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Abstract: This report describes the research undertaken to apply the stimulus-organism-response paradigm to construct a model to customise e-commerce web-atmospherics to genders' internal states to improve their shopping outcomes. The study investigated how e-commerce web-atmospherics influence genders' internal states which then determine shopping outcomes. Secondary research was conducted to gather information on the subject, and to develop a proof-of-concept online store, as primary research, the online store was empirically tested. The secondary research found that low task-relevant cues, elements of web-atmospherics that are not directly related to shopping goals, colours, lines, shapes, and typography, indeed influence consumers' internal states, affective and cognitive states, and shopping outcomes. Furthermore, it was found that genders differ in overall online behaviour, e-commerce usage, preferences regarding website design, and information processing approach. Based on the influence of low task-relevant cues and gender differences, the store was designed and tested. Survey design was implemented to measure the web-atmospherics influence on genders' internal states and shopping outcomes. The results from 164 participants were analysed, and it was found that customised web-atmospherics of the proof-of-concept store did not have significantly different influence on genders' internal states nor shopping outcome. Furthermore, the test revealed that there was no significant difference in the internal states nor shopping outcomes between genders. However, the test was not sufficient to disprove findings from plethora of prior studies, and the concluding answer to the research problem was based on the secondary research. Web-atmospherics can influence, either positively or negatively, consumers' internal states and shopping outcomes, and can have a different influence on genders.

Customising E-Commerce Web-Atmospherics for Genders

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1 Introduction

This chapter introduces the subject covered within the report. The first section presents the background and motivation for the study, to understand the area of research and the relevance of the topic. Thereafter, the research problem is formulated, the accompanying research questions and the objectives they arise are presented, and the limitation of the study is described. Finally, the chapter provides a short summary of the overall report structure.

1.1 Background and Motivation

With spreading of the Internet, e-commerce industry is continually growing. Ecommerce Foundation (2016) reported: in 2015, 26% of people older than 15 years were e-shoppers, who on average per person spent $1,583 US dollars per year; online goods account for 7% in total global retail goods, and e-commerce share in global GDP is 3.11%. The growing industry also means more competition among online stores to satisfy their customers.

E-commerce has benefits for businesses and customers. Compared to physical location, online store can host larger number of visitors, host people from great distances, and be always open. Likewise, some benefits that customers have, are the convenience to shop from anywhere, have superior means of gathering and comparing information, and a wider range of products (Chang & Wang, 2011).

In 1973, Kotler suggested a term 'atmospherics', to address the designing of store environment, which is composed of atmospheric cues that are recognised by consumer's senses and influence their affective states (Kotler, 1973). While Kotler (1973) proposed that improved atmospheric cues can generate positive affective responses from consumer, his approach was adapted to a framework by Mehrabian and Russell (1974), which is known as the stimulus-organism-response (SOR) model.

The premise of the SOR model is that store's environmental stimuli (S) influences consumer's organismic internal states (O), which in turn will determine their behavioural response (R), i.e., shopping outcomes. Several studies have used the SOR model to investigate store environment and found that improving the atmospherics can lead to positive consumer behaviour (Baker, Levy, & Grewal, 1992; Donovan & Rossiter, 1982). The approach of analysing store environment has also been adapted for online-stores, moreover, by implementing the SOR model (Eroglu et al., 2001; Menon & Kahn, 2002; Mummalaneni, 2005; Richard, 2005; Ha & Lennon, 2010).

However, when refining the online store atmospherics, one universal design for a website does not address individual consumer, and it is found that the perception of atmospherics is a function of individual perception (Porteous 1996). Gender has been used for segmentation for significant proportion of products and services (Putrevu 2001), and it has been found that genders are different in a variety of aspects which are related to online shopping. Women and men have different overall online behaviour (Moss, 2006; Cyr, 2013; Lin, 2016), e-commerce usage (Pascual-Miguel et al., 2015), preferences regarding website design (Mahzari & Ahmadzadeh, 2013; Shaouf, 2016), and information searching and processing styles (Myers-Levy, 1989). Furthermore, in recent years studies have researched the moderating role of gender in the influence of web-atmospheric stimuli (Tsichla et al., 2016), however, there is a gap in literature regarding how to customise web-atmospherics to genders in an online store.

Therefore, this study investigates online store web-atmospherics using the SOR model, furthermore, how web-atmospherics as stimuli influences genders' internal states, and thereafter determine the response behaviour. Moreover, the gender differences in terms of the SOR model will be important bases to analyse ways to customise online store website for genders to positively improve their consumer behaviour.

The significance and applications of understanding how online store atmospherics can be improved by customising it to genders, are the insights that have a potential to be extended beyond online stores, to a spectrum of websites that are directed to both genders. Furthermore, research on customising the web-atmospherics to genders can be the bases for studying the web-atmospheric customisation for variety of consumer segments. Following section gives the specific problem formulation.

1.2 Problem Formulation

Findings presented in the preceding *1.1. Background and Motivation* section are the bases and motivation for formulating the problem for the current study. The findings suggest that web-atmospherics can have a positive influence on consumers' internal states, which then determine shopping outcomes. Furthermore, for investigating web-atmospherics, the SOR model has been proven to be beneficial framework. In addition, the findings opine that perception of atmospherics is an individual matter, hence customising the atmospherics can result in improved atmospherics perceived by different consumers. On the subject of consumer differences, gender has been excessively used for segmentation. Additionally, since genders are found to be different in terms of overall online behaviour, e-commerce usage, preferences

regarding website design, and information searching and processing styles, genders will be used as segments the web-atmospherics should be customised to. The appropriateness of prior direction is confirmed by the gap in literature regarding customising web-atmospherics to genders in an online store. Based on the background findings and motivation, the purpose of this study is to apply the SOR paradigm to construct a model to customise e-commerce web-atmospherics to genders' internal states to improve their shopping outcomes. Within this section, the research problem and the accompanying research questions are formulated, the objectives that the research questions arise are stated, and lastly, the delimitation of the research is explained. With this report, the following research problem along with research questions will be addressed.

Research problem:
- How e-commerce web-atmospherics influence genders' internal states which then determine shopping outcomes?

Research questions:
- What are the e-commerce web-atmospheric cues that influence genders' internal states?
- What are the differences in genders' internal states that determine shopping outcomes?
- What are the possible shopping outcomes determined by genders' internal states?

The research questions deconstruct and address variables from the research problem. First question inquiries about the independent variable, web-atmospherics, to describe it and how it relates to the dependent variable, genders' internal states. Second question is interested in describing the internal states and uses gender as the mediating variable to compare possible differences. Third question is describing the second dependent variable, shopping outcomes, and how it relates to the other variables. To answer the research problem and questions, several objectives must be achieved.

Objectives:
- Obtain knowledge about the SOR model, its components, application, and limitations.
- Gain insight to state-of-the-art findings about web-atmospherics, organism's internal states, response behaviour, and gender differences related to the prior three.
- Investigate different state-of-the-art e-commerce stores' structure and use of web-atmospheric cues.

- Test the influence of web-atmospherics on genders' internal states and shopping outcomes, by constructing a model that customises the independent variable to the mediating variable, and by designing a proof-of-concept (PoC) e-store.

Delimitation

Due to the natural time constraints and testing purposes, the research within this project has been delimited in following areas: type of e-commerce, type of store, and user devices for visiting online stores.

There are different types of e-commerce, the most prevalent ones being business-to-business (B2B), business-to-consumer (B2C), and consumer-to-consumer (C2C) (Statista.ee, n.d.). The research will be delimited to investigating B2C, since it has consumer in the receiving end, which likely has both genders more equally represented.

Additionally, since the spectrum of goods sold online is abundant, the interest will be on clothes e-stores, as this is most purchased category in e-commerce (source: postnord, 2016, p. 9). Furthermore, the PoC website will be created as a store for both genders, since there are also stores for only one gender. However, during the research on the state-of-the-art stores, gender specific online clothes stores will be also investigated to compare different use of web-atmospherics.

Customers visit and purchase from e-commerce sites from different devices, and these require respective design of web-atmospherics. Desktop and laptop are the most preferred device to visit online stores and have the highest purchase rate, compared to smartphone and tablets (Monetate, 2016), therefore, the research will be delimited to desktop and laptop devices.

1.3   Report Structure

Within the current report, chapters and sections are referred to in italic text, e.g., to refer to this section *1.3. Report Structure* is used.

The report structure is following. First, the *2. Methodology* chapter explains the overall research approach and the methods applied to investigate the research problem and fulfil the objectives introduced in the previous section (*1.2. Problem Formulation)*. Thereafter, the *3. Theory* chapter defines the elements of the SOR model, its use by other studies, its relation to alternative framework, and its limitations. Next, the *4. State of the Art* chapter presents the findings of other studies concerned with web-atmospherics and its influence from the perspective of the SOR model, gender differences related to the SOR model elements, and the common structure and contents of an online clothes store. Following, the *5. Analysis* chapter

uses the findings to investigate possible answers to the research questions, and as an outcome produces a research model and requirement specification to develop a system to test possible customisation of web-atmospherics that influences genders' internal states and response behaviour. Then, the *6. Design and Implementation* chapter describes how the requirements from the analysis are implemented. Succeeding, the *7. Test and Results* chapter provides an overview how the test procedure was carries out and presents the results obtained from the test. Next, the *8. Discussion* chapter describes and interprets the findings, relates the findings to the prior research, elaborates on the limitations of the current study, and suggests improvements and future directions for research concerned with the subject. Finally, the *9. Conclusion* chapter elaborates on the significance of the findings, and how well they answer the research problem.

2 Methodology

The methodology chapter introduces the overall research approach and research design used to investigate the problem, and thereafter, the procedure for developing the PoC website. Next a detailed explanation is provided how the research was conducted to develop the research model and the PoC website. Last section presents the methods used for collecting and analysing empirical data from the PoC website.

2.1 Research Overview

To investigate and test the influence of web-atmospherics to genders' internal states and response, the overall research approach taken was quantitative. And to acquire numeric descriptions of trends, survey design was appropriate to use (Creswell, 2014). However, a qualitative prototype test was carried out during the development of the PoC website. Implementing survey design as the main approach allowed to collect data from a large population sample.

To develop the research model and PoC website to test, information was gathered via secondary and primary research. The development of the PoC website followed 'Agile' development methods, where the process of requirement engineering, design, and development were interleaved (Sommerville, 2011). This allowed to gather state-of-the-art findings and use them for the design and implementation, while the latter provided tangible insights what to further research.

Next section provides a detailed overview of the methods used to collect the information to develop the PoC website.

2.2 Research Model and Proof-of-Concept Development

To obtain an understanding of the SOR framework, its applications and limitations, information was gathered via secondary research, which is described the in the *3. Theory* chapter. Additionally, to obtain insights to state-of-the-art findings about web-atmospherics, organism's internal states, response behaviour, and gender differences related to the prior three, secondary research was conducted by gathering information from papers, books, reports, and dictionaries.

In addition to secondary search, a paper prototype was developed based on the initial findings, with a purpose to experiment with the design and check the feasibility of design customisation (Sommerville, 2011), which was then evaluated via a qualitative interview. Futhermore, primary research was conducted to garther information and assess the design of

state-of-the-art popular clothes stores, this allowed to gain insights how the web-atmoshperics were used, moreover, used in one gender exclusive stores.

When the necessary information was collected, analysis was carried out by using the findings to suggest possible answers to the research questions. The *5. Analysis* chapter produced, as an outcome, a requirement specification of what the system should be able to do, to conduct a test and measure the PoC online store web-atmoshperics infulence on genders' internal states and shopping outcomes. Additionlly, the *5.5. Requirement Specification* includes the proposed searech model that addresses the ressearch problem. Succeeding section describes the methods used to collect data with the PoC website and the methods implemented to analyse the collected data.

2.3 Testing the Influence of Web-atmospherics

When the PoC website was developed, it was used to gather data about the customisation influence on genders' internal states and response behaviour. The population this study was interested in are the people who shop online. According to Creswell (2014), one of criteria investigators use to decide on sample size is the size used by part studies, studies concerned with web-atmospherics and using survey design (Lorenzo-Romero et al., 2016; Lin & Hsieh, 2016; Prashar et al., 2016; Faisal et al., 2016) have sample size between 200 – 550. Therefore, this study was aiming to the lower limit of that sample size. Ideally, the study should have used random sampling, but due to the access to the population and reach, convenience sampling was used by distributing survey via the Internet (Creswell, 2014). The current study is interested in web-atmospherics as the independent variable, internal states and response behaviour as the dependent variable, and gender as the mediating variable. The survey instrument to measure the genders' internal states and response behaviour was adapted from other authors, who has proven the validity of the instrument. The exact internal states and response behaviour constructs measured are chosen in the sub-section *5.5.3. Research Model Related Requirements*, the constructs and scale items with the sources are seen in *Appendix A*. All the items were measured with a 7-point Likert-type scale labelled: 1 - strongly disagree, 2 - disagree, 3 - somewhat disagree, 4 - neither agree nor disagree, 5 - somewhat agree, 6 - agree, 7 - strongly agree. This method of measurement scale has been commonly used by other studies (E.g. Faisal et al., 2016; Parshar et al., 2016; Eroglu et al., 2003; Flavián et al., 2004; Lorenzo-Romero et al., 2016). The measurement items reliability was analysed with Cronbach's Alpha (Cronbach, 1970). This allowed to test for the internal consistency of the items, i.e., the ability of items to measure a same phenomenon.

Before the main test, a pilot test was conducted to ensure that the test can be administered without variability to the test sample (Creswell, 2014). The pilot test was carried out by a conductor passively observing if a participant can complete the test without issues.

The data gathered via the survey was used to provide a descriptive analysis of data for dependent variables, which included means (Creswell, 2014). Additionally, two-sample t-test (Student, 1908) was used for inferential statistics, for comparing the means to conclude if there is any significant difference in influence of the default and customised web-atmospherics to genders' internal states and shopping outcomes, and if there is any significant difference in the web-atmospherics influence between the genders, in terms of the internal states and response behaviour.

3 Theory

The purpose of this chapter is to present the SOR paradigm, which will be the basis for understanding, analysing, and designing the relationships between web-atmospherics, genders' internal states, and shopping outcomes. The chapter will specify and define the key variables of interest, how the model has been used in prior research, compares the model to alternative model and argues why the SOR model was chosen, and finally introduces the limitations of the model.

3.1 Stimulus Organism Response

The SOR model is used because it is a theoretically justified way of investigating the effects of web-atmospheric cues as an environmental stimulus; the model allows a customisation of the web-atmospherics to affective and cognitive characteristics of genders; and the model allows to study the response behaviours to web-atmospherics, which are the results of affective and cognitive changes of an organism.

3.1.1 Original and the Extended SOR model

Mehrabian and Russell (1974) developed the SOR model in environmental psychology (Figure 1). The paradigm describes the atmospheric cues (S) that generate emotional state (O) of pleasure, arousal, and dominance which in turn influence consumers' approach-avoidance response (R). Pleasure is the degree to which a person feels good or happy, arousal is the degree to which a person feels excited, stimulated, alert or active (Mehrabian & Russell 1974), and dominance is the degree to which a person feels unrestricted or in control of a situation (Donovan & Rossiter, 1982). However, in later research, Donovan and Rossiter (1982) concluded that pleasure and arousal indeed effected approach or avoidance, but dominance did not, thus the latter was excluded from examining the effect of environmental cues on consumers' behavioural intentions (e.g., Eroglu et al., 2003; Ha & Lennon, 2010; Menon & Kahn, 2002). The approach behaviour is defined as the desire to shop or explore in the website or the likeability of the website (Ha, 2006), and the avoidance behaviour refers to the desire to leave and not return to the website or the likelihood to avoid the website (Yoon, 2012).
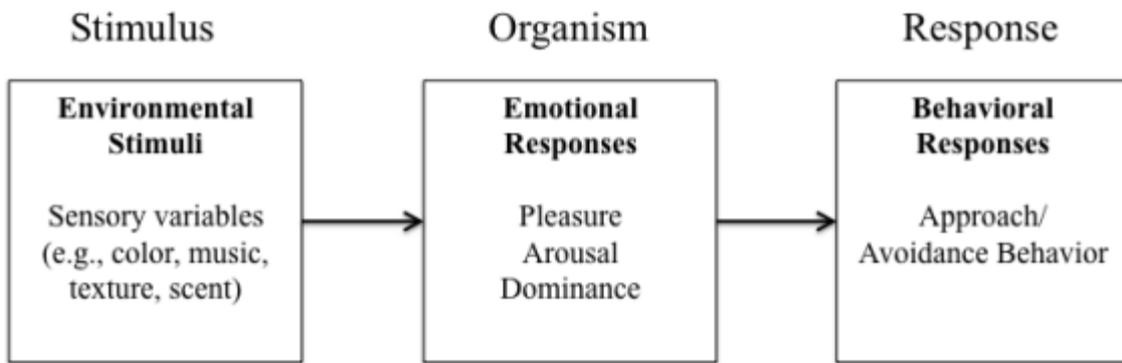
Figure 1. The SOR Model. From Mehrabian & Russel (1974).

An extended SOR model was created by Eroglu et al. (2001) (Figure 2), which will be used in current research for investigation and the basis for suggesting the research model to test the research problem. Eroglu et al. (2001) model is concerned with online environmental cues, the goal and benefit of the model is to classify stimulus in a useful way for better analysis. Eroglu et al. (2001) defined stimulus as high task-relevant and low task-relevant cues. High task-relevant cues are verbal or pictorial contents directly associated with the shopping goal, and the purpose of these cues is to assist online consumers to reach their shopping goals (Eroglu, 2001). While low task-relevant cues are peripheral contents, which are not directly related to the shopping goals (Eroglu, 2001), and have potential to evoke a pleasurable and entertaining experience (Tsichla et al., 2016).
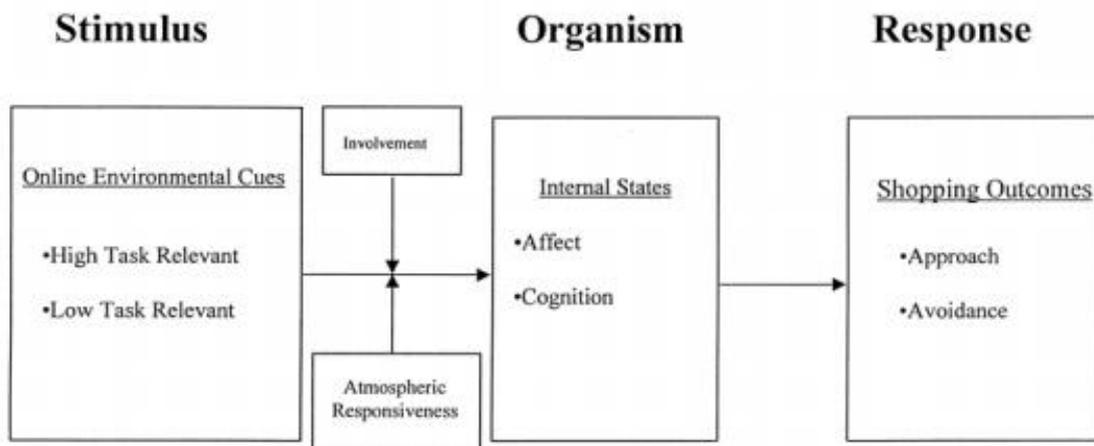
Figure 2. The Extended SOR model. From Eroglu et al. (2001).

