age (in years) and gender. All measures of constructs can be found in appendix 2.

Chapter 4: Results

In order to test the conceptual model of this study, all data of the eight experiments was combined to test the best fitting model. To test the importance of each online customer experience dimension on purchase intention while controlling for participant heterogeneity, a covariance-based structural equation modelling with robust maximum likelihood estimator (MLR) was used.

Structural model selection

While the measurement model specifies relationships between the scale items and their underlying factors, the structural model specifies the interrelated causal relationships among the constructs (Anderson & Gerbing, 1988). Since the measurement model achieved the desired level of validity, an estimation of the hypothesised structural model was created. Model 1 is the partial mediation model with all four experience dimensions as mediators (the corresponding diagram is shown in Appendix 7). Models 2–5 present a set of models with three mediators (within each model a path from one dimension to purchase intention was constrained as 0). Models 6-9 present a set of models with one mediator. Lastly, models 10-15 present a set of models with two mediators based on all possible combinations. The fit indices of the proposed model for this study (model 1) indicate acceptable goodness of fit (CFI = 0.941; TLI = 0.910; RMSEA = 0.060; SRMR = 0.032) and thus indicate good empirical support of the conceptual model (Hu & Bentler, 1999).

Table 3. Model comparison

	Online Customer Experience Dimensions included as mediators				N	χ^2	df	CFI	TLI	RMSEA	SRMR	AIC	$\Delta\chi^2$
Model	Inf	Ent	SocPres	SensApp									
1	x	x	x	x	88	337.701	120	.941	.910	.060 [.052 .067]	.032	19161.29	-
2		x	x	x	85	355.470	123	.937	.907	.061 [.054 .068]	.037	19174.14	19.81***
3	x		x	x	85	344.964	123	.940	.911	.059 [.052 .067]	.035	19161.94	7.00
4	x	x		x	85	349.448	123	.939	.909	.060 [.053 .068]	.037	19167.25	12.42**
5	x	x	x		85	354.346	123	.937	.907	.061 [.053 .068]	.039	19173.28	17.92***
6	x				79	362.564	129	.937	.911	.060 [.052 .067]	.041	19167.14	24.77**
7		x			79	367.763	129	.935	.909	.060 [.053 .068]	.043	19173.22	30.96***
8			x		79	368.989	129	.935	.908	.060 [.053 .068]	.042	19174.65	32.41***
9				x	79	365.485	129	.936	.91	.060 [.053 .067]	.041	19170.37	28.28***
10	x	x			82	358.739	126	.937	.909	.060 [.053 .068]	.041	19170.43	21.85**
11	x		x		82	358.873	126	.937	.909	.060 [.053 .068]	.039	19170.58	22.01**
12	x			x	82	352.527	126	.939	.911	.059 [.052 .067]	.038	19163.26	14.43*
13		x	x		82	363.361	126	.936	.907	.061 [.054 .068]	.042	19176.19	27.11***
14		x		x	82	362.316	126	.936	.907	.061 [.053 .068]	.041	19174.36	26.22***
15			x	x	82	359.975	126	.937	.908	.060 [.053 .068]	.038	19171.43	23.49***

***p ≤ .001; **p ≤ .01.; *p ≤ .05.

As shown in table 3, all 15 models indicate acceptable fit. Also, χ2 test indicates that there is no significant difference in model fit between model 1 and alternative models. However, model 1 indicates a slightly better fit, based on CFI, SRMR, and AIC. Considering all the possible moderations effects and the slightly better model fit are of interest to this research, the results of model 1 (with all four online customer experience dimensions) will be used for the remainder of this study.

Effects of the online customer experience dimension on purchase intention.

Section 1 in <u>table 9</u> (columns 1 to 4) contains the effects of the online customer experience dimensions on purchase intention, which are also shown below:

Table 4. *Effects of the online customer experience dimensions on purchase intention*

1. The effects of the online customer experience dimensions on purchase intention	Online Customer Experience Dimensions							
	(1)		(2)		(3)		(4)	
Structural Path	Informativeness		Entertainment		Social Presence		Sensory Appeal	
Online customer experience dimension -> purchase intention	.449**	(4.189)	-0.157	(-.929)	.228*	(1.992)	.104	(0.513)

Informativeness has the strongest effect and exhibits a significant and positive effect on the purchase intention (β = .449, p ≤ .001). Social presence also positively affects purchase intention (β = .228, p ≤ .05). The effects of entertainment and sensory appeal are nonsignificant, indicating that this research did not find convincing evidence against the null hypothesis (<u>Berkson, 1942</u>).

Relationship between design elements and the online customer experience dimensions.