The organism part of the model includes consumer's internal affective and cognitive states. The affective state refers to emotions that user feels toward stimuli, and the cognitive state is the thought processes and state of mind concerned with the acquisition, processing, retention, and retrieval of information (Eroglu et al., 2001). However, Eroglu et al. (2001)

admitted the importance of all the aspects of cognitive state, but narrowed the focus to attitudinal processes due to their documented impact on consumer responses (Ajzen & Fishbein, 1977). Furthermore, Eroglu et al. (2001) used two moderating variables, involvement and atmospheric responsiveness, that elaborate on the relationships between the perceived online environmental cues and the internal states. Involvement refers to the degree of how much a consumer feels that the online shopping activity is helping them to achieve goals. Atmospheric responsiveness is an environmental characteristic which influences consumer's decisions on where and how to shop and the outcomes of the shopping experience (Eroglu et al., 2001). This research will use the extended SOR model, as it is focusing on the online context, however, involvement and atmospheric responsiveness will be excluded from the following research, since this project attempts to test the effect of online environmental cues and it will be too difficult to measure these mediating variables.

3.1.2   Use of the SOR Model in Other Research

The SOR model has proven beneficial for investigating online shopping environments, and in addition to Eroglu et al. (2003) plethora or researchers have done so. The researchers using SOR model have typically operationalised environmental cues as independent variable, internal states as mediating variable, and shopping outcomes as dependent variable. Eroglu et al. (2003) found that perceived online environmental cues, high task-relevant and low task-relevant, had significant effects on consumers' affective states, pleasure and arousal, which in turn influenced response behaviours like satisfaction and approach or avoidance behaviours (Eroglu et al., 2003). Menon and Kahn (2002) used the model to investigate low task-relevant cues, and focused on how online consumers' affective states, created by environmental cues such as colours, lighting, and music, influenced their purchasing behaviours. The research concluded that consumers who are initially exposed to a pleasing website, tend to actively engage in unplanned purchasing, spend more time browsing the website, and seek for more stimulating products (Menon & Kahn, 2002). Hsu and Tsou (2011) research confirmed that website quality facilitated the formation of consumer's affective states either positively or negatively. Mummalaneni (2005) research revealed significant influence of affective states on the online consumer's satisfaction, and found that pleasure and arousal are fully mediating the relationship between website cues and satisfaction. Ha and Lennon (2010) found that pleasure and arousal, elicited by website cues, can in turn be positively or negatively associated with consumer satisfaction, intention to buy, and approach behaviour (Ha & Lennon, 2010). Prior examples confirm, the SOR model is appropriate way of investing the influence of online

environmental cues, however, majority of the studies have researched only the affective state of organism.

The model has also been implemented with different dependent variables. Floh and Madlberger (2013) used the SOR model to investigate how online store atmospheric cues, content, design, and navigation, influences approach behaviours like impulse-buying behaviour and expenditure. Floh and Madlberger (2013) results suggested the model's applicability in the context of impulse-buying behaviours and show that the design and navigation had significant positive affect on it. Mosteller (2014) used the SOR model to study the fluency of online shopping experience. Moreover, how the characteristics of text can enhance pleasure and enjoyment, and increase perceptual fluency, a construct describing the ease of which one is attending the information (Mosteller, 2014). Romero et al. (2016) used the model to study the differences between utilitarian stimulus (navigational structure) and hedonic stimulus (music and presentation of products), which can be related to high task and low task-related cues respectively. The research opined that positive online consumer's responses are likely to increase when they can freely navigate an online store which is enriched by animated gifs and background music (Romero et al., 2016), confirming that the model is beneficial also to study the cognitive state. The stimuli in the SOR model can also take a more complex form, Benlian (2016) used the SOR model to operationalise content and design personalisation as online stimuli. The research found that in isolation, content personalisation had significant effect on user's preference fit (cognitive system) and willingness to pay (response), and design personalisation had strong effect on perceived enjoyment (affective system), but while considered together the cue had negative effect on response (Benlian, 2016).

While implementing the SOR model, some authors have included gender as mediating variable (e.g., Prashar, 2017), and some have used the SOR model as in inspiration to propose their model to investigate the mediating effects gender in the online environment (e.g., Tsichla et al., 2016; Shaouf, 2016). However, the prior research incorporating gender, had contradicting findings, Prashar (2017) found that in India gender had no influence on response, while Tsichla et al. (2016) and Shaouf (2016) concluded that gender as mediating variable influences response behaviour. Preceding suggests the model is applicable for investigating the web-atmospherics influence on genders' internal states, but the use can be effected by the context.

3.1.3   The SOR Model Compared to Alternative Model and Its Limitations

To understand the potential of the SOR model and argue for choosing it, it must be related to broader context of theories and frameworks. Stimulus-Response model developed by Kotler (1973) is a popular model in marketing. The model considers stimulus as marketing stimuli and 'other' stimuli, while the marketing stimuli, i.e., the marketing mix, which includes product, price, place, and promotion, and 'other' stimuli which consists of economic, technological, political, and cultural stimuli. Where the SOR model has the organism part, Kotler's model has a 'black-box', which contains consumer characteristics and buying decision process, furthermore, Kotler's response contains purchase decision, i.e., attitudes and preferences of a consumer (Kotler, 2012). As the SOR stimuli is concerned with environmental stimuli, it could be considered as part of the Kotler's marketing stimuli, more specifically the 'place', since it is referring to the shopping environment. However, the middle and last part of the SOR model are not as elaborate as Kotler's and can be considered as resulting measurable constructs to what Kotler is describing. Compared to Kotler's model the SOR model gives more focused and isolated way of analysing online environment's influence.

Although, the SOR model has been proven beneficial to investigate the effects of online environments, it has limitations that must not be overlooked. The extended model by Eroglu et al. (2001) gives a method to classify environmental stimuli, while Kawaf and Tagg (2012) discussed how the classification is very generic and thus is a limitation, which likely is the reason why there is little consensus in the research how to further classify the cues. The different classifications are presented in the following *4. State of the Art* chapter. Although, the affective states of the model are easy to use, they have been criticised due to their narrow scope, which is not encompassing the spectrum of possible variations of emotional reactions (Richins, 1997; Machleit & Eroglu, 200). In addition, Kawaf and Tagg (2012), highlighted the importance of and suggested using more comprehensive models for measuring emotions. The model has also been criticised by the lack of considering context. Sautter et al. (2004) opined that the model is ambiguous as online shoppers are likely influenced by the physical environment that they are in, which is a factor that cannot be controlled by the online retailer, but must be taken into consideration (Sautter et al., 2004). Furthermore, Pelet and Papadopoulou (2012) agreed with the effect of context and argue that online shopping is different in various atmospheres, for instance, at the office in a bright atmosphere or in the bed in dark can have different impact on consumer's responses.

4   State of the Art

Current chapter gives an overview of information necessary for the analysis to answer the research questions. The research questions are interested in e-commerce web-atmospheric cues that influence genders' internal states, differences in genders' internal states that determine shopping outcomes, and possible shopping outcomes determined by genders' internal states.

The information presented is about web-atmospherics, low task-relevant cues as stimulus, pleasure, arousal, and perceptual fluency as organism's internal states, web-satisfaction and purchase intention as response behaviour, and gender differences related to these aspects of the SOR model. Furthermore, the structure and stages of e-commerce clothes store, and the contents (i.e., functionality and information) these stages include are presented. After the full overview of the findings, the *5.1. Focus and Use of Findings for Investigation* sub-section will reason why and how the information will be used for the investigation.

4.1   Web-atmospherics

This section defines web-atmospherics and gives a brief overview on how different authors have classified the contents of online store environment. Furthermore, the section presents the implications of changing web-atmospherics.

Dailey (2004) defined web-atmospherics as '*the conscious designing of web environments to create positive affect and/or cognitions in surfers to develop positive consumer responses*' (Dailey 2004, p.796). Presented in the previous theory chapter, Eroglu et al. (2001) classified the atmospheric cues to high and low task-relevant cues, categories which have been adopted by other researchers (e.g., Ha & Lennon, 2010; Richard, 2005). Richard (2005) categorised high task-relevant atmospheric cues to information content effectiveness (i.e., accurate and up to date information), navigability (i.e., easy to use and proper search engine), informativeness (i.e., informative and useful), and low task-relevant cues as entertainment (i.e., exciting, imaginative, and entertaining). Manganari et al. (2009) categorised online store environment to virtual layout and design, virtual atmospherics, virtual theatrics, and virtual social presence (Figure 3), in addition to having different classification, Manganeri et al. (2009) also added social dimension. Koo and Ju (2010) suggest three categories of atmospheric cues: visual, information, and navigation. Definitions by Garret (2003) describe Koo and Ju (2010) three categories of atmospheric cues respectively: elements of visual design deal with balance, emotional appeal, aesthetics, and uniformity of the website overall look, which encompasses colours, photographs, shapes, or font type; information design refers to elements of a site that

conveys accurate or inaccurate information to user; navigation design refers to navigational scheme, which is used to help or hinder user to the access different sections of a website. While Eroglu et al. (2001) and Richard (2005) defined atmospheric cues as attributes stimulating human senses, Managari et al. (2009) and Koo and Ju (2010) defined the cues as overall environmental attributes.
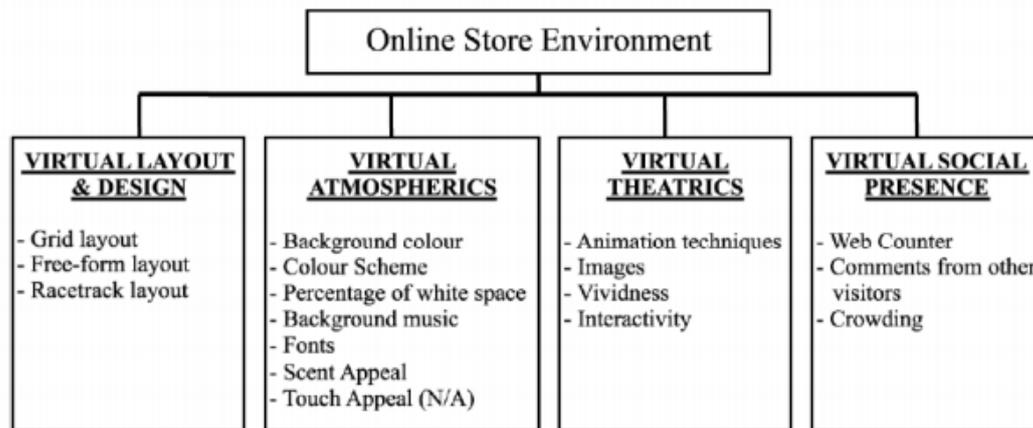
Figure 3. Manganari et al. (2009) classification of online store environment. From Manganari et al. (2009).

The research by Ainsworth (2017) was studying consumer's cognitive response to website change. Ainsworth (2017) terminology uses task-relevant functions and non-task-relevant functions, which are based on Eroglu et al. (2001) taxonomy, high task-relevant and low task-relevant cues respectively. The study found that changes to the task-relevant functions of a website have negative implications for consumers' sense of control, which in turn diminished perceptions of website performance, and diminished perceptions that the website delivers desirable utility and affective gains (Ainsworth, 2017). However, when the non-task-relevant dimensions were changed, the effect on consumers was positive. The curiosity elicited by changing the non-task-relevant elements provided users with affective stimulation (Ainsworth, 2017).

Next section presents what other research have found with regards to low task-relevant cues as stimulus.

4.2 Stimulus – Low Task-Relevant Cues

Low task-relevant cues encompass a spectrum of elements. Eroglu et al. (2001) examples of low task-relevant cues are verbal contents that are unrelated to shopping goals, colours, borders and background patterns, typestyles and fonts, animation, music and sounds, entertainment (e.g., games or contests), amount of white-space, icons, pictures other than the

products, indicators of secure connections, web counter, website awards, and affiliations (Eroglu et al., 2001). These low task-relevant are further categorised to atmosphere, environment, social, and non-task related verbal cues (Table 1).

Table 1. Categories of low task-relevant cues by Eroglu, Machleit, and Davis (2001).

Category	Low task-relevant cues
Atmosphere	Colour, background patterns, typestyles, and fonts
Environment	Animations, icons
Social aspect	Web counter
Non-task related verbal cues	Advertising

Simplicity has been identified as central design factor influencing perceived visual aesthetics (Choi & Lee, 2012). Simplicity includes aspects that facilitate perception and information processing, such as clarity, homogeneity, and orderliness (Moshagen & Thielsch, 2010). Visual complexity of a website refers to the degree to which a website includes visual diversity and visual richness (Lin et al., 2016). Visual diversity reflects aspects like dynamics, variety, creativity, and novelty (Moshagen & Thielsch, 2013), and visual richness is measured in the amount of text, graphics, and links (Deng & Poole, 2011). Websites with high visual complexity can reduce the ease of browsing (Lin et al., 2016), and receive lower aesthetic rating (Bauerly & Liu, 2008; Tuch et al., 2012).

Colours as tools are used in web design to create depth, structure information, and differentiate items (White, 2011). Colours also influence individuals' feelings, attention, judgments and decisions such as shopping intentions or perceived usability (Babin & Hardesty, 2003). Line as a design element refers to the connection between two points (Hostetler, 2011), and as a basic building block for web atmosphere has different influences on user, e.g., diagonal line can convey emotion and tension (Bradley, 2011). Shape or form is several lines connected (Hostetler, 2011), which is characterised through symmetry, proportion, size and angularity (Schmitt & Simonson, 2002). Similarly, to line, shapes have different effects on users based on its characteristics, e.g., round and oval shapes can convey femininity and joy (Schmitt and Simonson, 2002). Typography in web design has been observed as one of the strong determinants of user satisfaction, along with interactivity and colour (Faisal et al., 2016). Typography is related to appearance, attractiveness, and readability of text on the website to draw user attention (Faisal et al., 2016). Following section will give an overview of how these cues, as stimulus from the SOR model, can influence genders' internal states.

4.2.1   Colour - Hue, Brightness, and Contrast

Colours play a significant role in determining visitor interaction with a website (Bonnardel, 2010). As a stimulus influencing cognitive state, colour effects website navigation, memorisation, and retrieval of information (Bonnardel, 2010). Furthermore, colours help to understand the functions of buttons, icons, and boxes (Faisal, 2016). Chromatic colours are more likely to enhance memorisation of the displayed information, while monochrome scheme causes eyestrain and overall tiredness (Pelet, 2010). Nielsen (2001) noted that the number of colours on a website should be limited to avoid detracting visitor from the main message.

Colours also appeal to user's emotions and feelings (Faisal, 2016), affective states which in turn can mediate information memorisation and buying intention (Pelet, 2010). Different hues of colour, e.g., blue or red, have be observed to have different effects on affective states and responses. Additionally, in the context of website, blue hues were most preferred, whereas yellow and yellow-green hues were the least (e.g., Fortmann-Roe, 2011; Palmer, Schloss, & Sammartino, 2013). In addition to preference, different hues have different influence on the internal affective state of arousal. Blue elicits relaxed feeling states (Valdez & Mehrabian, 1994), while yellow has been found elicit less relaxed feeling states (Ballast, 2002), and overall cooler colours have been found more favourable then warmer colours (Cyr et al., 2010).

Brightness, as an attribute of colour, is contributing to the appeal of a website, which is related to the affective states. Lindgaard et al. (2011) results showed that websites with a high brightness in the background were rated as most appealing. Palmer and Schloss (2010) study found that the elements with higher brightness are preferred, and Papachristos et al. (2006) concluded that website's attractiveness is determined by the brightness of the dominant colour.

Contrast between objects and contrast with the background effect the affective and cognitive states. Colour preference increases as hue contrast against background increases, and strong contrast between figure colour and background colour is more preferred (Lin et al., 2016). Furthermore, colour contrast increases the perception of existence for objects (Lin et al., 2016). However, the website's attractiveness is determined by the brightness of dominant colour, then the hue, then the number of colours, and lastly the contrasts between the hues are least important (Seckler, 2015). Furthermore, Lin et al. (2016) stated that the colour contrast between figure and background will positively influence pleasantness, but not arousal.

Individual colours have different connotations and can influence individual's internal states differently, however, there is a high degree of subjectivism depending on the cultural context, and colour can have different, even opposite, meanings (Jacobs et al., 1991; Madden,

et al. 2000; Aslam, 2006). Table 2 presents the meanings and implications of using colour white, black, grey, red, blue, green, pink, mauve, turquoise, orange, and yellow.

Table 2. Colours and associated meanings.

Colour	Meaning and implications
White	Admiration, purity, simplicity, cleanliness, innovations, and modern spirit (Sullivan, 2008), peace, humiliation, refinement, happiness, precision, innocence, sadness, birth, winter, snow, kindness, sterility, death and wedding (Nicholson, 2002; Fraser & Banks, 2004; Clarke & Costall, 2007). Empty, isolated, boring, and sad. (Cerrato, 2012). White isn't stimulating to the senses, it opens the way for the creation of anything the mind can conceive. Physiologically calming, it creates simplicity, organisation and efficiency. White is probably the best colour to use as the background colour for websites. It allows all other colours to reflect from it and makes all colours except yellow and pastels to be very readable (Cerrato, 2012).
Black	Power (Sullivan, 2008), sensuality, formality, wealth, mystery, fear, malice, anonymity, sadness, anger, remorse, melancholy, death and mourning, and it is common for casual clothes. (Paul, 2002; Nicholson, 2002; Fraser & Banks, 2004). Black is used for selling and marketing products and services to the high-end youth market, and it is cutting edge and trendy (Cerrato, 2012).
Grey	Confusion, intelligence, futurism, modesty, boredom, indifference, sadness, safety, conservatism, practical spirit, dependence, elegance and decay. It can be also evaluated as sophisticated when speaking about silver grey. (Paul, 2002; Akcay, 2011). Grey serves as a good background for other colours as it doesn't attract attention, allowing the other colours to take prominence (Cerrato, 2012). Grey suggests security, reliability, modesty, maturity and dullness, and is a safe colour to use in many business applications. It is neutral and serious, and can be combined with almost any other colour to impart different messages and to reach different target markets (Cerrato, 2012).
Red	Power, energy, warmth, Christmas, love, enthusiasm, intensity, daring, sensuality, aggression, passion, danger, desire, power, violence, braveness, anger. It is specific for powerful and hyperactive women. (Paul, 2002; Sullivan, 2008). Red can grab attention and be associated with danger (Parmar, 2004). Red is a very emotionally intense colour. Brings text and images to the foreground. Useful for accent colour to stimulate people to make quick decisions, it is a perfect colour for 'Buy Now' or 'Click Here' buttons on Internet banners and websites. (Cerrato, 2012).
Blue	Trust, reliability, coolness, and is preferred by lonely people. Peace, quiet, calm, stability, harmony, unity, truth, conservatism, masculinity, authority, safety, cleanliness, order, loyalty, technology, depression, sky, water. (Jacobs et al., 1991; Paul, 2002; Fraser & Banks, 2004; Sullivan, 2008). Websites promoting technology, medical equipment, cleanliness, male products, or both male and female products should use some blue in their colours (Cerrato, 2012).