The second section of <u>table 9</u> reports the effect of the tested design elements on the 4 online customer experience dimensions, which is also presented in the table below:

Table 5. *The relationship between design elements and the online customer experience dimensions*

2. The effects of design elements on the online customer experience dimensions	Online Customer Experience Dimensions							
	(5)		(6)		(7)		(8)	
Structural Path	Informativeness		Entertainment		Social Presence		Sensory Appeal	
Avatar -> online customer experience dimensions	0.02	(.35)	-.03	(-.67)	-.07	(-1.35)	-.04	(-.92)
Consumer reviews -> online customer experience dimensions	<.01	(.01)	.04	(.81)	-.01	(-.15)	-.04	(-.78)
Product video -> online customer experience dimensions	.15**	(3.97)	.08	(1.78)	.09*	(2.09)	.13**	(2.94)

The use of a product video exerts significant effects on the informativeness, (β = .15, p ≤ .0001), social presence (β = .09, p ≤ .05), and sensory appeal (β = .13, ≤ .01) dimension. Other interactions between design elements and the online customer experience dimensions are nonsignificant (p > .05).

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The moderating role of the device type.

The existence of a moderating effect changes the magnitude or the direction of the relationship between two variables (Hayes, 2018). This study investigates the relationship between design elements and the online customer experience dimensions and the relationship between online customer experience dimensions and purchase intention for personal computer and mobile users. To test for differences between these groups, it must be established that differences exist between these two groups and that the differences stem from structural differences in path coefficients, not from measurement differences across these groups. Accordingly, it was necessary to see if the measurement parameters (especially factor loadings) were operating in the same way for both groups (i.e., a test of measurement invariance) before any evidence bearing on equality of structural paths was evaluated (i.e., a test of structural invariance).

In order to assess this measurement invariance, multi-group confirmatory factor analyses (MGFCA) was performed. This study followed Jöreskog's (1971) strategy for assessment of comparability of factor structures, which is typically followed to test measurement invariance (Milfont & Fischer, 2010). To conduct the multigroup analysis of measurement invariance, a baseline (configural) model was established in which model parameters for each group are estimated separately and no equality constraints are imposed across groups. This model was compared against other models in which all corresponding paths were constrained equal for both groups (table 6). A nonsignificant Chi-squared difference serves as evidence for the equivalency across groups. Other thresholds were also accepted (difference in; ΔCFI < 0.01, ΔTLI < 0.01, ΔRMSEA < 0.015) ensuring that all subsequent analyses to be performed to assess group differences in structural paths are not contaminated by differences of measurement properties across both groups (Milfont & Fischer, 2010). Following Maruyama (1997), a more in depth investigation of the moderation effect across separate paths was conducted by comparing non-standardised regression coefficients using a t-test.

Table 6. Fit indices and Chi-squared test result (constrained vs non-constrained models)

	N of parameters	χ^2	df	CFI	TLI	RMSEA	SRMR	AIC	$\Delta\chi^2$	Δ(df)	p-val
Paths are free across groups	168	473.067	248	0.94	0.912	0.060 [0.051 0.068]	0.048	19167.5			
Paths are equal across mobile phones and laptop/desktop groups	153	495.054	263	0.938	0.914	0.059 [0.051 0.067]	0.049	19155.56	20.27	15	0.162

The moderating effect of device type on the relationship between design elements and online customer experience dimensions.

Section 3 of table 9 shows the effect of device type as moderator of the relationship between design elements and the online customer experience dimensions, which is also shown below:

Table 7. Moderation of effects of design elements on online customer dimensions

3. Moderation of effects of design elements on online customer experience dimensions	Online Customer Experience Dimensions															
	(9)				(10)				(11)				(12)			
Structural Path	Informativeness				Entertainment				Social Presence				Sensory Appeal			
	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics
Avatar x device type -> Online customer experience dimensions	-.16	.363	-.523	(-1.563)	-.032	.149	.117	(.363)	-.092	-.314	.222	(.732)	.057	-.325	.382	(1.253)
Consumer reviews x device type -> Online customer experience dimensions	-.289	.404	-.693*	(-2.065)	.048	.234	-.186	(-.610)	.079	-.123	.202	(.695)	-.171	-.072	-.099	(-.318)
Product video x device type -> Online customer experience dimensions	.503**	.672**	-.169	(-.564)	.47*	.027	.443	(1.431)	.411*	.137	.274	(1.030)	.63**	.234	.396*	(1.972)

The device type changes the direction of the relationship between the use of consumer reviews and the informativeness dimension of the online customer experience (β = -693, p ≤ .05). The coefficients of both groups are insignificant, but the effect of consumer reviews on informativeness is negative in the mobile group, and positive in the personal computer group, making this crossover interaction interpretable (Loftus, 1978). Furthermore, this study found that the use of product video has a significant positive effect on the informativeness dimension for both mobile users and personal computer users. However, the effect of the use of a product video on the other three customer experience dimensions (entertainment, social presence and sensory appeal) is only significant for mobile users.

Moderating role of device type on the relationship between online customer experience dimensions and purchase intention.

Section 4 of table 9 shows that this study found that informativeness and social presence have a positive and significant impact on the purchase intention of mobile users while both effects are insignificant for users using a personal computer, which is also shown in the table below:

Table 8. Moderation of effects of online customer experience dimensions on purchase intention

4. Moderation of effects of online customer experience dimensions on purchase intention	Online Customer Experience Dimensions															
	(13)				(14)				(15)				(16)			
Structural Path	Informativeness				Entertainment				Social Presence				Sensory Appeal			
	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics
Online customer experience dimension x device type -> purchase intention	.854**	.789	.065	(.119)	.003	-.497	.5	(.549)	.78*	-.085	.865	(.886)	-.437	.901	-1.338	(-.989)

This research did not find any significant moderation effect of device type as moderator of the relationship between the online customer experience dimensions and purchase intention. However, the effect of

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informativeness on purchase intention and the effect of social presence on purchase intention is significant for mobile users, but insignificant for personal computer users.

Control variables

In the analysis, trust was included as a control variable. The results suggest that trust is significantly related to all of the four online customer experience dimensions, such that higher levels of trust are associated with increased scores informativeness (β = .59, p $\leq$ .001), entertainment (β = .57, p $\leq$ .001), social presence (β = .49, p $\leq$ .001) and sensory appeal (β = .45, p $\leq$ .001).

Table 9. *Results*

1. The effects of the online customer experience dimensions on purchase intention

Online Customer Experience Dimensions

Structural Path	(1) Informativeness		(2) Entertainment		(3) Social Presence		(4) Sensory Appeal	
Online customer experience dimension -> purchase intention	.449**	(4.189)	-0.157	(-.929)	.228*	(1.992)	.104	(0.513)

2. The effects of design elements on the online customer experience dimensions

Online Customer Experience Dimensions

Structural Path	(5) Informativeness		(6) Entertainment		(7) Social Presence		(8) Sensory Appeal	
Avatar -> online customer experience dimensions	0.02	(.35)	-.03	(-.67)	-.07	(-1.35)	-.04	(-.92)
Consumer reviews -> online customer experience dimensions	<.01	(.01)	.04	(.81)	-.01	(-.15)	-.04	(-.78)
Product video -> online customer experience dimensions	.15**	(3.97)	.08	(1.78)	.09*	(2.09)	.13**	(2.94)

3. Moderation of effects of design elements on online customer experience dimensions

Online Customer Experience Dimensions

Structural Path	(9) Informativeness				(10) Entertainment				(11) Social Presence				(12) Sensory Appeal			
	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics
Avatar x device type -> Online customer experience dimensions	-.16	.363	-.523	(-1.563)	-.032	.149	.117	(.363)	-.092	-.314	.222	(.732)	.057	-.325	.382	(1.253)
Consumer reviews x device type -> Online customer experience dimensions	-.289	.404	-.693*	(-2.065)	.048	.234	-.186	(-.610)	.079	-.123	.202	(.695)	-.171	-.072	-.099	(-.318)
Product video x device type -> Online customer experience dimensions	.503**	.672**	-.169	(-.564)	.47*	.027	.443	(1.431)	.411*	.137	.274	(1.030)	.63**	.234	.396*	(1.972)

4. Moderation of effects of online customer experience dimensions on purchase intention

Online Customer Experience Dimensions

Structural Path	(13) Informativeness				(14) Entertainment				(15) Social Presence				(16) Sensory Appeal			
	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics	Mobile device	Personal computer	Difference in β	t-statistics
Online customer experience dimension x device type -> purchase intention	.854**	.789	.065	(.119)	.003	-.497	.5	(.549)	.78*	-.085	.865	(.886)	-.437	.901	-1.338	(-.989)

*p ≤ .05; **p ≤ 0.01 (2-tailed)

Notes: The first column below each online customer experience represent the standardised coefficient (β); t-statistics are shown in parentheses. The model fit: χ2(.d.f) = 276.836 (80) CFI = .941, RMSEA = .060, SRMR = .038

Chapter 5: Discussion

This online experiment explored whether the four conceptualised dimensions that form the online customer experience (the cognitive dimension: informativeness, the affective dimension: entertainment, the social dimension: social presence and the sensory dimension: sensory appeal) mediate the relationship between three design elements (avatars, product videos and consumer reviews) and purchase intention, and whether this mediating process was moderated by the device type that was utilised while visiting the website. These structural relationships are analysed in the first analysis using SEM, which provided support for the conceptual model of this study. The second analysis uses multigroup SEM to assess similarities and differences between website visitors using a personal computer or mobile device. Whilst a nonsignificant Chi-squared difference serves as evidence for the equivalency across groups, a more in depth investigation comparing non-standardised regression coefficients using a t-test, revealed differences between these two groups.

Analysis: testing the conceptual model

The first analysis tested the hypothesised conceptual framework (figure 1) derived from the literature study. The online customer experience is theorised as consisting of four dimensions, and hypothesised as mediating the relationship between design elements and purchase intention. The results show that the conceptualised model created for this study, which includes all four dimensions of the customer experience found the best model fit with the data, indicating that the hypothetical model fits the empirical data. This study found evidence that a positive significant relationship exist between two dimensions (informativeness and social presence) of the online customer experience and purchase intention. Although this study found that informativeness is the most important dimension that affects purchase intention, it moves beyond the two-dimensional (informativeness and entertainment) perspective and explores other dimensions (Novak et al., 2000).