Green	Nature, health, luck, force, safety, autumn, sourness, generosity, fertility, Christmas, jealousy, lack of experience, envy (Parmar, 2004), money (Sullivan, 2008). It is common for bio products. (Parmar, 2004; Sullivan, 2008). A green ambiance has a calming effect (Moser, 2003).
Pink	It is specific for girls, so it is used for cosmetics and products for body (Sullivan, 2008). Pink reflects softness, love and compassion, warmth, innocence, sweetness and intuitive energy, and works for products and websites promoting women's products and services. However, it is also overly emotional and needy, immature, and lack of power (Cerrato, 2012).
Mauve	Royalty, spirituality, nobility, superiority, art, creativity, passion, complexity, intrigue, wealth, mystery, solemnity, transformation, wisdom, illumination, cruelty, arrogance, mourning. (Paul, 2002; Nicholson, 2002; Fraser & Banks, 2004; Sullivan, 2008).
Turquoise	Aids self-expression, clarity of thought and logical thinking. Combined with pale pink, lavender or pale lemon, turquoise has a feminine energy, it is ideal for the fashion or beauty market, gift or homeware stores. (Cerrato, 2012).
Orange	Energy, balance, warmth, vibration, adventure, and characteristic for cheap products. It is lightening, and grabs attention. (Speichert, 2005; Sullivan, 2008). It is frequently related to fast-foods (Parmar, 2004). It should not be used for website, nor in expressing luxury and elegance (Paul, 2002).
Yellow	Warmth, joy, happiness, optimism, idealism, hope, jealousy, bad faith, betrayal, cowardice, prosperity, spirituality, success, cautiousness, royalty, and associated with lower price (Paul, 2002; Fraser & Banks, 2004; Kaya & Epps, 2004; Clarke & Costall, 2007; Sullivan, 2008). It is the best colour in grabbing attention to expose products (Sullivan, 2008).

4.2.2 Line and Shape

Lines are defined by their characteristics of orientation, weight (thickness), angularity, which in turn determine the meanings they convey (Bradley, 2011). Line as a basic design element is used for variety of purposes for all websites. Line, as a connection between two points, it can be used to direct the eye through design, lead to focal points, and emphasise what lies at the endpoints (Bradley, 2011). Additionally, lines can be used for structuring, apply to define space is some way, connect elements or provide barrier, and separate elements or areas (Bradley, 2011).

The way several lines are united together creates a shape and defines the shape's characteristics, symmetry, proportion, size, and angularity (Schmitt & Simonson, 2002). Shapes are powerful means to communicate and can be divided to three categories (Bradley, 2011). Geometric shapes are made up of regular patterns and are easily recognisable; natural or organic shapes are irregular, have more curves and are uneven, they present shapes found in

real world; abstract shapes are recognisable by form but are not real, they are stylised or simplified versions of organic shapes (Bradley, 2011).

Shapes can organise information by connection and separation, lead the eye from one design element to next, and create movement and depth (Bradley, 2011). Furthermore, shapes can be used to emphasise areas of interest, and convey mood and emotion (Bradley, 2011).

Different types of lines and shapes have different meanings associated with them, and these meaning influence the viewer. Table 3 and 4 presents the types of lines and shapes and the connotations and implications associated with them.

Table 3. Types of lines and associated meanings.

Type of line	Meanings and implications
Curved lines	Kindness, tenderness, maternal warmth (Schmitt & Simonson, 2002), gentleness, unpredictable and change; describe a fluid movement, can by dynamic and static (Bradley, 2011).
Zig-Zag lines	The combination between vertical and diagonal lines. They transmit emotion, intense movement, dynamicity and energy (Bradley, 2011).
Horizontal lines	Relief, quiet and rest (Schmitt & Simonson, 2002), calm, stability, safety, quiet, rest, comfort, sleep, the lack of a conflict (Bradley, 2011).
Diagonal lines	Movement, activity and effort (Schmitt & Simonson, 2002), unbalanced, tension, emotion, solidity and strength when they unite the vertical lines with the horizontal ones (Bradley, 2011).
Vertical lines	Balance, formality and vigilance, strength, rigidity and height (Bradley, 2011).
Thin lines	Simplicity, strength (Schmitt & Simonson, 2002), fragility, elegance and delicacies (Bradley, 2011).
Thick lines	Resistance, unbreakable and imposing (Bradley, 2011).

Table 4. Types of shapes and associated meanings.

Type of shape	Meanings and implications
Angular	Dynamism, masculinity, virility, aggressiveness, bounded spirit (Schmitt & Simonson, 2002), conflict and aggressiveness (Zhang et al., 2006). Associated with sparkle water (Chandrashekar et al., 2009), energy and power (Berlyne, 1976).
Round and oval	Femininity, harmony, sensibility, continuity, joy, open spirit (Schmitt & Simonson, 1997; 2002), friendliness and accessibility (Berlyne, 1976), and gentleness (Zhang et al., 2006). Associated with still water (Chandrashekar et al., 2009). Round shapes are preferred by the individuals in comparison with angular ones (Bar and Neta, 2006).
Circle	Unity, plenitude, perfection and harmony (Schmitt & Simonson, 2002).
Triangle	Rigor, vivacity and aspiration (Schmitt & Simonson, 2002).

Square and rectangle	Solitude and power (Schmitt & Simonson, 2002), stable, right angles represent order, math, rationality, formality, and grabbing attention (Bradley, 2011).

4.2.3   Typography

According to Faisal et al. (2016), typography is related to appearance, attractiveness, and readability of text on a website to draw user attention. Appearance refers to the way something looks (Appearance, n.d.), attractiveness is defined as the quality of being pleasing or appealing to the senses (Attractiveness, n.d.), and readability refers to the quality of being legible or decipherable (Readability, n.d.). The terms font and typeface are used interchangeably to refer to the same thing, the design of characters unified by consistent visual properties (Carter, Day, & Meggs, 1993).

The typographic elements themselves, text colour, typeface, size, and spacing, are important factors that facilitate effective communication and reading (Hasan & Abuelrub, 2011). According to Cui (1998), the legibility of font is determined by its contrast, proportion, and simplicity. The font may be categorised as serif, sans serif, or script. Serif fonts include a finishing stroke at the end of letter or symbol, while sans serif does not, and script fonts are based on the fluid strokes of handwriting. In web design, highly stylised or script fonts are used sparingly (e.g., for headings and titles) to ensure readability (Cui, 1998). To further ensure readability, White (2011) suggested to adequately space the text, not to overwhelm the user. In addition, for better readability text should be in contrasting colour to the background, and large enough (Nielsen, 2008). The font colour itself also plays a prominent role by enhancing the readability and drawing attention to important information (Kuzu & Ceylan, 2010). Myung (2003) empirically observed users' preferences for typography and found that the line spacing was considered important by 56%, style by 35%, and size by 12% of the users. Nielsen (2008) suggested that the line spacing of 1.5 facilitates better reading, speed, and comprehension.

Subsequent section presents the overview with regards to organism's internal affective and cognitive states that determine shopping outcomes.

4.3   Organism

Based on the SOR model, organism represents the cognitive and emotional responses a person has for the environmental stimuli. Large amount of literature has studied affective states, pleasure and arousal, and found these to be primary antecedents to approach behaviour (Lin et al., 2016), whereas limited research has explored cognitive responses (Liu, Li, & Hu, 2013). Mosteller (2014) studied cognitive state from the perspective of perceptual fluency construct,

which the research found to be critical in shaping cognitive processes and reducing cognitive effort. Next two sections present the importance of these affective and cognitive states as part of the SOR model.

4.3.1   Affective States – Pleasure and Arousal

Floh and Madlberger (2013) suggested that the emotional responses are generated by the shopping environment. While these affective states are generated by the environment, they are the primary antecedents of approach behaviours (Lin et al., 2016). Different authors have established the influence of website atmospherics on consumer's emotional responses. Davis, Want, and Lindridge (2008) and Eroglu et al. (2003) have noted that low task-relevant cues have strong influence on emotions (i.e., arousal and pleasure) and furthermore state that their impact is automatic and subconscious.

As the internal affective states are influenced by web-atmospherics, Mummalaneni (2005) reported that consumers' affective states have significant effect on their online satisfaction, which is confirmed by Prashar et al (2017) stating that web-atmospherics and website satisfaction is totally mediated by pleasure and arousal.

In terms of simplicity and complexity of the visual design of the atmospherics, Lin et al. (2016) found that moderately visual complex design could elicit the most positive emotional responses, both pleasure and arousal. Visually easy to perceive verbally depicted information elicits positive affect which in turn is associated with the visual processing experience (Mosteller, 2014). Following section defines the cognitive state and presents the implications related to it.

4.3.2   Cognitive State – Perceptual Fluency

As Eroglu et al. (2001) described cognitive states with regards to thought processes and state of mind related to the acquisition, processing, retention, and retrieval of information, whereas, Mosteller (2014) studied the cognition as a construct called perceptual fluency. Perceptual fluency construct refers to the perceived ease with which one attends to the information presented based on the aesthetic properties of the stimulus (Reber, Schwarz, &Winkielman, 2004). Aesthetics has different definitions, Seckler (2015) used the term 'classical aesthetics' which is described by adjectives like clear, organised, and pleasant. Furthermore, the introduced concept of simplicity, is one of the central design factors influencing aesthetics (Choi & Lee, 2012).

Perceptual fluency and positive affect are crucial in shaping cognitive processes, and both attenuate consumers' perceptions of effort and time needed to complete a shopping task

(Mosteller, 2014). Furthermore, Mosteller (2014) study found that perceptual fluency not only influences cognitive effort, but also positive affect experienced during shopping experience.

Following section defines the possible relevant shopping outcomes determined by the internal states, and introduces the implications regarding how these responses are taking place.

4.4 Response

When a person is visiting a website, Lindgaard et al (2006) found that the impressions about the site are formed in the first fifty milliseconds and these impressions influence the thought about rest of the website. Furthermore, when responding to websites, Gofman (2007a, 2008) implied that it is mostly the main features and the general appearance of a page that makes a difference to the visitor, not the actual page content. While the visitor is influenced within the first half second by the overall appearance, Ha and Lennon (2010) opined that pleasure and arousal, stimulated by the website atmospherics, are positively linked with shopper's satisfaction, buying intention, and approach behaviour.

Both, satisfaction and purchase behaviour are direct and/or indirect indicators of actual purchase behaviour (Shankar, Smith, & Rangaswamy, 2003). Next two sections define satisfaction and purchase intention as response approach behaviours to website. Furthermore, how these two responses are related to web-atmospherics, internal states, and each other.

4.4.1 Satisfaction

There are different definitions to satisfaction for the online context (i.e., e-satisfaction), and studies have positioned satisfaction as both, part of the organism's internal cognitive state (Prashar et al, 2017; Faisal et al., 2016) and response behaviour (Liu et al., 2016).

Satisfaction is a global evaluation or attitude as a result of relationships between store and consumer (Flavián et al., 2004). With this definition Lorenzo-Romero (2016) considered satisfaction as an internal cognitive state which contributes to the approach behaviour and real shopping outcomes. According to Evanschitzkya et al. (2000), e-satisfaction is users' positive perceptions of a website design. An aesthetical website is one that allows a user to achieve goals with satisfaction, along with effectiveness and efficiency (Chowdhury et al., 2014).

The low task-relevant atmospheric cues, like colours and typography have been observed to be strong determinants of user satisfaction (Faisal et al., 2016). Moreover, Faisal et al. (2016) emphasised the satisfying influence of proper use of typographic elements like spacing, font colour, typeface, and size. As satisfaction is determined by the atmospherics, and internal affective and cognitive states, satisfaction with a website also leads to purchase

intention (Prashar et al., 2016). Subsequent section defines what is purchase intention, and what influences it.

4.4.2 Purchase Intention

Purchase intention is an outcome of consumers assessment of site's quality, information processing, and product evaluation (Hausman & Siekpe, 2009), which has been interpreted as a function of the strength of a shopper's effort to perform a specific purchase behaviour through a website (Lin & Ding, 2005). While purchase intention is determined by the site, it is an important predictor of actual buying behaviour (Hausman & Siekpe, 2009). Furthermore, intention as a response resulting from a website has also been found to be related to consumer's overall satisfaction with online service (Shankar, Smith, & Rangaswamy, 2003).

Whereas the response is determined by the organism's internal states, studies have found that visual appeal has the potential to influence consumer's purchase intention directly, even without influencing consumer's cognitive judgement (Sundar & Noseworthy, 2014). Thus, several authors have adopted 'direct effect model' to study how online stimuli directly effects consumer's responses (Shaouf, 2016). However, Prashar et al. (2017) stated that web-satisfaction fully mediates the association between atmospheric cues and purchase intention, and insisted that the atmospheric cues also have indirect effect on purchase intention (Prashar et al, 2017).

4.5 Gender Differences Related to the SOR Model

With regards to the SOR model, studies have found women and men to have differences in all three aspects, following sections covers findings concerning gender differences related to low task-relevant cues, differences in genders' internal states, and how genders respond to web-atmospherics.

4.5.1 Gender Differences Related to Low Task-Relevant Cues

Studies have found genders to have different preferences regarding website design, moreover, different preferences regarding low task-relevant cues. Several studies have revealed that preferences differ towards colours, shapes, lines (Mahzari & Ahmadzadeh, 2013; Moss, Gunn, & Heller, 2006), and font styles (Lieven et al., 2015). Furthermore, Cyr (2014) found that women prefer less graphics, clutter, and interactivity compared to men.

Women prefer more rounded shapes, more colours, and horizontal layout (Moss et al., 2006), while men prefer regular and formal layout with straight lines and forms (Mahzari & Ahmadzadeh, 2013). With regards to regularity, Tuch et al. (2010) found that only men respond positively to symmetry of website design and negatively to asymmetry, whereas women's

opinion was not influenced. It has been opined that the use of script fonts and pink hues make a logo perceived more feminine, while display fonts and blue hues make it perceived masculine (Lieven et al., 2015). Additionally, Moss et al. (2006) stated that men indeed prefer formal typography, and black or blue colour schemes, whereas, women prefer informal typography, and pink, mauve, and yellow colour schemes.

The differences in women's and men's internal states will be presented in the next section.

4.5.2   Gender Differences in Organism's Internal States

Genders' cognitive and affective online shopping attitudes differ in the overall degree, it is found that men have higher attitudes then those of women, which suggest that online shopping is not as attractive to women as it is to men (Hasan, 2010). Furthermore, Ong and Lai (2006) and Huang et al. (2013) have found that women have much higher level of anxiety about using the Internet, then men do.

As the overall affective state is different in genders, Tsichla et al. (2016) found gender differences in cognitive evaluations, and referred to differences in information processing style. The selectivity model by Myers-Levy (1989) asserts that women are comprehensive processors while men are selective processors, and the model has been used to investigate genders' cognitive states. As comprehensive processors, women tend to process all available information before making a conclusion, while men as selective processors rely on specific and readily available cues (Myers-Levy, 1989). In relation to the selectivity model, Tsichla et al. (2016) suggested that women's processing approach motivate them to engage more in exploratory behaviour, and spend more time gathering information and comparing products. Additionally, Lai et al. (2014) opined that the superfluous information women gather is likely to exceed their capability of short-term memory, furthermore, the information that is not related to their goal will distract them and reduce the navigation efficiency (Lin, 2016).

Men as selective processors have been found to benefit more from website enriched with low task-relevant cues, and the absence would impact men's attitudes more than those of women's (Tsichla et al., 2016). Furthermore, Tsichla et al. (2016) suggested that websites for women should also incorporate low task-relevant cues with high task-relevant cues, but focus the emphasis on the richness and quality of the information displayed to appeal women's comprehensive processing approach.

Following section present the findings with regards to gender difference in responding to web-atmospherics.

4.5.3 Gender Differences in Responding to Web-Atmospherics

As the internal states of genders differ, women have also lower web-satisfaction (Cyr & Bonanni, 2005). Cyr and Bonanni (2005) suggested the lower web-satisfaction is the result of more negative evaluation of the presentation of product information and site organisation. Lin (2016) elaborated on the lower satisfaction in women, and suggested the reason is web interfaces that are not designed to suit women, which produces frustration and anxiety during navigation.

Different aspects of website influences genders' purchase intention differently, performance expectancy and hedonic motivations influence men's purchase intention more, while effort expectancy, social influence, and facilitating conditions influence women's behavioural intention more (Venkatesh et al., 2012). While, Shaouf (2016) studied the gender difference, the research found that web advertising visual cues have direct effect on men's purchase intention, but not on women's. However, in the context of Indian online shopping environment, Prashar et al. (2017) noted that gender and income do not influence web-satisfaction. Furthermore, Pascual-Miguel et al. (2015) proposed that gender differences in the factors affecting e-commerce acceptance and use are disappearing, because the gender difference in e-commerce adoption and online shopping is narrowing.

4.6 Stages in Online Clothes Store

Online clothes store includes progressive stages the user will pass through (McDowell, 2016). Homepage is the first stage, which identifies the site, gives content information, and provides links to other pages (Singh, Dalal, & Spears, 2005). Catalogue page is the second page and it provides product information and offers browsing among options (Sismeiro & Bucklin, 2004). Further, Lal (2013) identified several purposes for catalogue page: it is a visual list of products meant to help the consumer find a product to buy; it is the first stage where a user decides to buy a product after browsing, sorting, and filtering through multiple items (Lal, 2013). Product page is presenting product information and its purpose is to help the shoppers with purchase decision. The page should be a single page with all the required information, images, specifications, size, colour, discounts, shipping cost, and related media about the product (Lal, 2013). Shopping cart (in clothing stores often referred to as shopping bag) summarises the customer's order and allows the user to return to browsing or move on to complete the purchase (McDowell, 2016). Checkout is the final step in e-commerce, and this is where the transaction occurs. In this stage, the consumer pays for the items in the shopping cart using online payment method. (Lal, 2013)

Succeeding section gives an overview of common contents of popular clothes e-commerce sites.

4.7 Contents and Cues in Online Clothes Store Stages

The assessment and resulting overview of popular clothes store contents was conducted as part of the current project. Popular clothes e-stores were researched in terms of the common contents, i.e., the functionality and information, that are usually present in a store, and how the websites use the low task-relevant cues for these common elements.

The overview of popular e-stores is presented in terms of the header, the body, and the footer of a page. The header and footer are the parts of an online store that usually do not change during the five stages. However, there are exceptions, e.g., in shopping cart the header is different than in prior stages. The body part of the website is where the user progresses through the stages, the homepage, catalogue page, product page, shopping cart, and checkout.

Three categories of popular clothes stores were researched:

- stores for both genders (4 e-stores),
- stores exclusively for women (4 e-stores),
- and stores exclusively for men (3 e-stores).

The eleven stores under investigation based on the categories are:

- H&M, Roots, boohoo, and ASOS, which are the stores for both genders,
- charlotte russe, Lulu's, Ann Taylor, and Nelly's, which are the stores for women,
- Men's warehouse, Jacamo, and Kenneth Cole, which are the stores for men.

These stores were chosen based on the results from www.alexa.com, a webservice that ranks websites in terms of categories, and calculates the popularity of a site as a combination of average daily visitors and pageviews, within the past month. The three categories of stores were selected arbitrarily from the top 20 sites from their respective category site, e.g., men's stores were selected from top men's clothing stores category.

Table 5 presents the common contents in e-stores' header. The table does not include all possible elements that a store could contain, instead, the table contains the elements that are present in all stores. In addition, the table includes descriptions of each element and the use of it. Figure 4 illustrates the header of a popular e-store H&M.

Table 5. The common elements in the header of clothes e-stores.

Element	Definition and use
Logo/name	Logo and/or the name of a store.
Navigation bar	Main navigation bar with selection of product categories to browse.

Search bar	Search engine with free-text search.
Icons - shopping cart, favourites	Icons with direct link to users shopping cart and favourites.
Sign-in and register	Links to sign-in and register to the store.
Change the country/currency	Option to change the country and/or currency the store uses for prices, policies, and delivery.

Figure 4. Header of H&M online store. From http://www2.hm.com.

Table 6 presents the common elements in the body section of the stores. The table is divided by the stages in e-commerce, the homepage, catalogue page, product page, and the shopping cart page. The checkout stage was excluded from the research, and the reasons for excluding it are explained in the *5.1. Focus and Use of Findings for Investigation* section.

Table 6. Common contents of the body of popular clothes e-store, divided by the stages.

Stage	Element	Definition and use
Homepage	Offers, promos	Current sales, seasonal offers, and collections at store.
	Images, videos	Graphics to illustrate clothes, usually including people.
	Site information	A slogan or a sale phrase.
	Products	Stores include products with images for browsing.
Catalogue page	Vertical navigation or refinement	Either option to navigate the category hierarchy to browse, or refinement option to choose product type, colour, size, price, brand, etc.
	Catalogue filters	Option to filter the results in catalogue by price, new, rating, etc.
	Product images	Images of products in catalogue.
	Products info	Product information, name and price, under respective image.
Product page	Product image – large	Large product image, selected from thumbnails, with an option to zoom into the details.
	Product images– thumbnails	Additional small images of the product from another angle, with an option to select for previewing as the large product image.
	Product info	Product info with name, price, size and colour selection, and product description and details.
	Add to cart button	Emphasised button to add the selected product to the shopping cart.

	Recommended items	Selection of products images under the main product, recommended as 'You may also like', 'Others also bought', etc.
Shopping cart	Product image(s)	Images of products user has added to the shopping cart.
	Product info	Information of products in the cart, with an option to remove or edit the items.
	Order summary	The estimated total order value.
	Button to checkout	Emphasised button to proceed to the checkout, positioned under order summary.

Figure 5 illustrates the men's shirts catalogue page of ASOS, Figure 6 illustrates the product page for men's Jeans of H&M, and Figure 7 shows the shopping cart page of ASOS.
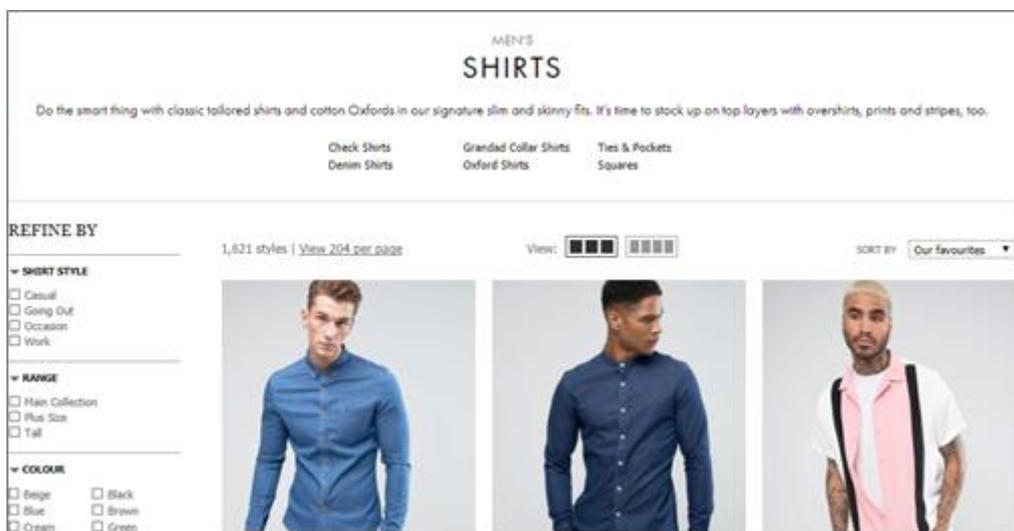
Figure 5. Body of ASOS catalogue page for men's shirts. From
http://www.asos.com/men/shirts/cat/?cid=3602.
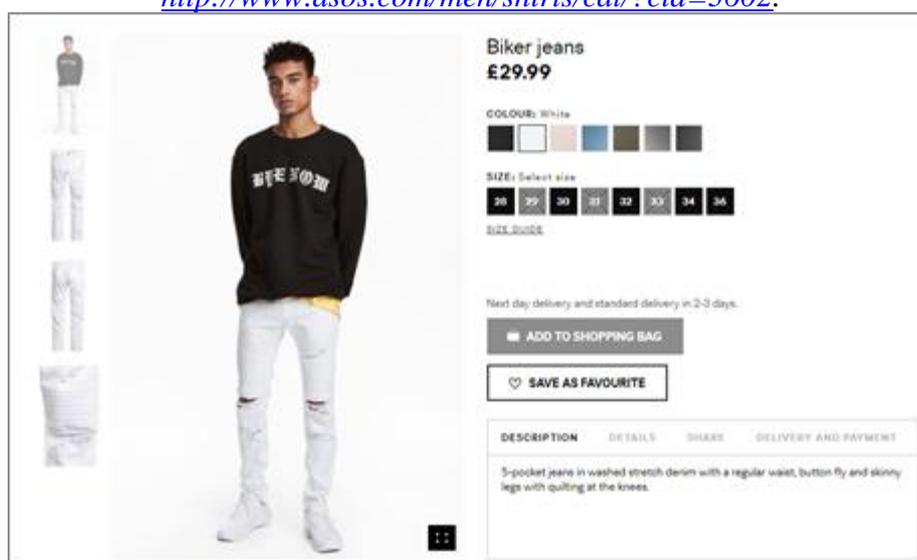
Figure 6. Body of H&M product page for Biker Jeans. From
http://www2.hm.com/en_gb/productpage.0458428003.html#White.
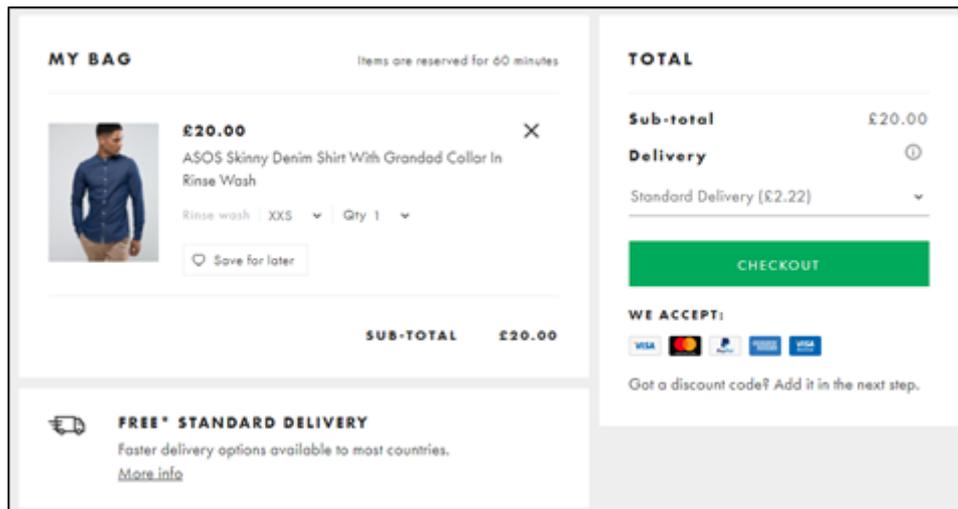
Figure 7. Body of ASOS shopping cart page with Denim Shirt. From
http://www.asos.com/bag.

Table 7 presents the common elements and their description in the footer of a store, while Figure 8 illustrates the footer of the Roots store.

Table 7. Common contents in the footer of popular clothes e-stores.

Element	Definition and use
Additional information	Links to additional information about a store.
Help and services	Links to customer service, FAQs, policies, contact, etc.
Sign up	Option to sign up for newsletters, offers, promotions, etc.
Social media links	Icons linking to a store's social media pages.
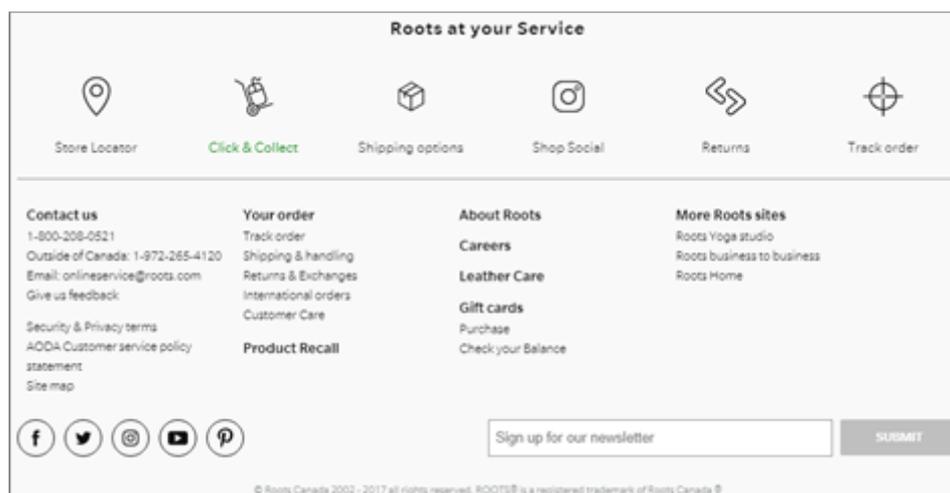
Figure 8. Footer of Roots e-store. From: http://www.roots.com/us/en/homepage.

In addition to gathering an overview of the common elements in popular e-stores, the stores were also assessed in terms of using low task-relevant cues for the elements. The

overview is based on how many stores from the three categories use individual low task-relevant cues for a specific purpose. Tables 8 - 12 consists of the purpose in the left column and the following columns represent the count of how many stores use individual cue, WM refers to both genders' stores, W refers to women's stores, and M refers to men's stores. E.g., Table 8 demonstrates the use of colour, and the colour black is used for logo/name by 2 both genders' store, 3 women's store, and 2 men's store. The tables regarding the use of cues are an approximation, as changes in the designs take place, e.g., while collecting information on the stores' design over several days, sale-price colour of one store had changed.

Table 8. Overview of colours used by popular clothes stores.

Used for	Black			White			Grey			Red		
	WM	W	M	WM	W	M	WM	W	M	WM	W	M
Logo/name	2	3	2	-	-	1	-	-	-	1	-	-
Background	1	-	-	4	4	3	-	-	-	-	-	-
Navigation	4	3	2	-	-	-	-	1	1	-	-	-
Sub-navigation	2	2	1	-	-	-	2	2	2	-	-	-
Search	4	3	1	-		1	-	1	1	-	-	-
Headings	4	2	3	-	1	-	-	1	-	-	-	-
Product name	3	4	1	-	-	-	1	-	-	-	-	-
Price	4	3	3	-	-	-	-	-	1	-	-	-
Sale-Price	-	-	-	-	-	-	-	-	-	1	-	1
Buttons	2	3	2	4	2	2	4	3	2	-	-	1
Text	3	4	3	-	-	-	4	2	2	-	-	-
Lines	3	2	3	-	-	-	4	3	3	-	-	-

Table 9. Continuing overview of colours used by popular clothes stores.

Used for	Blue			Green			Pink		
	WM	W	M	WM	W	M	WM	W	M
Logo/name	-	-	-	1	-	-	-	1	-
Background	-	1	-	-	-	-	-	1	-
Headings	-	-	1	1	-	-	-	-	-
Price	-	-	-	-	-	-	1	2	-
Sale-Price	-	-	1	-	-	-	-	1	-
Buttons	-	-	1	2	-	1	1	-	-
Text	-	-	-	-	-	-	-	2	-
Lines	-	-	-	-	-	-	-	2	-

Table 10 shows how the online stores use lines for the purposes to divide and separate elements on the websites. Table 11 illustrates how the websites use shapes for different elements.

Table 10. Overview of lines used by popular clothes stores.

Used for	Horizontal			Vertical			Thin			Thick		
	WM	W	M	WM	W	M	WM	W	M	WM	W	M
Division/separation	4	4	3	1	1	3	4	4	3	3	2	2

Table 11. Overview of shapes used by popular clothes stores.

Used for	Round/oval			Square			Rectangle			Triangle		
	WM	W	M	WM	W	M	WM	W	M	WM	W	M
Sections	-	-	-	1	-	1	4	2	2	-	-	-
Buttons/checkbox	-	2	2	4	4	3	4	4	3	-	-	-
Images	-	-	-	1	2	1	4	4	3	-	-	-
Icons	4	4	2	4	4	3	2	-	-	-	-	-
Search	-	1	-	-	-	-	1	1	3	-	-	-
Arrow (open/next)	-	-	-	-	-	-	-	-	-	4	4	3

Table 12 gives an overview of the assessment of typography in popular stores in terms of using serif, sans serif, or script font, and if the text is either in uppercase or lowercase letters.

Table 12. Overview of typography used by popular clothes stores.

Used for	Serif			Sans serif			Script			Uppercase			Lowercase		
	WM	W	M	WM	W	M	WM	W	M	WM	W	M	WM	W	M
Logo/name	1	-	1	3	3	2	1	1	-	1	2	3	3	2	-
Navigation	1	-	-	4	4	3	-	-	-	3	4	3	-	-	3
Sub-navigation	1	1	-	4	4	3	-	-	-	-	1	1	4	3	2
Search	-	1	-	3	2	3	-	-	-	-	1	2	3	2	
Headings	2	2	1	4	4	3	-	-	-	4	4	3	3	2	3
Product name	-	1	-	4	4	3	-	-	-	-	2	2	4	4	3
Price	-	-	-	4	4	3	-	-	-	-	-	-	-	-	-
Button-text	-	-	-	4	4	3	-	-	-	4	4	3	2	2	2
Text	-	1	1	4	4	3	-	-	-	3	1	1	4	4	3

5 Analysis

The purpose of this chapter is to investigate possible answers to the research questions. The questions raised in the *1.2. Problem Formulation* section inquire how the web-atmospherics influence genders' internal states, differences in genders' internal states, and possible shopping outcomes determined by genders' internal states. The first section elaborates on the focus of the investigation, why the information presented in the *4. State of the Art* chapter is relevant, and which findings will be used. The outcome of this chapter is the requirement specification for the PoC website. The specification will compose of prioritised list of requirements and the suggested research model. The specification will be the bases to design and implement the PoC website. The website will be used to gather data with a purpose to analyse and interpret the influence of the low task-relevant cues on genders' internal states and their response behaviour. Furthermore, the data will provide bases to discuss and conclude if the suggested solution can answer the research questions and the main problem of the research.

5.1 Focus and Use of Findings for Investigation

To provide an overview of how the information presented in the proceeding *4. State of the Art* chapter is used, and the direction of the investigation, this section argues why the focus of the research is concerned with low task-relevant cues, pleasure, arousal, and perceptual fluency as internal states, and satisfaction as response. Additionally, the section reasons for using the five-stage model to assess online clothes stores, why the checkout stage is excluded, and the purpose of analysing the contents of popular online stores along with the purpose for choosing and categorising the stores. Finally, the first prototype is introduced, and how the insights from testing the prototype are used.

As introduced in the *4.1. Web-atmospherics* section, changing high task-relevant cues of a website can have negative effects on consumer, while changing low task-relevant cues can have a positive one, and since the goal is to build a PoC website that customises (i.e., changes) the cues to genders' internal states, the low task-relevant cues will be used. Furthermore, the *4.2. Stimulus – Low Task-Relevant Cues* section presented the categories of low task-relevant cues, and due to the scope and time limit of the current research, the focus will be on the atmosphere category, which includes elements related to visual design. Furthermore, since the interest is on visual design of web-atmospherics, the study will be interested in the basic elements of visual design, therefore colour, line, shape, and typography are included.

As pleasure and arousal as internal states has been shown to significantly influence response behaviour (*4.3.1. Affective States – Pleasure and Arousal*), these affective states are

researched to customise cues to influence them. In addition, perceptual fluency is in the interest since it is crucial for shaping cognitive responses (*4.3.2. Cognitive State – Perceptual Fluency*). As this construct is related to the ease of attending information based on the aesthetic properties of stimuli, and aesthetics are described by adjectives like clear, organised, and pleasant (*4.3.2. Cognitive State – Perceptual Fluency),* perceptual fluency will be considered as the perceived ease with which one attends the information presented based on clarity, organisation, and pleasantness.

Satisfaction has been considered both, internal state and shopping outcome, however, satisfaction is influenced by internal states (*4.3. Organism*), hence the current research considers satisfaction as a response, and therefore the relevant definition is: e-satisfaction is users' positive perceptions of a website design (*4.4.1. Satisfaction*).

To analyse the low task-relevant cues that influence genders' internal states, it is necessary to have an overview of e-commerce environment, and how consumers use the site (*4.6. Stages in Online Clothing Store*). Assessing e-store in terms of the stages allows to investigate how to design customised low task-relevant cues to women and men. Furthermore, having a structured overview of the contents of an e-store allows to present the common use of low task-relevant cues in the popular clothes e-stores. E-commerce website can be different in terms of stages (i.e., pages) they contain, which depends mainly on the type of a store. Clothes stores are usually made up of five progressive stages, homepage, catalogue page, product page, shopping cart, and checkout, each contributing their specific purpose for the whole e-store. However, online stores do not always include all stages, or sometimes combine some of the stages. The five-stage model is used as this is a comprehensive model which includes all possible stages an online clothes store can have.

To show customised design to the correct gender, i.e., show the design customised for women to women and show the design customised for men to men, the PoC store will be set up based on an assumption that genders browse products for their gender. Moreover, when a user chooses either catalogue page for women's category or product for women, the PoC website will assume that the user is a female and displays the custom design for women, and same approach applies for men.

The checkout stage will be excluded from PoC website (*4.7. Contents and Cues in Online Clothes Store Stages*) because the test participants will be informed that the store is set up with the purpose to test design and the interaction is followed by a survey. Moreover, since the website does not include any delivery or billing information, nor payment methods, the

participants should not enclose any personal information, as this could make them sceptical about the website.

Identifying the main elements, the functions and information, that are required to give an e-commerce experience allows to set up PoC website (*4.7. Contents and Cues in Online Clothes Store Stages*). Furthermore, identifying and understanding the elements within specific stage, according to the purpose of each stage, will be advantageous for customising the low task-relevant cues to influence genders' internal states.

To investigate the use of low task-relevant cues that influence genders' internal states, three categories of stores are relevant, stores for both genders, for women, and for men (*4.7. Contents and Cues in Online Clothes Store Stages*). For this reason, several stores were assessed, to compare the similarities and differences between and within these three groups.

While assessing the use of lines by popular e-stores (*4.7. Contents and Cues in Online Clothes Store Stages*), curved, zig-zag, and diagonal lines were not included, since if used at all, these types of lines were only used as typographical signs, e.g., diagonal lines were used as forward slash '/', and zig-zag lines used as greater than sign '>>'. Analysing small lines as typographical signs is beyond the scope this research due to the complexity it will require, and the focus remains on larger lines used for purposes to organise, divide, and separate elements. Additionally, introduced in the *4.2.3. Typography* sub-section, typographic elements like size, spacing, and typeface are important in shaping overall quality of text, however, the assessment of typography in popular stores remained limited to the use of serif, sans serif, script font, and uppercase or lowercase letters. The size, spacing, and typeface was excluded as investigating these would also require more time than this project time limit allows.