The use of a product video had a significant positive effect on informativeness, social presence and sensory appeal. The animated video shown to participants of this condition contained a demonstration of the available features for the fictional company using animated characters. This video helps users to make purchase decisions which logically results in an increase in informativeness (Bleier et al., 2018). The increase in the sensory dimension due to the use of a product video is in line with extant research that stated that the improvement of the sensory dimension can be challenging due to the 'intangible nature' of the online environment. This makes senses such as smell and taste unavailable. In the online environment, where one is deprived of physical interaction with the product, mental images evoked by the representation of a product can serve as an substitute of the sensory experience with a product (Bone & Ellen, 1992; Schlosser, 2003).

The positive relation between the use of a product video and the socialness of the website can be explained by the social response theory, which states that product videos that contain persons or animated characters (social cues), can increase customer perceptions of a website's social value (Wang et al., 2007).

This study did not find a significant relationship between entertainment and purchase intention. A possible explanation for this result is that respondents experienced the visited website as trustworthy (Mcomposite score = 5.61, SD = .97) and the entertainment dimension is most essential for brands that are perceived as less trustworthy (Bart, Shankar, Sultan, & Urban, 2005). This study also found no significant relationship between sensory appeal and purchase intention. A possible explanation can be found in the orientation of the product. Extant research makes a distinction between search orientated and experience orientated products (Weathers et al., 2007). The more a consumer needs to use senses to evaluate a product, the more experience qualities this product possess. The more a consumer feels that second-hand information will suffice in order to adequately evaluate a product, the more search qualities a product possesses (Weathers et al., 2007). This makes sensory appeal especially important for products that possess more experience qualities as this could reduce a consumers' uncertainty about perceived performance.

The control variables indicate that trust and online customer experience dimensions are positively related. In other words, trustworthy brands compared to non-trustworthy brands seem to evoke the online customer experience dimensions stronger or the stronger online customer experience dimensions are evoked, the more trustworthy the brand is perceived. Pavlou, Liang, & Xue (2007) already found that trust, website informativeness and social presence facilitate online exchange relationships by overcoming the agency problems of hidden information and hidden action. This result indicates that that sensory appeal and entertainment also correlate with trust. Schlosser et al. (2006) state that design elements can be used to improve the trustworthiness. Bart et al. (2005) found a positive relationship between entertainment and trust in a website.

This study did not find any significant effects between the use of an avatar or consumer reviews and any of the online customer experience dimensions in the first analysis. It is noticeable that none of the participants sought interaction with the avatar. A possible explanation for these findings could be the relative positioning of the design elements. The use of a product video had the strongest effect on the online customer experience dimensions, which is the design element that was located at the top of the web page. The consumer reviews and avatar were located more towards the bottom of the page. This finding adds to the importance of the relative positioning of design elements on a web page, indicating the importance of displaying the most important design elements at the top of the web page.

To sum up, testing the hypothesised conceptual framework using data of both groups found that the online customer experience moves beyond the two-dimensional (informativeness and entertainment) and found that social presence is also of importance (Novak et al., 2000). This study also indicates that trust and online customer experience dimensions are positively related and that the relative positioning of design elements on a web page might influence the degree of effectiveness in evoking online customer experience dimensions.

Analysis 2: multigroup analysis

In the second analysis the relationship between design elements and the online customer experience dimensions and the relationship between online customer experience dimensions and purchase intention for both personal computer and mobile users is investigated, to identify differences and similarities between groups.

Results of this study show that design elements can have different effects on purchase intention, depending on the device type. Even though the coefficients for the effect of consumer reviews on informativeness were not significant for both personal computer users and mobile users, the difference between coefficients was significant, indicating a differentiation in the effect of consumer reviews on informativeness depending on device type (Loftus, 1978). More specifically, consumer reviews have a positive influence on informativeness for users that visit the site on a desktop/laptop, while this effect is negative for users that use the website on a mobile device. This is in line with extant research that suggests that consumer behaviours and perceptions are different for users browsing on personal computers and mobile devices as mobile devices have increased search costs due to smaller screen sizes (Ghose et al., 2013). These differences are of importance, as consumers increasingly use mobile devices (smartphones and tablets) as primary devices for shopping in the online environment (De Haan, Kannan, Verhoef, & Wiesel, 2018; Lemon & Verhoef, 2016). Additionally, this study demonstrate that informativeness has a positive significant effect on purchase intention for mobile users. Findings show that design elements can influence informativeness positively on personal computers, while this effect is negative on mobile devices, which is of importance for managers and future research.

The use of a product video has a significant positive effect on the informativeness dimension of the online customer experience for both personal computers users and mobile device users. Both groups show a significant positive effect while the t-test shows an insignificant difference between the means of both groups, indicating that the beta coefficients do not significantly differ. The use of a product video significantly evokes entertainment, social presence and sensory appeal for mobile device users, while these effects are insignificant for personal computer users. Given the analysis of smaller sub groups, a decrease in power of the analysis remains a possible explanation of the insignificance for personal computer users. Even though

differences between coefficients were not always significant, these finding hint a differentiated effect between personal computer users and mobile users. Future research is needed to further investigate the differences between these groups.