As part of the research, a prototype was built to carry out design experiment and check the feasibility of the design customisation, furthermore, to analyse if the low task-relevant cues have different effect on genders, and to interpret these effects. The prototype was designed using a product page of boohoo.com store. Genders preferences of low task-relevant cues (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*) were used to change the orignial boohoo design to fit genders preferences, e.g., rounder shapes and pink colour were used for women's design. Thereafter, screenshots were taken from the original design and gender customised designs, and these images were shows to women and men with 7-point Likert-type scales, with items that addressed web-atmoshperics. Furthermore, the goal was to have a qualitative interview while a test participant was rating the images. The images, scale items with sources, and quntiative and qualitative responses are in *Appendix B*. The quantitative results do not have great value as there was only 8 responses, however, they are inline with the

literature, e.g., women rate lower than men and prefer more colours, and men do not prefer pink (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*). Nevertheless, the qualitative responses from 5 participants (3 women and 2 men) provided understanding to gender differecnces and similarities, e.g., men did not have issues with the lack of colours while it was disturbing all women, and both genders argued that the use of colours helps to organise the design. The insights from the qualitative interviews along with the findings form the *4. State of the Art* chapter will be used during the following three sections where the results are relevant for the investigation.

5.2   Low Task-Relevant Cues Influencing Genders' Internal States

The purpose of this section is to elaborate on how the low task-relevant cues can make genders feel good and thus induce pleasure, how the cues can arouse genders by stimulating and exciting, and how the cues that are, and make a website simple, clear, and organised can facilitate perceptual fluency in genders. Presented by different authors in the *4. State of the Art* chapter, cues in interest have a significant influence on consumer's internal states (*4.2. Stimulus – Low Task-Relevant Cues*), and genders have different preferences with regards to these cues (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*). Furthermore, when analysing and designing any of the low task-relevant cues, simplicity, as an important factor influencing aesthetics (*4.2. Stimulus – Low Task-Relevant Cues*), will be implicitly considered while making design choices.

The following analysis is based on single cue's influence on internal states, and not analysing nor considering the influence of combination of cues, which likely would have different effect on internal states. Although, the limitation may not show the actual effect of cues used in combination, it is necessary limitation due to the difficulty that raises from analysing combinations.

5.2.1   How Colours Influence Genders' Internal States?

The use of colours has a significant influence on affective and cognitive states (*4.2. Stimulus – Low Task-Relevant Cues*). Colours have different connotations which can affect how a person feels, therefore using some colours can promote pleasure. Some colours can arouse and excite an individual, while others relax (*4.2.1. Colour – Hue, Brightness, and Contrast*), a beneficial property which will be considered while designing colours to influence the affective state arousal. Furthermore, with regards to perceptual fluency construct, colours can be used to structure information and differentiate items (*4.2.1. Colour – Hue, Brightness,*

and Contrast), and influence the memorisation and retrieval of information (*4.2.1. Colour – Hue, Brightness, and Contrast*).

Since high level of colour saturation is perceived more beautiful (*4.2.1. Colour – Hue, Brightness, and Contrast)* high level of saturation will be used to influence pleasure. However, it was suggested that brightness of the dominant colour is most important determinant of attractiveness (*4.2.1. Colour – Hue, Brightness, and Contrast*), accordingly, highly saturated and bright colours will be used, and together with bright background to increase pleasure by creating an attractive and aesthetical website. However, too bright websites were found to make it difficult for a user to grasp rest of the site (*4.2.1. Colour – Hue, Brightness, and Contrast*), which can negatively influence user's pleasure and perceptual fluency, thus the level of brightness used should not be too high.

While composing colours, contrast must be considered, since it increases the perception of the existence of an object (*4.2.1. Colour – Hue, Brightness, and Contrast*), and increases the overall perceived aesthetics. Both effects could increase perceptual fluency, by making it easier to attend the presented information. Furthermore, it was opined that website colour contrast reduces consumer's information processing load and positively influences pleasantness (*4.2.1. Colour – Hue, Brightness, and Contrast*), consequently colour contrast will be used in design to increase pleasure and facilitate perceptual fluency.

Several authors found that blue hues were most favourable, while yellow and yellow-green where the least (*4.2.1. Colour – Hue, Brightness, and Contrast*), but before using this finding as a design guideline, the purpose and context of using colours must be considered and exceptions may be necessary when using colours to increase pleasure.

With regards to genders, it was found that women prefer more colours than men, and genders prefer different colour schemes, and furthermore, women also prefer lighter colours (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*). According to prior points, the women's design will include more and lighter colours from schemes they prefer.

While using different hues to increase pleasure, based on the meanings associated with the colours, it must be repeated that these meanings can subjectively vary due to the cultural context (*4.2.1. Colour – Hue, Brightness, and Contrast*), however, based on these meanings suggestions will be made.

As white can convey the meaning of peace and happiness (*4.2.1. Colour – Hue, Brightness, and Contrast*), it will be used to induce pleasure, however, too much white could also cause sadness and be perceived as empty and boring (*4.2.1. Colour – Hue, Brightness, and Contrast*). In terms of arousal, white does not have inherent characteristics to arouse, since it

not simulating the senses (*4.2.1. Colour – Hue, Brightness, and Contrast*), however, it will be used as a background for other colours, as it allows for colours that arouse to stand out. Moreover, white is recommended as the best colour for background (*4.2.1. Colour – Hue, Brightness, and Contrast*) and is used most commonly for background by all the popular e-stores researched (*4.7. Contents and Cues in Online Clothes Store Stages*). As a background, white indeed allows effective use of other colours, as it also creates simplicity, organisation, efficiency, purity, cleanliness, precision, and sterility (*4.2.1. Colour – Hue, Brightness, and Contrast*), therefore white will be used as a component in creating perceptual fluency.

Tables 13, 14, and 15 in the end of this section give an overview of the colours that will be used for the PoC website based on the current analysis. Furthermore, the tables are accompanied by the description and explanation of using colours for different stages.

Black is a powerful colour (*4.2.1. Colour – Hue, Brightness, and Contrast*), but the meanings associated with it cannot be interpreted as producing pleasure, e.g., fear, malice, anonymity, sadness, anger, remorse, melancholy, death, and mourning (*4.2.1. Colour – Hue, Brightness, and Contrast*). From these previous meanings, black is also not suitable for arousing either gender, and in addition, seen from the prototype test, women interviewees did not like the amount of black it had and men though that only black and white can be confusing. However, black is preferred by men (*4.2.1. Colour – Hue, Brightness, and Contrast*), and black is extensively used by all popular stores for similar purposes, nevertheless, women's stores seem to use less black and substitute it with grey (*4.7. Contents and Cues in Online Clothes Store Stages*). Black will be used due to its benefit to create strong contrast and organise the elements on the site. Furthermore, since men's stores use black more consistently, e.g., for lines, price, and headings, men's custom design will use more black than women's custom design to facilitate perceptual fluency.

Grey, like black, is not appropriate for arousing, and not the best choice for inducing pleasure. Grey will be used for facilitating cognitive internal state, as it can mean intelligence, practical spirit, elegance, security, reliability, modesty and maturity, however, this should be done in combination with other colours, as it can also mean boredom, indifference, sadness, decay, and dullness (*4.2.1. Colour – Hue, Brightness, and Contrast*), which could have negative influence on affective states. Furthermore, it is suggested that grey is a good colour to use due to its neutral and serious look (*4.2.1. Colour – Hue, Brightness, and Contrast*), which allows to combine it with any other colour. All categories of popular stores use grey for sub-navigation, buttons, text, and lines, however, women's stores use it also for headings, and more for buttons than other stores (*4.7. Contents and Cues in Online Clothes Store Stages*). Since

using more grey makes the women's stores look smoother and less striking, it will be used for influencing women's cognitive internal states.

Red has properties to induce pleasure, as it is emotionally very intense colour, and its meanings can convey love, passion, sensuality, and warmth (*4.2.1. Colour – Hue, Brightness, and Contrast*). However, as it is emotionally intense colour and also has multiple negative meanings, e.g., aggression, danger, violence, anger, and can be taken as a sign of warning (*4.2.1. Colour – Hue, Brightness, and Contrast*), it will be used sparingly in terms of pleasure. The use of red by popular stores is limited, and the purposes seem to be for grabbing attention and arousing, for example, it was used for sale price by one men's and one both genders' store, and for logo in one instance by latter category (*4.7. Contents and Cues in Online Clothes Store Stages*). Thus, red will be used to stimulate men, to make quick decisions, as it also brings text to foreground (*4.2.1. Colour – Hue, Brightness, and Contrast*). Due to its intensity, red will be used to arouse, however, this will be done carefully due to its strong and possible negative effects.

Blue is the preferred hue for websites, and it is a cool and relaxing colour, which is also preferred on websites, furthermore, it is used by many websites and it is recommended to do so (*4.2.1. Colour – Hue, Brightness, and Contrast*). With one exception, only popular men's stores used blue and did so sparingly (*4.7. Contents and Cues in Online Clothes Store Stages*). Since blue is one of the hues preferred by men (*4.2.1. Colour – Hue, Brightness, and Contrast*), it will be used to induce pleasure for men, which is also suggested by some of its meanings, e.g., trust, reliable, masculine, and quiet (*4.2.1. Colour – Hue, Brightness, and Contrast*), however, blue is not the colour for arousing as it has relaxing effects, and could mean coolness, peace, quiet, calm, and conservative (*4.2.1. Colour – Hue, Brightness, and Contrast*). On the other hand, blue can have beneficial effects on cognitive faculty, as it creates unity, safety, cleanliness, and order (*4.2.1. Colour – Hue, Brightness, and Contrast*), therefor blue will be used to facilitate perceptual fluency. Lastly, since blue was little used by popular stores and has meanings that could reduce pleasure, e.g., loneliness and depression (*4.2.1. Colour – Hue, Brightness, and Contrast*), it will be used cautiously for pleasure and perceptual fluency for men's design, and not for women's.

Green is not used by any of the popular women's stores (*4.7. Contents and Cues in Online Clothes Store Stages*), and it does not have strong meanings that could be related to pleasure, nor it has any arousing effects (*4.2.1. Colour – Hue, Brightness, and Contrast*), hence it is not suitable to influence women's internal states in the current context. Green is sparingly used by one men's store, and it is used by two both genders' stores (*4.7. Contents and Cues in*

Online Clothes Store Stages), which suggests that green could be used for facilitating perceptual fluency of men. Possible meanings of green are confirming the previous suggestion e.g., luck, health, nature, safety (*4.2.1. Colour – Hue, Brightness, and Contrast*), but it will be used in small amounts, as an excess of it could mean jealousy, lack of experience, and envy (*4.2.1. Colour – Hue, Brightness, and Contrast*).

Pink is specific to girls' and women's products, it has feminine energy, and could mean sweetness, and love (*4.2.1. Colour – Hue, Brightness, and Contrast*), as a result, pink will be used to induce pleasure in women. It is also one of the preferred colour schemes by women (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*), and it is used by popular women's stores for several purposes, e.g., logo, background, price, buttons, text, and lines (*4.7. Contents and Cues in Online Clothes Store Stages*), which all approves its suitability to create pleasure for women. However, it has relaxing effect and is related to softness, hence it is not the colour for arousing. The colour can also mean immaturity, overly emotional, needy, and lack of power (*4.2.1. Colour – Hue, Brightness, and Contrast*), thus it is not suited to create pleasure for men, furthermore, the same connotations can be interpreted by women, especially when the colour is overly used. Through the prototype test, pink was perceived 'fine' by the female interviewees, but the use of pink in the prototype was excessive, which might have limited its positive influence, as in contrast to the prototype, the popular stores use pink sparingly, which suggests its suitability for women's design.

Mauve is also one of the colour schemes preferred by women (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*), accordingly it could be used to induce pleasure for women. Investigating its possible meanings, this colour may not the suitable for arousing, and in terms of pleasure, it should be used carefully, as it could be interpreted as cruel or arrogant (*4.2.1. Colour – Hue, Brightness, and Contrast*). Furthermore, using mauve to support the perceptual fluency by separating elements and making structure may not be suitable as it can transfer the message of complexity and mystery (*4.2.1. Colour – Hue, Brightness, and Contrast*). In addition to prior characteristics of the colour, it is not used by popular stores (*4.7. Contents and Cues in Online Clothes Store Stages*), and since is similar to pink, latter will be used instead of mauve for women's design.

Since turquoise could be used to convey feminine energy and it is ideal for fashion and beauty market (*4.2.1. Colour – Hue, Brightness, and Contrast*), it will be good choice for women's internal affective states. Furthermore, as it aids self-expression, clarity of thought, and logical thinking (*4.2.1. Colour – Hue, Brightness, and Contrast*), it will be used as a component facilitating perceptual fluency for women.

Orange has positive connotations which could potentially increase pleasure and excite, and it has characteristics that could be used to attract attention (*4.2.1. Colour – Hue, Brightness, and Contrast*), which could be useful to induce perceptual fluency, however, it not recommended to use for websites (*4.2.1. Colour – Hue, Brightness, and Contrast*). In addition, because orange is often related to fast-food, cheap products, it does not express luxury or elegance (*4.2.1. Colour – Hue, Brightness, and Contrast*), and it is not used by the popular e-stores (*4.7. Contents and Cues in Online Clothes Store Stages*), it will not be used for the PoC online store. Yellow has similar meanings and effects as orange. It also has strong association with lower price (*4.2.1. Colour – Hue, Brightness, and Contrast*) and it is also not used for low task-relevant cues in the popular stores (*4.7. Contents and Cues in Online Clothes Store Stages*), thus it also is not a good choice for a clothes store to influence internal states. However, one of the colour schemes preferred by women is yellow, but due to prior discussion, it is not suitable for the current context, whereas, when the purpose is to convey a message of low price and sell cheap products, both orange and yellow could be considered as possible options.

Following Tables 13 - 15 illustrate the use of colour for men's and women's customised design. Table 13 presents the colours that will be used for the header and footer, since these parts of the site will not change during the stages. Tables 14 and 15 presents how the colours are used in the body of a page for different stages. The choices for colouring specific elements in specific stages is based on the assessment of how the researched popular e-stores use colours (*4.7. Contents and Cues in Online Clothes Store Stages*). Furthermore, the design is illustrated in the *6. Design and Implementation* chapter, with screenshots of PoC design.

Table 13. Use of colours for the header and footer.

Colour	Header		Footer	
	Women	Men	Women	Men
White	Background	Background	Background	Background
◼ Black	Logo, navigation	Logo, navigation, h-line	Heading, text,	Heading, text, h-line,
◼ Grey	Search, navigation, sign-in/register and language, text, h-line, rounded-shape	Navigation, sign-in/register and language, text, rectangle	H-line, social media icons	Social media icons

	Blue	-	Search, shopping cart icon, view-cart button.	-	-
	Pink	View-cart button	-	-	-
	Turquoise	Shopping cart icon	-	-	-

Table 14. Use of colours for the catalogue and product stage.

Colour		Stage 2 – Catalogue		Stage 3 – Product Page	
		Women	Men	Women	Men
	White	Background	Background	Background	Background
	Black	V-navigation	V-navigation, heading, text, price	Price, heading, text	Heading, text.
	Grey	V-navigation, filter, heading, text	Filter	Heading, text, lines, shapes	Text, lines, shapes.
	Red	-	-	-	Price
	Blue	-	Buttons, icons	-	Buttons, icons
	Green	-	-	-	icons
	Pink	Price, button, icons	-	Button, price	-
	Turquoise	Icons	-	Icons	-

Table 15. Use of colours for the shopping cart stage.

Colour		Stage 4 – Shopping Cart	
		Women	Men
	White	Background	Background
	Black	Heading text	Heading, text, lines
	Grey	Text, h-line	-
	Blue	-	Button
	Pink	Button, price	-
	Turquoise	Section background	-

Succeeding section investigates how lines, as low task-relevant cues, could and will be used in the PoC website with a purpose to influence genders' internal states.

5.2.2   How Lines Influence Genders' Internal States?

This section elaborates how lines can and will be used to influence genders' internal states by their application to emphasise and connect or separate elements (*4.2.2. Line and Shape*), furthermore, how to use lines based on the connotations they have.

Interpreting the meanings of line types suggest that curved, zig-zag, and diagonal lines could be used for the affective states. For inducing pleasure, curved lines can be used based on their meanings of kindness and tenderness, whereas zig-zag and diagonal lines could transmit emotion (*4.2.2. Line and Shape*), furthermore, same types could also influence arousal, e.g., curved lines represent change, dynamicity, and unpredictability, while zig-zag and diagonal lines can convey movement, dynamicity and energy (*4.2.2. Line and Shape*). However, none of the three types of lines are used by any of the popular clothes stores (*4.7. Contents and Cues in Online Clothes Store Stages*), therefore, these types will not be implemented for influencing genders' internal states.

Horizontal and vertical lines are used by all popular stores (*4.7. Contents and Cues in Online Clothes Store Stages*). The common use of lines is to organise websites. Moreover, the use seemed to have a purpose of dividing different sections of a website, and separate different elements from each other, e.g., navigation links, icons, images, etc. Based on the use, horizontal and vertical lines will be effective tools for creating perceptual fluency. From the conveyed meanings, vertical lines could have a potential to arouse, as they can convey strength, height, and rigidity (*4.2.2. Line and Shape*), however, vertical lines were used sparingly by both genders' and women's stores, while all the men's stores used them. Thus, vertical lines will be only used for men's design. Horizontal lines do not seem to have characteristics to arouse, but their meanings, e.g., stability and calmness (*4.2.2. Line and Shape*), confirm their suitability for facilitating perceptual fluency. Additionally, horizontal lines will be used to influence pleasure, as they convey relief, safety, comfort, and lack of conflict (*4.2.2. Line and Shape*).

Based on the meanings, thin lines could be used to promote pleasure and thick lines to arouse, since thin lines can mean elegance and delicacies, while thick lines can mean resistance, unbreakable, and imposition (*4.2.2. Line and Shape*). Since all the popular stores use preferably thin lines (*Contents and Cues in Online Clothes Store Stages*), they will be suitable for influencing internal states. Thin lines will be used for inducing pleasure and facilitating perceptual fluency by organising, emphasising, and clarifying design. Thick lines are used sparingly overall, and less in women's stores than others, furthermore, thick lines were used for horizonal and not vertical lines (*4.7. Contents and Cues in Online Clothes Store Stages*),

consequently thick lines will not be used for influencing women's internal states, and used only in case of necessity to arouse men or facilitate their cognitive faculty.

Tables 16 – 18 present the use of lines for gender customised design. Table 16 shows the use for header and footer, while Tables 17 and 18 shows how lines are used for the body in different e-commerce stages. Again, the choices for specific elements in specific stages is based on how the popular e-stores use lines (*4.7. Contents and Cues in Online Clothes Store Stages*). The design is illustrated in the *6. Design and Implementation* chapter.

Table 16. Use of lines for the header and footer.

Line	Header		Footer	
	Women	Men	Women	Men
Horizontal	Header separation	Header separation	Footer separation	Footer separation
Vertical	Link separation	Link separation	-	-
Thin	Header separation, link separation	Link separation	Footer separation	-
Thick	-	Header separation	-	Footer separation

Table 17. Use of lines for the catalogue and product stage.

Line	Stage 2 – Catalogue		Stage 3 – Product Page	
	Women	Men	Women	Men
Horizontal	Vertical navigation	-	Sections	Sections
Vertical	-	Vertical navigation	Sections	Sections
Thin	Vertical navigation	-	Sections	Sections
Thick	-	Vertical navigation	-	-

Table 18. Use of lines for the shopping cart stage.

Line	Stage 4 – Shopping Cart	
	Women	Men
Horizontal	Cart division	Cart division
Vertical	-	Cart separation
Thin	Cart division	Cart division
Thick	-	Cart separation

Subsequent section investigates how shapes, as low task-relevant cues, could and will be used in the PoC website with a purpose to influence genders' internal states.

5.2.3   How Shapes Influence Genders' Internal States?

Shapes can be used to create depth, organise information, convey mood and emotion, and emphasise important areas, moreover, based on the associated meanings, shapes have potential to influence all internal states (*4.2.2. Line and Shape*).

Since angular shapes could mean dynamism, masculinity, virility, aggressiveness (*4.2.2. Line and Shape*) they can influence the affective states, but due to the meanings, they can have positive influence on pleasure rather in men. Although the meanings can be interpreted as strong influencers of arousal, none of the popular stores used angular shapes (*4.7. Contents and Cues in Online Clothes Store Stages*), hence angular shapes will not be used to influence internal states of genders in the current context.

Round and oval shapes, including circle, can have positive effect on pleasure, particularly in women. Round and oval shapes are feminine, represent sensibility (*4.2.2. Line and Shape*), and are more preferred shape type by women (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*), furthermore circle can convey the meanings of unity and perfection (*4.2.2. Line and Shape*). On the other hand, as the authors point out, these shapes mean harmony, and are associated with still water (*4.2.2. Line and Shape*), thus they are not suited for the purpose to arouse. While creating harmony, these shapes will be used to positively influence perceptual fluency, by allowing the information to be perceived with more ease. The use of round and oval shapes by popular stores do not suggest any constraints for using them. They are used by all stores for icons, search bar by one women's store, and buttons and checkboxes by two women's and men's stores (*4.7. Contents and Cues in Online Clothes Store Stages*). Therefore, these shapes will be used to produce pleasure for women.

According to the connotations, square and rectangle are similar, and mean stability, order, rationality, and formality (*4.2.2. Line and Shape*), hence are suitable for influencing perceptual fluency by organising and simplifying the content. As men prefer the use regular and formal content (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*), squares and rectangles could also have positive influence on men's pleasure. These shapes are the building blocks for a website, however, popular stores use them for different purposes. Square is used for icons, but only two both genders' stores use square for this purpose. Additionally, squares are used for buttons and checkboxes, but mainly for checkboxes, and only in few instances for small images and sections, hence they could best influence internal states while using them for smaller elements. Rectangles are used most prominently by all stores, all men's stores have explicit rectangle for the search bar, while only one of both genders' and women's store do so (*4.7. Contents and Cues in Online Clothes Store Stages*). Therefore, rectangles will

be used more to influence men's internal states, while for women, angular or oval shapes will be implemented.

Triangles could arouse both genders, as this shape type can mean rigorous, vivacity and aspiration (*4.2.2. Line and Shape*), but triangles are used only for small open and next arrows by researched stores (*4.7. Contents and Cues in Online Clothes Store Stages*). As a result, the use of triangular shapes will remain limited to small arrows.

Tables 19 - 21 present the use of shapes for gender customised design. Table 19 shows the use for the header and footer, Tables 20 and 21 shows how shapes are used for the body in different e-commerce stages. The choice of shapes for specific elements in specific stages is based on how the popular e-stores use shapes (*4.7. Contents and Cues in Online Clothes Store Stages*). The design is illustrated in the *6. Design and Implementation* chapter.

Table 19. Use of shapes for the header and footer.

Shape	Header		Footer	
	Women	Men	Women	Men
Round/oval	Search, sections, buttons, icons	-	Icons	-
Square	-	icons	-	Icons
Rectangle	-	Search, sections, buttons	-	-

Table 20. Use of shapes for the catalogue and product stage.

Shape	Stage 2 – Catalogue		Stage 3 – Product Page	
	Women	Men	Women	Men
Round/oval	Filter buttons	-	Buttons, checkboxes	-
Square	-	Filter buttons	-	Checkboxes.
Rectangle	Images	Images	Sections	Buttons, sections

Table 21. Use of shapes for the shopping cart stage.

Shape	Stage 4 – Shopping Cart	
	Women	Men
Round/oval	Buttons, checkboxes	-
Square	-	Checkboxes
Rectangle	Sections	Buttons, sections
Triangle	-	-

Next section investigates how typography can be used to influence genders' internal states, an influence which to an extent will be related to meanings of lines and shapes.

5.2.4   How Typography Influences Genders' Internal States?

The use of typography as a cue could have influence on each internal state. Use that makes a person feel good can induce pleasure; use that stimulates and excites can arouse a person; and use that makes text simple, clear, and organised can facilitate perceptual fluency.

The three typographical characteristics of text, appearance, attractiveness, and readability, are all likely to influence each of the three internal states. For the purposes of analysis, appearance of text will be considered as a characteristic to arouse, attractiveness will be considered for inducing pleasure, and readability will be considered for facilitating perceptual fluency. Within the context of these three characteristics, appearance is a noun referring to how a font looks, which can be described by verbs, i.e., font appears sticking or calming, attractiveness, as a possible appearance, will be interpreted as how pleasing a font looks, and readability will be considered as the quality of how easy it is to read a text (*4.2.3. Typography*).

To make the typography appear arousing, several of its attributes could be used. A colour of a font can make it appear arousing, as some colours are arousing. The method to do so will be same as described in the beginning of this section (*5.2.1. How Colours Influence Genders' Internal States?*), how colours in general and individually can be used to arouse. The size of a font will be implemented to make it look arousing, since it could make it stand out and give a sticking appearance. In addition, the use of different typefaces could be used to arouse. The underlying shapes that individual characters in a typeface have, could convey the same meaning as the basic shapes themselves. For example, a typeface that has characters with angular and triangular shapes could arouse more than the characters that's shape is round or oval. The weight of typeface could convey the meanings of thin or thick lines, i.e., a bold typeface can take the characteristics of thick line, while a light typeface weight can take the characteristics of thin line, and therefore the arousing meanings of thick lines could possibly apply to bold font and be applied in design. Additionally, the use of serifs or sans serifs could have an effect related to shapes, as the finishing strokes of serif category can make the typeface look rounder and smoother, and accordingly less arousing, while sans serif without the finishing strokes can appear more angular. The attribute of casing the letters can make the font appear arousing, the use of only uppercase letters makes text larger and the uppercase letters are less round compared to lowercase letters. Hence, when appropriate, sans serif typeface and uppercase letters are used to arouse.

The same attributes that can make typeface appear arousing, can make typeface appear attractive. To make a font attractive and thus induce pleasure, the meanings of colours, gender

preferences of colours, and the implementation of colours by popular stores, discussed in the beginning this section (*5.2.1. How Colours Influence Genders' Internal States?*), will be applied to fonts. Similarly, to the purpose of making a font appear arousing, typeface could make the text appear attractive through the shapes and the weight it conveys. As women prefer more round shapes, fonts that have characters with round or oval shapes will be used to induce pleasure to women. The popular stores for women used more serifs than men's stores (*4.7. Contents and Cues in Online Clothes Store Stages*), which could suggest that because serifs appear rounder due to the finishing strokes, are preferred by women, and therefore will be used for women's design. Additionally, the script font makes a typeface look more feminine (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*), and this could be related to the same reason of the rounder shapes it creates. For a font to have a change to induce pleasure, is must be large enough not to frustrate users, as smaller size can do so (*4.2.3. Typography*). However, important consideration while designing typography either to appear arousing or attractive is to keep the text readable, which in discussed in the following paragraphs.

Although the appearance and attractiveness of text are relevant to influence the internal affective states of genders, the readability of text will be considered most significant characteristic of text, as the main purpose of a text is to convey information. Other research has shown the importance of typeface size, spacing, and colour to facilitate effective communication and reading (*4.2.3. Typography)*. The spacing of a font is an important attribute for facilitating perceptual fluency. Line spacing is the relevant attribute of typographic elements, 56% users argued so (*4.2.3. Typography*). Based on this, text for the design will be adequately spaced not overwhelm users, and line spacing of 1.5 used to facilitate best reading, speed, and comprehension (*4.2.3. Typography*). Colour of a font enhances readability and draws attention to important information (*4.2.3. Typography*), therefore colours will be used to make important test to stand out to facilitate cognitive processes. Prior is also confirmed from the interviews with the prototype, where both, male and female interviewees suggested that the grey scale text is confusing and makes everything blend together. The legibility of typeface is determined by its contrast, proportion, and simplicity (*4.2.3. Typography)*, attributes that will be considered while enhancing readability.

While choosing a font to influence the affective states, the choice's influence on cognitive states is prioritised, e.g., inducing pleasure for women with highly stylised or script fonts will be used with caution, as they can reduce readability (*4.2.3. Typography*). Furthermore, the style of a font, i.e., the typeface, was found be the second relevant attribute of font, argued by users (35%), while the size of font was the least important attribute for users,

only for 12% (*4.2.3. Typography)*, thus these ratios will be taken into consideration for designing text that is readable. The prototype interviewees in majority argued that the size of the font was too small in all design instances, though, men were more persistent with suggesting that the font size should be larger. According to prior, font for men's design will be larger, however, font size for women must not also be too small.

Investigating the use of font by popular stores for examples to facilitate perceptual fluency, it was evident that serifs were used sparingly, and more so by men's stores, sans serifs were used by all stores for all possible purposes (*4.7. Contents and Cues in Online Clothes Store Stages*). Based on the use, serif fonts along with sans serif will be used for women's design, and only sans serif font for men's design. Script font was used twice by one both genders' stores and by one women's store for logo, hence script font will not be used to foster cognitive processes. The casing of letters had differences between the store categories (*4.7. Contents and Cues in Online Clothes Store Stages*), while all the navigations were in uppercase, only one men's and one women's store used it for sub-navigation. Men's stores were persistent using uppercase letter for a search bar, suggesting that this casing will be preferred by men and helps to draw attention to the search. Headings were used in both, uppercase and lowercase letters, depending on the stage, however, women's stores were least likely to use lowercase letters for headings, suggesting that women's perceptual fluency will benefit more from uppercase headings. Product names and informational text was mostly in lowercase letters by all categories of stores, signifying that these elements due their longer content, will be more readable with lowercase letters. Buttons' text was in uppercase letter in all stores, with some exceptions from all categories for only few buttons, highlighting the importance to use uppercase letters for buttons to draw attention and convey the purpose of a button quickly.

Tables 22 - 24 present the use of typography for gender customised design. Table 22 shows the use for the header and footer, and Tables 23 and 24 shows how typography is used for the body in different e-commerce stages. The design of typography for specific elements in specific stages is based on how the popular e-stores use typography (*4.7. Contents and Cues in Online Clothes Store Stages*). The design is shown in the *6. Design and Implementation* chapter.

Table 22. Use of typography for the header and footer.

Typography	Header		Footer	
	Women	Men	Women	Men
Serif Serif	Sign-in/register and language link,	-	Text	-

	search, sub-navigation, text			
Sans serif **Sans Serif**	Navigation, button, heading	Logo, search, sign-in/register and language link, navigation, sub-navigation, heading, text	Heading	Text, heading
Script *Script*	Logo	-	-	-
UPPERCASE	Navigation, button	Logo	Heading	Heading
Lowercase	Sign-in/register and language link, search, sub-navigation, heading, text	search, sign-in/register and language, heading, text,	Text	Text

Table 23. Use of typography for the catalogue and product stage.

Typography	Stage 2 – Catalogue		Stage 3 – Product Page	
	Women	Men	Women	Men
Serif	Vertical navigation, filter, text	-	Text	-
Sans serif	Button, heading	Vertical navigation, heading, button, filter, text,	Button, heading	Button, heading, text
Uppercase	Vertical navigation, heading, button	Vertical navigation, button	Button, heading	Button, heading
Lowercase	Vertical navigation, text	Heading, text	Heading, text	Text

Table 24. Use of typography for the shopping cart stage.

Typography	Stage 4 – Shopping Cart	
	Women	Men
Serif	Text, heading	-
Sans serif	Heading, button	Heading, button, text
Uppercase	Heading, button	Heading, button
Lowercase	Heading, text	Text

Following section investigates the findings related to the genders' internal states, and how the differences in the organism part of the SOR model will be taken into consideration while developing the PoC online store.

5.3   Differences in Genders' Internal States Determining Shopping Outcomes

This section elaborates on possible answers to how the genders' internal states are different, with a purpose to provide insights how these differences can be used for customising the PoC online store. The discussion is also concerned with how the affective and cognitive states can influence each other, in terms of the gender differences.

Men's shopping outcomes are more influenced by hedonic motivations than those of women's (*4.5.3. Gender Differences in Responding to Web-Atmospherics),* suggesting that pleasure and arousal could be more easily induced in men. It was also proposed that online shopping is more attractive and appealing to men as they have higher affective and cognitive online shopping evaluations (*4.5.2. Gender Differences in Organism's Internal States*). This possibility of higher degree of pleasure and arousal in men could be related to gender difference in information processing style.

Based on the selectivity model, women are comprehensive processors while men are selective processors (*4.5.2. Gender Differences in Organism's Internal States*). As comprehensive processors women attempt to assimilate all the available information before moving on, while men as selective processors rely only on specific and readily available cues, which gives women more cognitive effort while allows men to process through a website with more ease. Prior was confirmed, as superfluous information that women gather during processing is likely to exceed the capacity of their short-term memory (*4.5.2. Gender Differences in Organism's Internal States*), which could cause them frustration. And women indeed experience more frustration and anxiety while using the Internet compared to men (*4.5.3. Gender Differences in Responding to Web-Atmospherics*). It was also suggested that women cannot navigate website efficiently due to the distracting information that is not related to their goal (*4.5.2. Gender Differences in Organism's Internal States)*. Since women spend more effort on information processing, which can cause them frustration, it can also inhibit their availability for pleasure and arousal. While men, as selective processors, can orientate on websites with more ease, and consequently could be more easily pleasured and aroused by web-atmospherics.

Women's shopping outcomes are more influenced by effort expectancy, social influence, and facilitating conditions than those of men (*4.5.3. Gender Differences in Responding to Web-Atmospherics*), from which the first and last influence could be resulted from the higher level of required effort on websites. Since women as comprehensive processors spend more cognitive energy on websites, they are interested in how much effort is to be

expected, and benefit more from facilitating conditions on a website, that could ease the effort. On the other hand, in addition to being more influenced by hedonic motivations, men's shopping outcomes are also more influenced by performance expectancy (*4.5.3. Gender Differences in Responding to Web-Atmospherics*), which could be also due to the information processing difference, as men are not concerned with the effort they must put in, since it is not as a big of a problem, but rather, how well the site preforms to allow them to quickly process through it. The prior discussion on the cognitive processing differences in genders again suggest that men are more available for pleasure and arousal compared to women, who spend more cognitive effort. Therefore, the custom design for women will attempt to decrease the required cognitive effort and facilitate their perceptual fluency.

Next section elaborates on the shopping outcomes that are determined by genders' internal states, furthermore, what are the gender specific peculiarities.

5.4 Possible Shopping Outcomes Determined by Genders' Internal States

To customise the PoC online store web-atmospherics to genders, with a purpose to positively influence genders' internal and the resulting shopping outcomes, this section attempts to provide insights how genders differ in terms of response behaviour.

Women experience significantly less web-satisfaction compared to men, which can be determined by all three internal states. As introduced in the previous section, women have less favourable perceptions of website design, and negative evaluation of site organisation and navigation (*4.5.2. Gender Differences in Organism's Internal States*). Prior is in line with findings which opined that women perceive less emotional gratification from online shopping, as the details and intricacies they rely on affects how they feel (*4.5.2. Gender Differences in Organism's Internal States*), for this reason affective states can decrease their overall satisfaction. Furthermore, the frustration and anxiety that women feel on website (*4.5.3. Gender Differences in Responding to Web-Atmospherics*) possibly inhibits their affective states and results in lower satisfaction. However, referring to the previous elaboration on gender differences in information processing, the lower satisfaction could also be determined by this cognitive difference. The design must take these differences into consideration and customise the cues for genders' internal states to result in higher satisfaction.

Purchase intention as a shopping outcome is also different in genders, and influenced by different factors. Firstly, the lower web-satisfaction of women, a response which itself is influencing purchase intention, can translate to lower purchase intention (*4.4. Response*). Secondly, it was opined that advertising visual cues as stimuli directly promotes purchase

intention in men and not in women (*4.5.3. Gender Differences in Responding to Web-Atmospherics*). Additionally, the factors introduced, performance expectancy, hedonic motivations, effort expectancy, social influence, and facilitating conditions, have different degree of influence on genders' purchase intention, reflecting possible gender differences in the internal states, which are discussed in the previous section.

Therefore, it is possible that gender differences that determine shopping outcomes exist on all levels. The influence of low task-relevant cues directly determines genders' shopping outcomes differently, the low task-relevant cues have different influence on genders' internal states, which are also different, and thus, resulting in a varying degree of satisfaction and purchase intention, which both are higher in men. These differences must be taken into consideration while designing customised low task-relevant cues to genders individually.

Based on the elaboration in the first four sections of the current chapter, next section is the outcome of this chapter, a requirement specification for the PoC online store.

5.5 Requirement Specification

This section specifies the requirements that the system should be able to do. The purpose of the system is to test the low task-relevant cues influence on genders' internal states and response behaviour. The information gathered in the *4. State of the Art* chapter and investigated in this chapter is translated to a set of system requirements – a detailed description of the systems' functions, services and operational constraints, i.e. what is to be implemented (Sommerville, 2011).

The requirements are categorised to functional and non-functional requirements. The functional requirements state the services the system should provide, how the system should react to inputs, and how the system should behave in situations, while the non-functional requirements are the constraints on the services or functions offered by the system (Sommerville, 2011). The requirements are divided to whole system, online store, and research model related requirements. Each division includes figures for illustration, and tables with prioritised statements of requirements. The MoSCoW method (Water, 2009) is used for prioritisation (i.e., the system 'must have', 'should have', 'could have', and 'would have') and are shown in the right-side column of the table, however, only 'must have' and 'should have' statements were relevant to use. Furthermore, each statement includes ID, title (function or requirement, for functional and non-functional requirement respectively), description, and rationale for proposing the requirement.

The following Table 25 provides the definitions and abbreviations used for the figures and requirements.

Table 25. Definitions and abbreviations used for the figures and requirements.

System	The whole system that is set up to instruct participant, give the clothes e-store experience to expose participant to the low task-relevant cues, and test the cues' influence on genders' internal states and response behaviour.
Online store	The clothes e-store as part of the whole system, i.e., PoC online store.
Default design	The design that is default in the online store, and is same for women's and men's products.
Custom design	The design that has the low task-relevant cues customised for genders, pages that include products for a gender are customised for that gander, i.e., the low task-relevant cues are customised for women on pages that have women's products.
FR	Functional requirements.
NFR	Non-functional requirements.
LTRC	Low task-relevant cues.
FUNC	Function – title referring to the functional requirements on the tables.
REQ	Requirement – title referring to the non-functional requirements on the tables.
DESC	Description of a requirement.
RAT	Rationale for proposing a requirement.
Cookie	A small data unit sent by the PoC website and stored on user's computer by user's browser. This cookie allows to assign and track the design assigned to user.