To sum up, this research confirms that the online customer experience includes more than the informativeness and entertainment dimension typically conceptualised in extant research and that entertainment and sensory appeal can also be evoked (Novak et al., 2000). Informativeness appeared to have the strongest effect on purchase intention. This research also shows that not all findings for visitors using personal computers can be copied to the mobile environment and that device type influences the effect that design elements have on the customer experience.

The online customer experience

In an online experiment, this research explored whether the 4 conceptualised dimensions that together form the online customer experience (the cognitive dimension: informativeness, the affective dimension: entertainment, the social dimension: social presence and the sensory dimension: sensory appeal) mediate the relationship between design elements and purchase intention. This study moves beyond the two-dimensional (informativeness and entertainment) perspective and explores other dimensions (Novak et al., 2000). Although this study found that informativeness is the most important dimension that affects purchase intention, social presence and entertainment where also evoked by design elements and social presence also has a positive effect on purchase intention. This study contributes to online marketing and web design research by exploring the mechanism by which design elements influence purchase intention, contrary to mainly assessing the direct effects (Cooke et al., 2002; Shi & Zhang, 2014; Zhu & Zhank, 2010). Furthermore, this study shows that the device type can influence the extent or direction to which design elements evoke online experience dimensions, making it important for future research to consider differentiating between different device types when researching the online customer experience.

Managerial implications

This research gives more insights into the mechanism by which design elements influences purchase intention on different device types and shows that design elements should be adjusted according to the device type that is used when visiting a web page. Informativeness has the strongest positive effect on purchase intention for mobile devices users. This study shows that consumer reviews negatively affect the dimension of informativeness on mobile devices. Earlier research already stated that consumer behaviours and perceptions are different for visitors that use mobile devices or personal computers because of increased search cost due to smaller screen sizes (Ghose et al., 2013). A possible more-is-better approach could have negative influences on marketing relevant outcomes, especially on mobile devices. Organizations should not only focus on what design elements to use, but also assess what design elements not to use on their web

pages. When managers have to choose between personal computer orientated or mobile device orientated strategies, it is important to investigate visitors' primary device used when visiting a specific website. In general this study advices to use a mobile-first approach as consumers increasingly use a mobile device (smartphones and tablets) as primary device for shopping in the online environment (De Haan, Kannan, Verhoef, & Wiesel, 2018; Lemon & Verhoef, 2016).

The homepage of a website is an essential tool for managers that can effectively orchestrate design elements to evoke customer experiences that mimic sensory experiences from the offline world. This makes the results of this study interesting for retailers that sell goods via their own website, but results might also be applicable for retailers selling through online marketplaces as they can often also implement the design elements tested in this study. The conceptual framework of this study provides deeper insight into how and when design elements are likely to be successful. Results also show that not all design elements elicit dimensions in a positive way, but can even influence dimensions negatively. Specifically, consumer reviews show to have a positive influence on informativeness for personal computer users, while this design element has a negative influence on informativeness for mobile users.

Limitations and directions for further research

Although this study provided a framework which can be used to design effective online customer experiences and tested this framework on different device types, this study is not without limitations. This study focused on the mediating effect of online customer experience dimensions between design elements and purchase intention for one product. To increase the generalizability of this model, future research should assess this model for different products (such as search or experience orientated products) and brands within different industries in combination with different design elements. Additionally, the results demonstrate no effects of the use of an avatar on any of the online customer experience dimensions for personal computer users and mobile device users. Future research is needed to further investigate this design element to discover circumstances in which this design element proves to be effective in evoking purchase intention. Purchase intention is the final outcome presented in the framework of this study, although other marketing relevant outcomes such as customer satisfaction, customer loyalty or customer equity could extend the provided framework and deepen our understanding of how design elements influence these outcomes (Becker & Jaakkola, 2020; Verhoef et al., 2009).

This study focused on the homepage and design elements with the highest relevance in terms of the presentation of the product. Research could also analyse website elements more relevant to the structure of the website such as the footer and navigation of the website. Future research might examine the effects of the dimensions of online customer experience on pages other than the homepage, such as the checkout

page, the product page, landing pages, overview pages or other pages that were not considered in this research. The relative position of design elements could also be experimentally manipulated to examine the effect on the customer experience. The use of a product video has the strongest effect on the online customer experience dimensions, which is the design element that was located at the top of the web page. Prior research that used eye tracking technology to gain a better understanding of the users attention found that users devote more attention to the top of the page (Buscher, Cutrell, & Morris, 2009; Sutcliffe & Namoun, 2012). This study focused on the homepage of a website, although findings of this study might also improve understanding in different domains where design elements evoke customer experience, such as mobile applications, advertising material or handbooks.

Participants that found the mobile hit on MTurk, were only able to fulfil the HIT on a mobile device. This may have caused participants to switch from their personal computer to mobile device in order to be able to participate in the HIT. This could have influenced the results as these participants were not naturally on their mobile device. Grewal et al. (2018) stated that consumers often use their mobile devices while they are on the go and that the usage of mobile devices while multitasking leads to more distraction, decreasing cognitive resources. However, in this study participants possibly switched from their personal computer to a mobile device, indicating that they were not on the go. Hypothesised was that higher levels of distraction and limited available information on the screen, makes mobile users rely more heavily on the affective dimension of the online customer experience than on the cognitive dimension of the online customer experience. This study did not find significant effects, moderating the relationship between online customer experience dimensions and purchase intention. Future research is needed to conduct a field experiment to further explore these relationships.