5.5.1 Whole System Requirements

The purpose of the whole system is to expose genders to the default and custom designed LTRC, and test the influence of these cues on genders' internal states and response behaviour (*5.1. Focus and Use of Findings for Investigation*). To expose user to LTRC design, one must complete tasks to visit necessary stages, thus user is first instructed with tasks. The activity diagram on Figure 9 illustrates how the user reads the instructions, gets either the default or custom design assigned to browse, and is directed to fill the survey when done browsing.
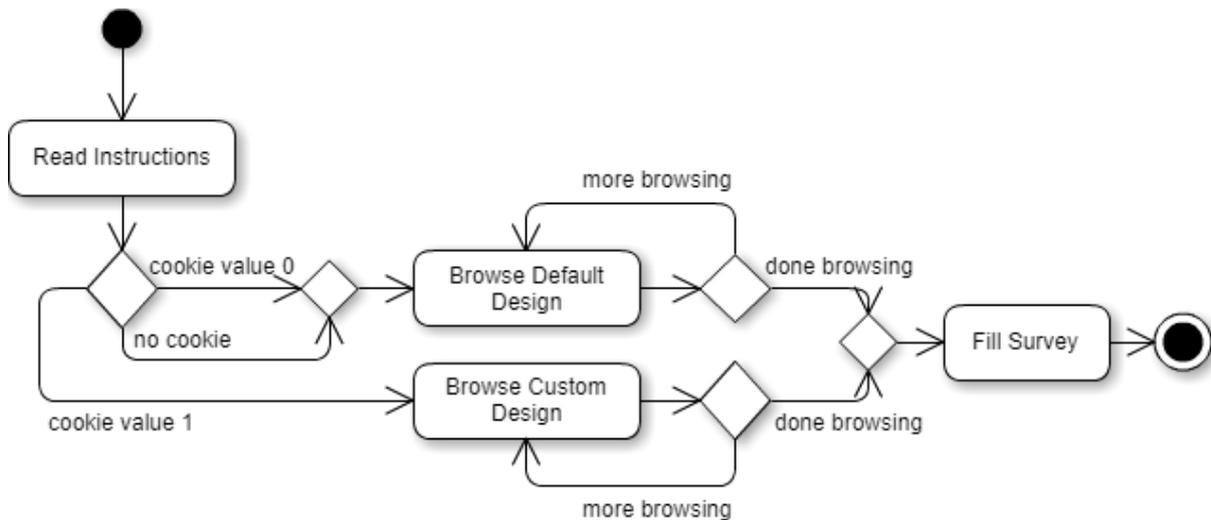
Figure 9. The whole system activity diagram.

The whole system functional requirements are presented on Table 26.

Table 26. Whole system requirements.

Whole System Functional Requirements			
FR1	FUNC	The system **must** display instructions to user.	**Must**
	DESC	When test participant enters the PoC website, the instructions to complete the test are displayed.	
	RAT	For a user to be exposed to the design and fill the survey, one must view item(s) and add item(s) to cart to proceed to the survey, accordingly tasks must be given to user (*5.1. Focus and Use of Findings for Investigation*).	
FR2	FUNC	The system **must** allow user to proceed to the PoC online store.	**Must**
	DESC	When user has read the instructions, 'continue' button allows one to proceed to the PoC online store.	
	RAT	To complete the tasks instructed, user needs to enter the PoC website (*5.1. Focus and Use of Findings for Investigation*).	
FR3	FUNC	The system **should** send a cookie to user with a randomly assigned binary value.	**Should**
	DESC	When user enters the PoC online store, cookie with random binary value is sent to user.	
	RAT	To compare the LTRC default and custom designs' influence on the internal states and response, test participants are divided to two groups. The cookie value is used by the system to decide which design to display (*5.1. Focus and Use of Findings for Investigation*).	
FR4	FUNC	The system **must** display the default design when user browser does not accept cookies, or cookie value is 0.	**Must**
	DESC	In some instances, user browser may not accept cookies, then the default design is displayed, and when the value is 0, also the default design is shown.	

	RAT	To later compare how many test participants were shown which design, all users must be shown a design (*5.1. Focus and Use of Findings for Investigation*).	
FR5	FUNC	The system **must** display the custom design when the cookie value is 1.	**Must**
	DESC	When the user enters the PoC site, and the sent cookie has value of 1, the system must display the custom design.	
	RAT	To compare the influence of designs, half of the participants should be shown the custom design (*5.1. Focus and Use of Findings for Investigation*).	
FR6	FUNC	The system **must** allow user to proceed to the survey.	**Must**
	DESC	When user has followed the instructions, and finished with the PoC online store, one can proceed to the survey from the shopping cart stage.	
	RAT	To test the influence of LTRC on genders' internal states and response, user is directed to the survey (*5.1. Focus and Use of Findings for Investigation*).	

5.5.2 PoC Online Store Requirements

To expose the LTRC to user, one must progress though the e-commerce stages (*5.1. Focus and Use of Findings for Investigation*). After user has received the instructions, user enters the PoC store. Activity diagram on Figure 10 demonstrates the flow through the PoC store. Entering the homepage, user can either search or browse items. When user has found an item, user can view the item on item's product page, and thereafter user can add the item to the cart or return to browsing. When user has added an item to the cart, user can again return to searching and browsing, or continue to view the cart. Lastly, user has options in the cart to go back to browsing or leave the PoC online store, and fill the survey.
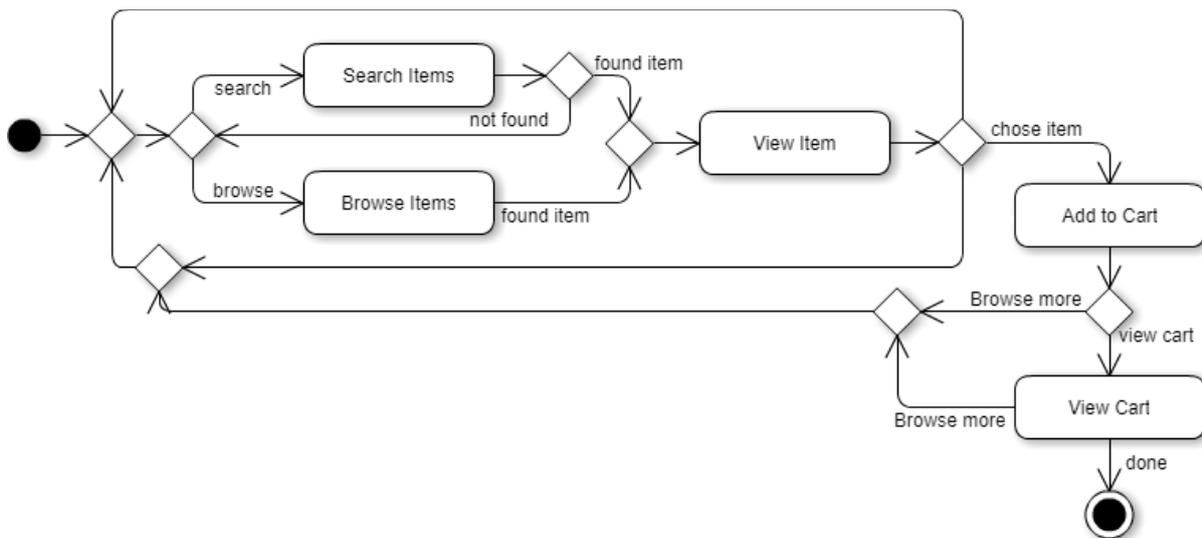

Figure 10. The e-store experience activity diagram.

Table 27 provides the list of functional and non-functional requirements for the PoC store, which enable user to experience LTRC design and continue to the survey.

Table 27. PoC online store requirements.

PoC Online Store Functional Requirements			
FR7	FUNC	The online store **must** enable user to search items with search engine.	**Must**
	DESC	Regardless of the stage in the store, user can always use the search engine in the header.	
	RAT	Since search engine is an element that is in all online stores, it must be also in PoC store (*4.7. Contents and Cues in Online Clothes Store Stages*).	
FR8	FUNC	The online store **must** enable user to browse items on homepage and browse items by category.	**Must**
	DESC	User can start browsing items on the homepage, or choose a category from navigation and browse within a category.	
	RAT	To allow user to find items that are either for women or man, user should have an option to browse items (*4.7. Contents and Cues in Online Clothes Store Stages*).	
FR9	FUNC	The online store **must** enable user to choose and view items.	**Must**
	DESC	User can click on an item to view the item's page (product page).	
	RAT	To expose user to either the default or custom design, user can enter product page, which is designed according to the product category, i.e., women's or men's product (*4.7. Contents and Cues in Online Clothes Store Stages*).	
FR10	FUNC	The online store **must** enable user to add/remove products in the cart.	**Must**
	DESC	While user is in product page, user can add/remove product to the cart.	
	RAT	To allow user to enter the cart, and proceed to the survey, user must first add item to the cart, this ensures that user has been exposed to either the default or custom design, furthermore, removing products from the cart is a common function in all stores (*4.7. Contents and Cues in Online Clothes Store Stages*).	
FR11	FUNC	The online store **must** enable user to view the contents of the cart.	**Must**
	DESC	When user has added item(s) to the cart, user can view the contents of the cart, which it the last stage where user is exposed to either the default of custom design.	
	RAT	This allows user to enter to the last stage in the PoC store, and when done experiencing the site, proceed to the survey (*4.7. Contents and Cues in Online Clothes Store Stages*).	
PoC Online Store Non-Functional Requirements			
NFR1	REQ	The online store **should** include additional common elements from the popular e-stores.	**Should**

	DESC	As popular e-stores include common elements like sign-in/register, social media links, additional information about the shop, and recommended products, the PoC store should also include some of these elements.
	RAT	For user to experience more complete online store and thus the visual design, the PoC store should incorporate common elements that popular stores use (*4.7. Contents and Cues in Online Clothes Store Stages*).

5.5.3 Research Model Related Requirements

Figure 11 presents the proposed research model to test if the LTRC, customised to genders, influence the internal states and response behaviour, compared to the default design. The model displays the default design to half of the participants, and the custom design to the other half of the participants. The model includes the gender as the mediating variable, to measure if the influence of either design on internal states is mediated by gender. The research model also investigates the web-satisfaction as response behaviour and if gender is mediating this variable. Purchase intention will be excluded from the research model, because the PoC website is developed with a purpose to test only the design, and the participants will be aware that there is no actual possibility to purchase anything from the PoC store, which can possibly influence their purchase intention. 17 items are used to measure the internal states and web-satisfaction constructs, 5 items are for pleasure, 5 for arousal, 3 for perceptual fluency, and 4 for web-satisfaction. The constructs with scale items and sources are seen in *Appendix A*.
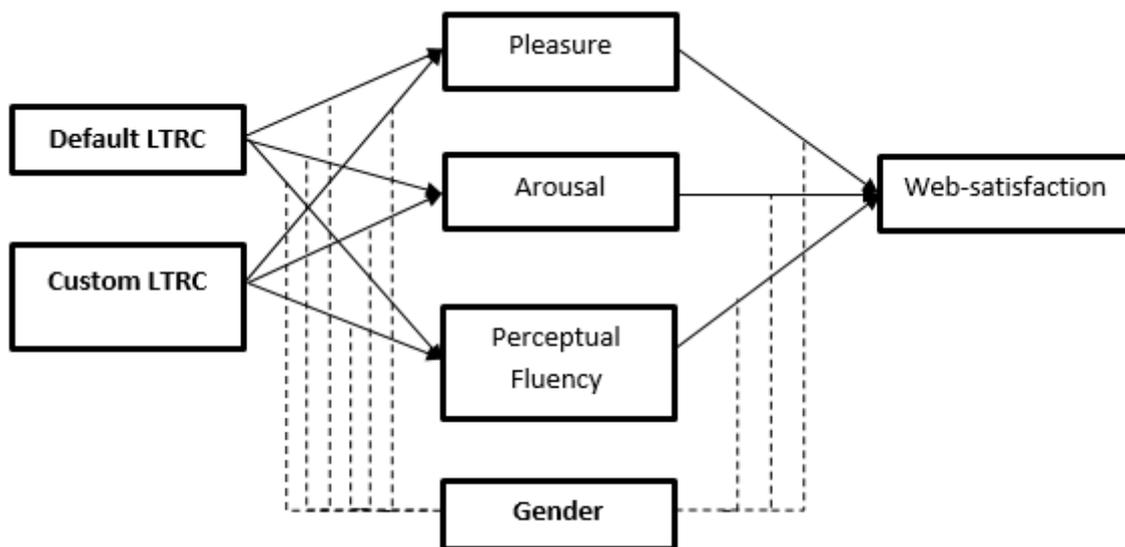
Figure 11. The research model to investigate the mediating effects of gender.

State machine diagram on Figure 12 shows which gender customised LTRC are displayed when user has been assigned a cookie with value of 1. When user is on the homepage,

user is always shown default design, as the gender cannot be assumed. When user goes to the pages related to women's products, PoC store displays the LTRC customised to women, and when user goes to pages related to men's products, the LTRC customised to men are shown. Furthermore, when user views the cart page, gender specific design will depend on the category of the most items in the cart, i.e., if most of the item's in the cart are men's, the LTRC will have men's custom design, and vice versa for women.
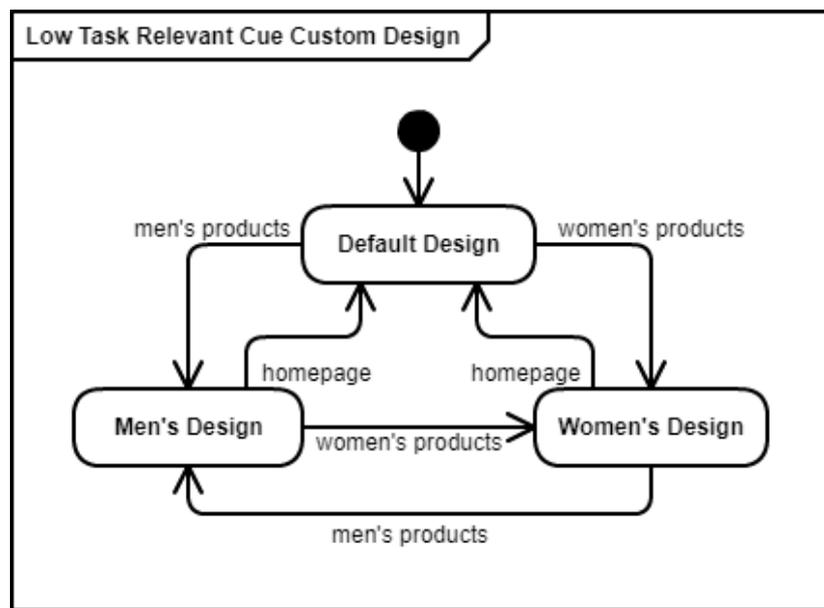
Figure 12. States of the low task-relevant cues for the custom design for genders.

Table 28 presents the functional and non-functional requirements for the system elicited from the research model.

Table 28. Research model related requirements.

Research Model Related Functional Requirements			
FR12	FUNC	The online store custom design **must** display women's design when user browses or views women's products, or has more women's products in the cart.	**Must**
	DESC	When a user, whose cookie value is 1, views women's items, or browses items in women's category, or views the cart which has more women's than men's products, the system must display the custom design for women.	
	RAT	To test the influence of the customised LTRC to genders' internal states, it is necessary to distinguish women from men, the assumption is that genders view and browse products to one's own gender (*5.1. Focus and Use of Findings for Investigation*).	
FR13	FUNC	The online store custom design **must** display men's design when user browses or views men's products or has more men's products in the cart.	**Must**

	DESC	When a user, whose cookie value is 1, views men's items, or browses items in men's category, or views the cart which has more men's than women's products, the system must display the custom design for men.	
	RAT	The same rationale applies as to FR12.	
FR14	FUNC	LTRC custom design **should** induce pleasure in women.	**Should**
	DESC	LTRC are custom designed according to gender differences and with a purpose to induce pleasure in women.	
	RAT	To test the influence of the LTRC to women's pleasure, the cues should be customised to women based on the discussion in the *5.2. Low Task-Relevant Cues Influencing Genders' Internal States* section.	
FR15	FUNC	LTRC custom design **should** induce pleasure in men.	**Should**
	DESC	LTRC are custom designed according to gender differences and with a purpose to induce pleasure in men.	
	RAT	To test the influence of the LTRC to men's pleasure, the cues should be customised to men, based on the discussion in the *5.2. Low Task-Relevant Cues Influencing Genders' Internal States* section.	
FR16	FUNC	LTRC custom design **should** arouse women.	**Should**
	DESC	LTRC are custom designed according to gender differences and with a purpose to arouse women.	
	RAT	To test the influence of the LTRC on women's arousal, the cues should be customised to women, based on the discussion in the *5.2. Low Task-Relevant Cues Influencing Genders' Internal States* section.	
FR17	FUNC	LTRC custom design **should** arouse men.	**Should**
	DESC	LTRC are custom designed according to gender differences and with a purpose to arouse men.	
	RAT	To test the influence of the LTRC on men's arousal, the cues should be customised to men, based on the discussion in the *5.2. Low Task-Relevant Cues Influencing Genders' Internal States* section.	
FR18	FUNC	LTRC custom design **should** facilitate perceptual fluency in women.	**Should**
	DESC	LTRC are custom designed according to gender differences and with a purpose to facilitate perceptual fluency in women.	
	RAT	To test the influence of the LTRC to women's perceptual fluency, the cues should be customised to women, based on the discussion in the *5.2. Low Task-Relevant Cues Influencing Genders' Internal States* section.	
FR19	FUNC	LTRC custom design **should** facilitate perceptual fluency in men.	**Should**
	DESC	LTRC are custom designed according to gender differences and with a purpose to facilitate perceptual fluency in men.	
	RAT	To test the influence of the LTRC to men's perceptual fluency, the cues should be customised to men, based on the discussion in the *5.2. Low Task-Relevant Cues Influencing Genders' Internal States* section.	
FR20	FUNC	LTRC custom design **should** reduce cognitive effort required from women.	**Should**

	DESC	While women are experiencing the site, the custom design of LTRC should reduce the cognitive effort women are supposed to put into the browsing.	
	RAT	Based on the gender differences in the internal states, custom design of the LTRC should reduce women's cognitive effort to make them more available for pleasure and arousal, which furthermore should translate into higher web-satisfaction *(5.3. Differences in Genders' Internal States Determining Shopping Outcomes)*.	
Research Model Related Non-Functional Requirements			
NFR2	REQ	The PoC online store overall design **should** be simple and aesthetical.	**Should**
	DESC	The overall visual design and the individual pages of the PoC website should be simple and aesthetical.	
	RAT	Since simplicity and aesthetics are both important factors influencing organism's internal states and response, the visual design should be designed considering both factors *(5.2. Low Task-Relevant Cues Influencing Genders' Internal States)*.	

6   Design and Implementation

Current chapter describes how the requirements from the end of previous *5. Analysis* chapter were implemented. The chapter is structured to three sections, based on the categories of requirements, whole system, PoC online store, and research model related requirements.

There is plethora of e-commerce platforms available for building an online store. Based on www.top10ecommercesitebuilders.com website, which rates and overviews different e-commerce platforms, WooCommerce platform was chosen for this project, and the reason being, using WooCommerce is free of charge. Since WooCommerce is a platform for WordPress, the PoC website was set up with WordPress, an open source content management system. Furthermore, WooCommerce is easily customisable platform, which already includes or has installable necessary stages and functions for an e-commerce clothes store. WordPress also allows to change a template (called 'theme' in WordPress), to change the set up and look of a website. After exploring multiple themes, 'Fashion' theme developed by OpalTheme was chosen for the PoC online store, the theme was chosen as it is specialised for clothes store and the design looked similar to the researched both genders' stores (*4.7. Contents and Cues in Online Clothes Store Stages*). However, there are many other themes that also looked similar to popular stores, Fashion theme was chosen arbitrarily instead any other theme, as it fulfilled the need of looking similar to other stores. As a result, Fashion theme default design was usable for as the default design for the test. Additionally, there was a need to host the website on the Internet, based on the www.top10bestwebsitehosting.com ratings and reviews, and a discount offered by GoDaddy service, for setting up the website, GoDaddy hosting service was used.

6.1   Whole System

This section elaborates on how the whole system requirements were implemented, which includes functional requirements FR1 – FR6 (*5.5.1. Whole System Requirements*).