This experiment provides insights into the relevance of the dimensions of online customer experience as a mediating mechanism between the influence design elements have on purchase intention and the effect that the device type has on these relations. More than 500 U.S. citizens were sampled for this study. Findings of this study may not be applicable to other populations by cause of variations in cultural climate. Furthermore, motives among MTurk participants differ: there are 'MTurkers' who participate in HITs because they find it entertaining, others are motivated by financial incentives (for additional income, or to earn their full income from participating in HITs). However, it should be emphasised that the vast majority of MTurkers cherish their approval rating. MTurkers consequently fulfil HITs with care and consideration (Hauser & Schwarz, 2015; Paolacci et al., 2010).

Lastly, the data collection for this experiment occurred during the COVID19 pandemic in 2021. The uncertainty associated with this global event, could have affected the results through changes in preferences.

To illustrate, participants who feared unemployment or got unemployed might prefer to spend less money than prior to the pandemic. However, no indications that this indeed influenced the results were found. This laboratory experiment provides interesting findings with strong internal validity. Future research could conduct a field experiment by varying these design elements and investigating the product sales to increase external validity of the framework provided in this study. As websites advance to match the wealth of brick and mortar stores and mobile devices become even more ubiquitous. Academic researchers should examine the benefit of design in creating effective online customer experiences adapted to the different device types.

Chapter 6: Conclusion

Creating a strong customer experience has become a leading management objective (Lemon & Verhoef, 2016). The success of a website depends on the ability to evoke successful customer experiences that are not merely informative. The central research question of this study was presented in the introduction: 'How does the online customer experience mediate the relationship between design elements and purchase intention and is this mediation moderated by the device type?'. This study conceptualised the customer experience as consisting of 4 dimensions that together form the online customer experience (the cognitive dimension: informativeness, the affective dimension: entertainment, the social dimension: social presence and the sensory dimension: sensory appeal) and shows through 8 experiments that design elements can evoke informativeness, entertainment, social presence and sensory appeal. Furthermore, this study found evidence that informativeness and social presence can positively influence purchase intention.

The results of this study reveal that the evoked online customer experience does not only depend on the used design element, it may also vary depending on the product and brand that are presented on the website. Furthermore this study demonstrates the relevance of the device type when examining the online customer experience, which so far has been limited to visitors using personal computers. These findings offer important contributions to both research and practice.

Acknowledgments

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Appendix 1: Conceptual model including all possible mediations and moderations

Appendix 2: Measures of constructs

Online Experience (consists of four dimensions)

Informativeness/the cognitive dimension (three items were derived from Luo (2002, 41 p.)).

6) Information obtained from the web page is useful.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

10) I learned a lot from using the web page.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

14) I think the information obtained from the web page is helpful.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

Entertainment/the affective dimension (three items were adapted from Hausman and Siekpe (2009. 12 p.)).

7) The web page is enjoyable.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

11) The web page is pleasing.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

15) The web page is entertaining.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

Social presence/the social dimension (three items were adapted from Gefen and Straub (2003, 24 p.)).

8) There is a sense of human contact in the web page.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

12) There is a sense of personalness in the web page.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

16) There is a sense of human sensitivity in the web page.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

Sensory Appeal/the sensory dimension (three items were adapted from Jiang and Benbasat (2007, 468 p.)).

9) The product demonstration on the web page is lively.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

13) I can acquire product information on this website from different sensory channels.

Completely disagree ⚪⚪⚪⚪⚪⚪ Completely agree

17) This web page contains product information exciting to senses.

Completely disagree ⚪⚪⚪⚪⚪⚪ Completely agree

Purchase intention (the 11 point Juster scale is used to measure purchase intentions (Juster, 1966)).

10 Certain, practically certain
9 Almost sure
8 Very probable
7 Probable
6 Good possibility
5 Fairly good possibility
4 Fair possibility
3 Some possibility
2 Slight possibility
1 Very slight possibility
0 No chance, almost no no chance

Search or experience products (Weathers et al., 2007).

20) I can adequately evaluate this product using only information provided by the web page about the product's attributes and features.

Completely disagree ⚪⚪⚪⚪⚪⚪ Completely agree

21) It is important for me to test this product to evaluate how it will perform.

Completely disagree ⚪⚪⚪⚪⚪⚪ Completely agree

Trustworthiness derived from (Schlosser et al., 2006).

22) I feel very confident about cvbuilder's online skills.

Completely disagree ⚪⚪⚪⚪⚪⚪ Completely agree

23) Cvbuilder appears to try hard to be fair in dealing with others.

Completely disagree ⚪⚪⚪⚪⚪⚪ Completely agree

24) Sound principles seem to guide cvbuilder's behavior.

Completely disagree ⚪⚪⚪⚪⚪⚪ Completely agree

Realism check variables

To examine the realism perceptions of the participants, a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) is used to indicate the agreement or disagreement with the following items:

18) The website I just explored was realistic.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

19) I would believe that the website I just explored could be an actual website in reality.

Completely disagree ⬤⬤⬤⬤⬤⬤ Completely agree

Appendix 3: Manipulated design elements, definitions, operationalizations.

|			Operationalizations	
Design Element	Synonym	Definition	1	2
Avatars	Chatbots (Ho et al., 2018), embodied conversational agents (Lee & Choi, 2017; Schuetzler et al., 2018), digital assistants (Chattaraman et al., 2019), virtual customer service agents (Verhagen et al., 2014) or online shopping assistants (Al-Natour et al., 2011)	A digital entity with anthropomorphic appearance, which is controlled by a human or software and gives it the ability to interact (Miao et al., 2021)	Web page contains an avatar	Web page does not contain an avatar.
Product video	Dynamic product presentation (Grewal et al., 2017), Multimedia presentations (Huang et al, 2009)	A video incorporating the product or service in use (Grewal et al., 2017).	Web page contains multiple product videos.	Web page does not contain a product video.
Consumer reviews	Online consumer reviews (Zhu & Zhang, 2010), customer reviews (Mayzlin, 2006), online user reviews (Chevalier & Mayzlin, 2006; Duan, Gu, & Whinston, 2008), Online product recommendations (Senecal & Nantel, 2004), online product reviews (Dellarocas et al., 2007)	User-generated product information posted on the product web site in form of a review (Zhu & Zhang, 2010).	Web page contains customer reviews.	Web page does not contain customer reviews.

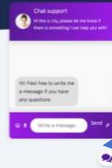## Appendix 4: Web page including all manipulated design elements (personal computers)
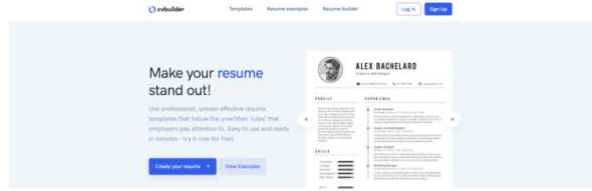
Product Video
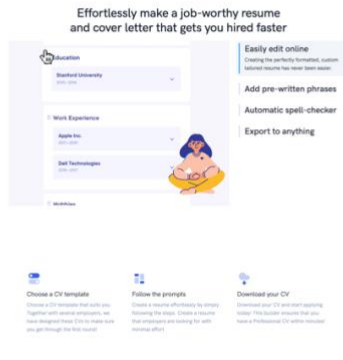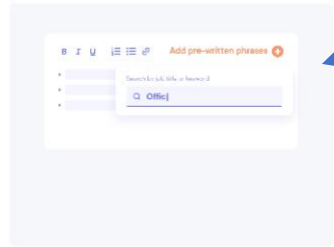
Customer Reviews
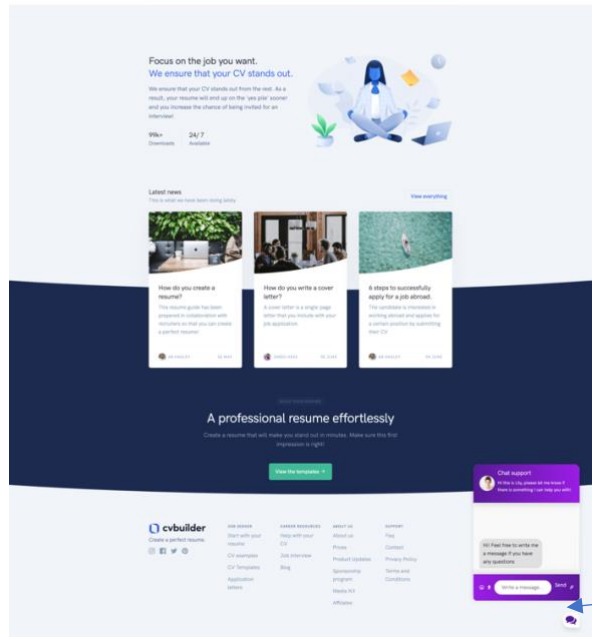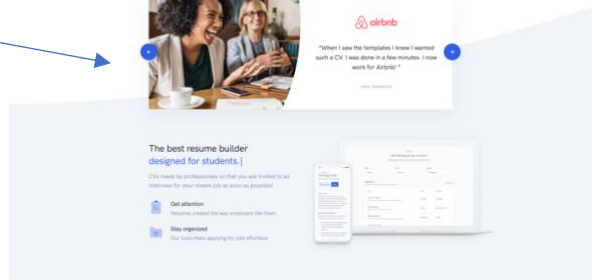
Avatar

This page shows all manipulated design elements as shown on personal computers.

Appendix 5: Web page including all manipulated design elements (mobile devices)

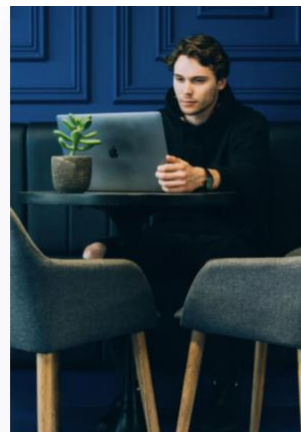**Effortlessly make a job-worthy resume and cover letter that gets you hired faster**

Product video

Add pre-written phrases

Beat writer's block with pre-written and tested phrases that successfully communicate your experience and skills.
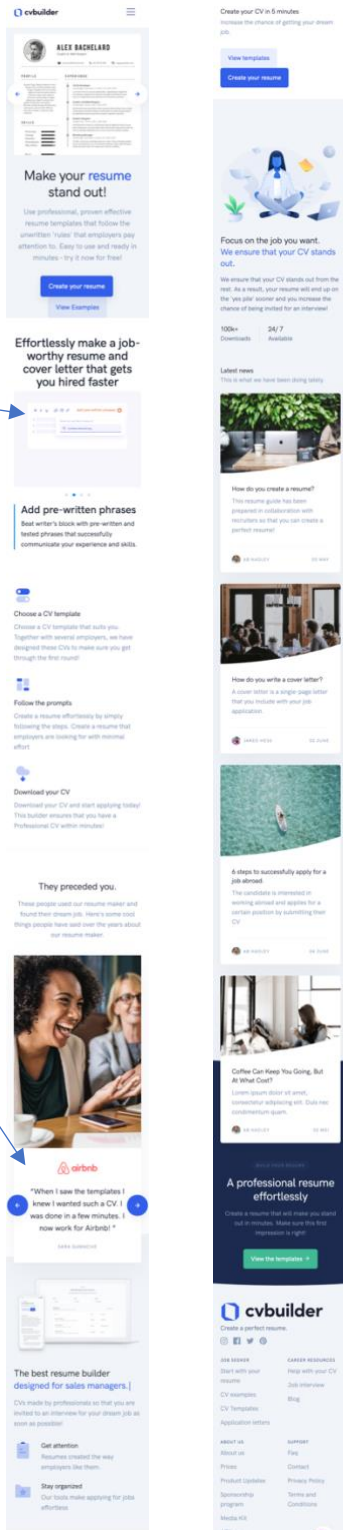
Avatar

Product Video

Customer Reviews

Consumer review

Instagram

"All designs look stylish. I recommend it to everyone. I had all my letters out the door within one hour. "
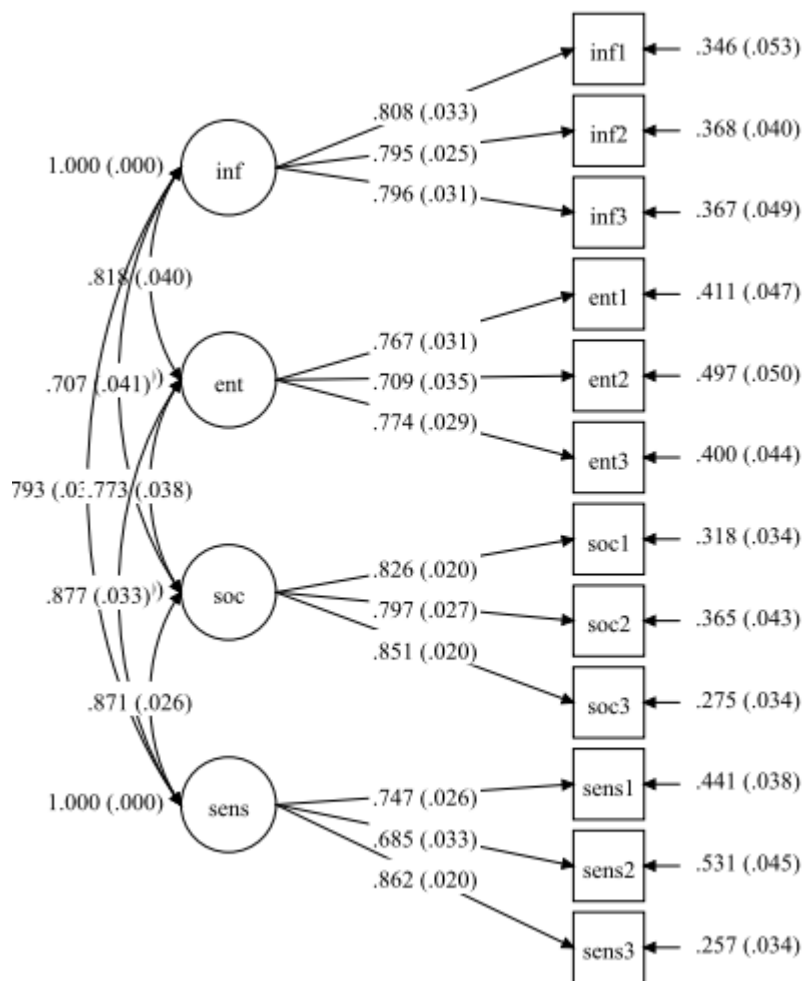
RUSS D'SA

1. Full layout screenshot   2. screenshots as seen on a mobile device

Appendix 6: Measurement model (CFA)