FR1. The instructions are displayed on the first page (i.e., the introduction page), to where user enters via a provided link. The tasks are given to user as a numbered list to signify the order of the tasks. Screenshot of the introduction page is in *Appendix C,* Figure 30.

1. Browse clothing items in the online store.
2. Find an item and view the product page.
3. Choose and add an item to the shopping cart.
4. View the shopping cart.
5. When done browsing, proceed to the survey.

FR2. The introduction page includes a button leading to the online store. The button is positioned under the instructions list, titled 'CONTINUE'. See Figure 30 in *Appendix C*.

Figure 13 illustrates PHP (server-side scripting language) in the backend which generates a response to user browser's request, and the communication of JavaScript (frontend scripting language for behaviour) and CSS (Cascading Style Sheet for presentation) with HTML (Hypertext Markup Language for page content and structure) in the frontend. The complete code of additional JavaScript and CSS used for PoC website is in the external accompanying ZIP package named 'Additional JS and CSS code'.
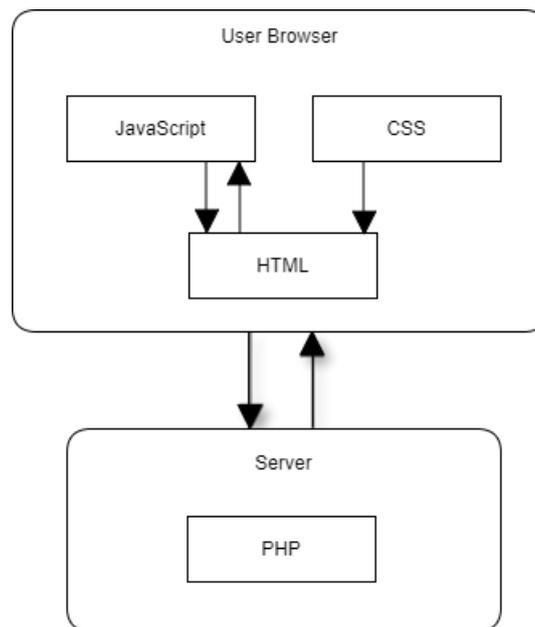
Figure 13. The System's design customisation.

FR3. When user requests to enter the store, after the tasks are given, the system (PHP in the backend) checks if a cookie is set, if there is no cookie, the system randomly generates binary value for the cookie and sets the cookie to user (Figure 14).

```php
if (!isset($_COOKIE["styleCookie"])){
        add_action( 'init', 'my_setcookie' );
}

function my_setcookie() {
        $cookieValue = rand(0,1);
        setcookie("styleCookie", $cookieValue, time() + 36000, COOKIEPATH, COOKIE_DOMAIN  ) ;
}
```

Figure 14. PHP code example to check and set cookie.

FR4 and **FR5**. When user requests any page, the system in the backend adds the cookie value to the HTML body tag's 'style-' class (Figure 15). Hence, the system can use the assigned

class and style the page accordingly. If there is no cookie, the style class will be without value 'style-', if the cookie value is 0, the style class will be 'style-0', and if the cookie value is 1, the style class will be 'style-1'. In case the class is either 'style-' or 'style-0', the system uses the default design, but when the class is 'style-1', the system uses the custom design.

```php
<body <?php echo 'class="style-' . $_COOKIE["styleCookie"] . '"'; ?> <?php body_class(); ?>>
```

Figure 15. PHP code example of adding cookie value to HTML body tag.

FR6. When user is done browsing a button is placed to direct user to the survey. The button is positioned where commonly is the 'CHECKOUT' button. The button is titled 'PROCEED TO SURVEY'. See Figure 35 in *Appendix C*.

6.2 PoC Online Store

Current section explains the implementation of the PoC online store related functional requirements FR7 – FR11, and non-functional requirement NFR1.

To have products for users to browse, two categories of items are added for both genders to the PoC store, jeans and shirt. Jeans and shirts categories were arbitrarily chosen as these are existing in all stores, and 6 to 8 items were added to each category, an amount that filled the catalogue page. The images for all the products were downloaded from Amazon.com.

FR7. The search engine that WooCommerce includes was used. The search bar is positioned it in the right side of the header, as it is common in the popular stores (*4.7. Contents and Cues in Online Clothes Store Stages*).

FR8. A row of women's and row men's products are added to the homepage for user to browse. Furthermore, 'women' and 'men' links are added to the navigation of the header as top hierarchy categories, that user can choose. Furthermore, 'jeans' and 'shirts' as sub-categories are added to both 'women' and 'men' categories to the sub-navigation.

FR9. From the search results or during browsing, the images and names of items are clickable, which leads user to the product page. The 'SELECT OPTIONS' button shown on Figure 33 in *Appendix C*.

FR10. When user is on product page, user can add the product to the cart. See Figure 34 in *Appendix C*.

FR11. After user has added item(s) to the cart, user can click the 'VIEW CART' button and view the cart. See Figure 31 in *Appendix C*.

NFR1. 'Sign in/register' and 'Language' are added to the header, 'Related Products' as products recommended to user to the body of product page, and 'About the shop' additional information and social media link to the footer. In the introduction page, disclaimer is added to notify user that 'Sign in/register', 'Language', and social media links are not functioning, but are to emulate actual store visual design. See Figure 32 in *Appendix C*.

6.3   Default and Custom Design

This section describes the design and implementation of non-functional requirement NFR2, and functional requirements FR12 -FR20.

NFR2. Before describing the design of functional requirements that are concerned with the design of low task-relevant cues, NFR2 must be covered. According to NFR2, the overall design should be simple and aesthetical, criteria which will be considered while designing any of the following functional requirements. Therefore, the custom designs for both genders should foremost remain simple and aesthetical, which constrains the customisation. The design should not 'over' customise any of the low task-relevant cues as this can counteract with the need for simplicity and aesthetics.

FR12 and **FR13**. When the cookie value of 1 has assigned 'style-1' class to the webpage, the CSS stylesheet uses this class for custom styling. The system checks which page user is on, i.e., catalogue page or product page for item(s) for which gender. If the category is women's, or sub-category is women's jeans or shirts, or the product is women's, the system adds 'women' style class to the page. This is done by JavaScript checking the HTML tag's classes, Figure 16 demonstrates how JavaScript checks which navigation tab is 'active', and accordingly adds a class of gender to the HTML body tag. While in the shopping cart, the system checks all the products in the cart, identifies if a product is women's or men's, thereafter sums up the number of women's and men's products in the cart, and displays the design to gender that has more products in the cart, e.g. if most products are women's, the system adds 'women' style class to the page. Thereafter, the system uses class 'women' to use the custom design for women. The implementation for FR13 is same as for FR12, but the system adds 'men' style class.

```
function addCategory(){
        if (jQuery('#main-menu > li:nth-child(2)').hasClass('active')){
                jQuery('body').removeClass('women').addClass('men');
        }
        if (jQuery('#main-menu > li:first-child').hasClass('active')){
                jQuery('body').removeClass('men').addClass('women');
        }
}
```

Figure 16. JavaScript code example of checking the page category user is on.

Figure 18 – 21 illustrates the custom design for women. The design of the header is shown on Figure 18, the design of the catalogue page on Figure 19, the design of the product page on Figure 20, and the design of the shopping cart on Figure 21. The designs are indented to induce pleasure, arouse, and facilitate perceptual fluency in women. The application of low task-relevant cues for specific elements are argued and in the sub-sections of the *5.2. Low Task-Relevant Cues Influencing Genders' Internal States* section.

As an example of CSS code used for styling, Figure 17 demonstrates a snippet of CSS that custom styles (based on '.style-1' class) HTML button elements for men's (based on '.men' class) and women's pages (based on '.women' class). The exact blue and pink colour values (#1D3557 and #ff9393 on Figure 17) were chosen from http://www.color-hex.com website (a website that provides a selection of colour palettes), based on looking similar to the pink and blue used by women's and men's popular stores respectively (4.7. Contents and Cues in Online Clothes Store Stages). Furthermore, shown on Figure 17, button shape for women's design is rounded by applying the CSS border-radius property.

```
.style-1.men .product-info button {
    background-color: #1D3557;
}

.style-1.women .product-info button {
    background-color: #ff9393;
    border-radius: 10px;
}
```

Figure 17. CSS code example of styling men's and women's custom button.

Figure 18. Custom design for women store header.

FR14. To produce pleasure for women, bright and saturated colours are used, furthermore, pink and turquoise hues are used. For the same purpose, horizontal thin lines are used for separation, and round shapes are used for sections, buttons, and icons. Serif font is used, with mostly lowercase letters, whereas uppercase letters are used for navigation and buttons.
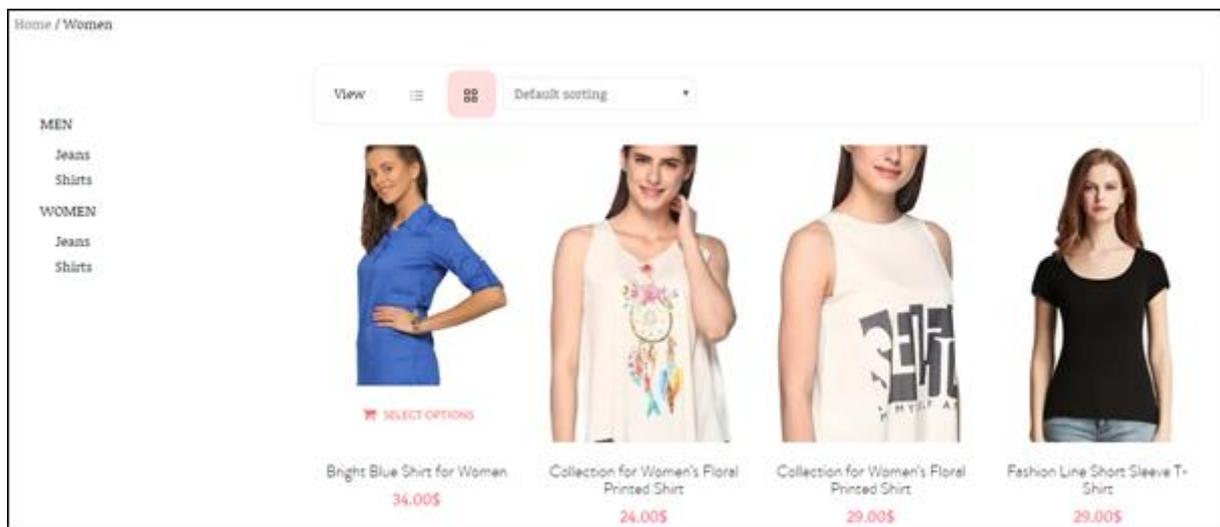
Figure 19. Custom design for women's catalogue page.

FR16. To arouse women, none of the hues of colours were found appropriate, as it they would counteract the purpose to induce pleasure. For the same reason, line and shape cannot be used to arouse women. However, typography is used for the purpose, moreover, the size of and the casing of the text. Navigation and buttons are in uppercase letters and headings are in large font.
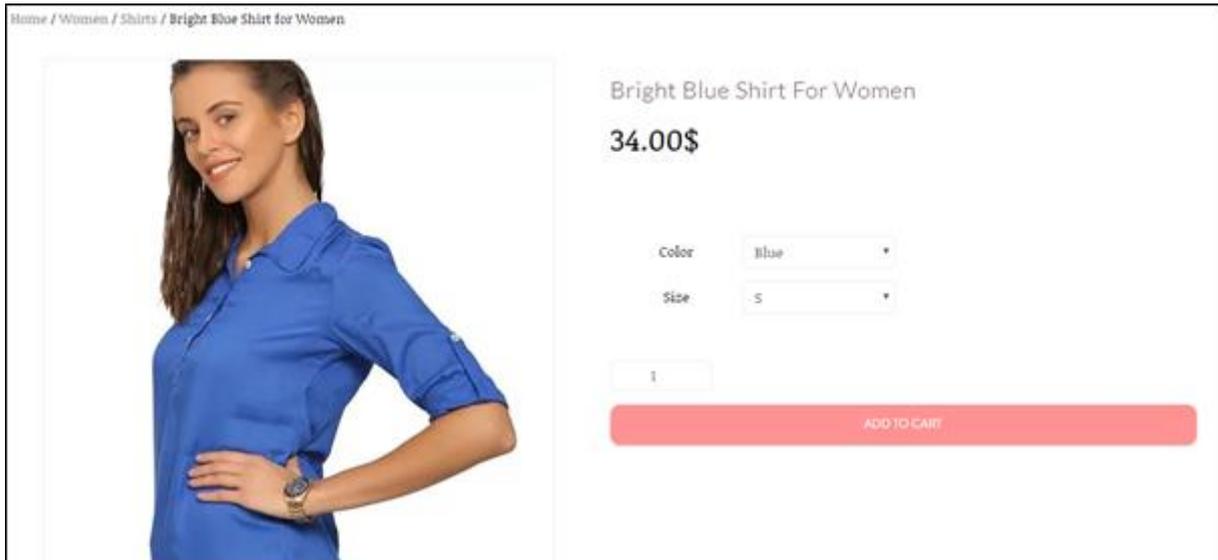
Figure 20. Custom design for women's product page.

FR18 and **FR20**. For the purpose to facilitate perceptual fluency in women and reduce their cognitive effort, colours used are not too bright, and white, black, grey, and turquoise hues are used. Thin vertical lines are used to separate links in the header and thin horizontal lines are used to separate parts the page and contents in the cart. However, the *5.2.2. How Lines Influence Genders' Internal States?* sub-section concluded to use horizontal lines for the vertical navigation, but since there were too little contents in that navigation, no lines were implemented. The rectangular, and round or oval shapes are used for sections to draw attention and emphasise important information. The typographical elements like font colour, size, spacing are used to make the text readable and easy to notice. Furthermore, the headers and buttons are in uppercase letters to make them clear.
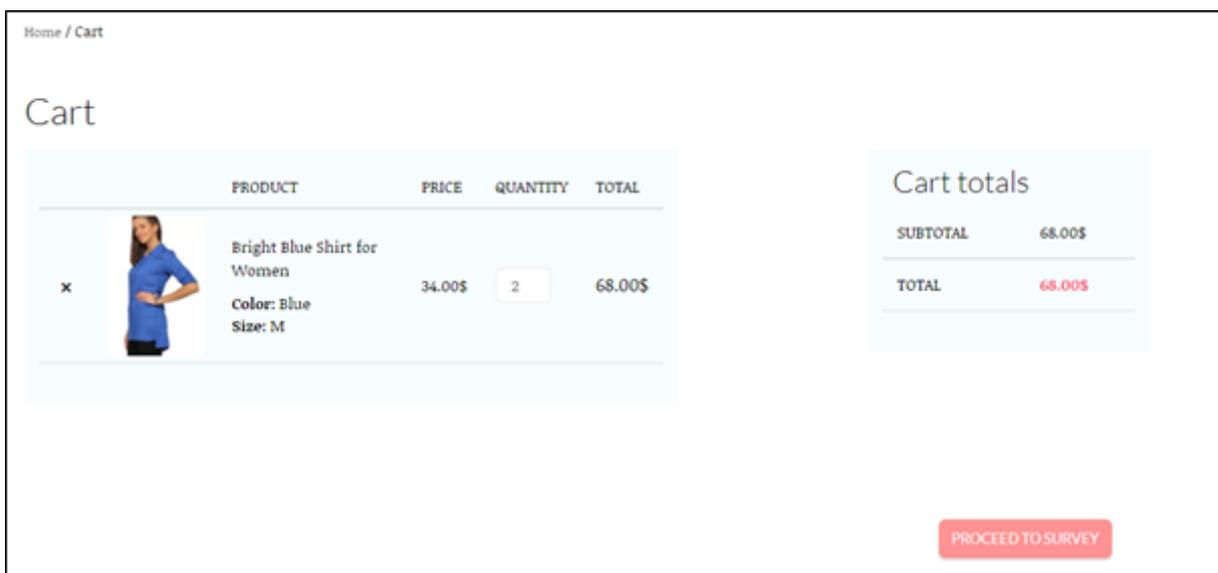
Figure 21. Custom design for women's shopping cart.

Figure 22 – 25 illustrates the custom design for men. Figure 22 shows the header, Figure 23 shows the catalogue page, Figure 24 shows the product page, and Figure 25 shows the shopping cart. The custom design on figures are with the purpose to induce pleasure, arouse, and facilitate perceptual fluency in men. Again, the use of low task-relevant cues is argued in the sub-sections of the *5.2. Low Task-Relevant Cues Influencing Genders' Internal States* section.

Figure 22. Custom design for men's store header.

FR15. Like for women, bright and saturated colours are used to induce pleasure for men. In addition, white, black, red, and blue hues are used for pleasure. Furthermore, thin horizontal lines, and square and rectangular shapes are used. Typography is designed to induce pleasure with colour, sans serif, and size.
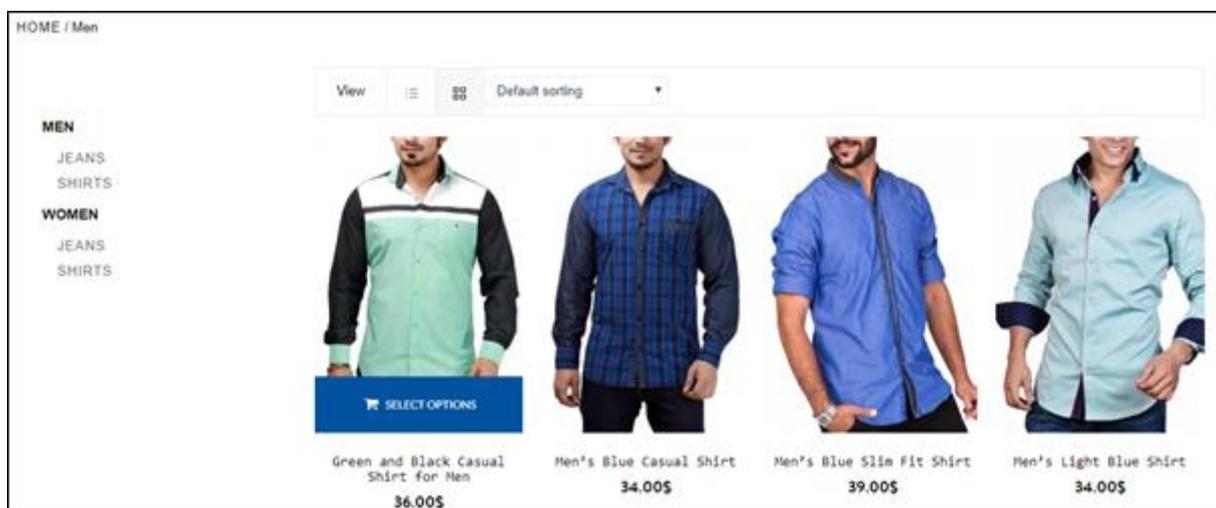
Figure 23. Custom design for men's catalogue page.

FR17. To arouse men with low task-relevant cues, red colour, and thick lines are used. For the same purpose, typography uses red colour, sans serif, large size, thicker font, and uppercase letters.

Figure 24. Custom design for men's product page.

FR19. For the purpose to facilitate perceptual fluency in men, colours are not too bright, and white, black, blue, red, and grey hues are implemented for men's cognitive faculty. Furthermore, both thin and think horizontal lines, together with rectangular shapes are used. Colour and size are used for typography to grab attention. Furthermore, sans serifs, and uppercase letters are used to make shorter text and buttons to stand out, while lowercase letters are used to make the longer text readable.
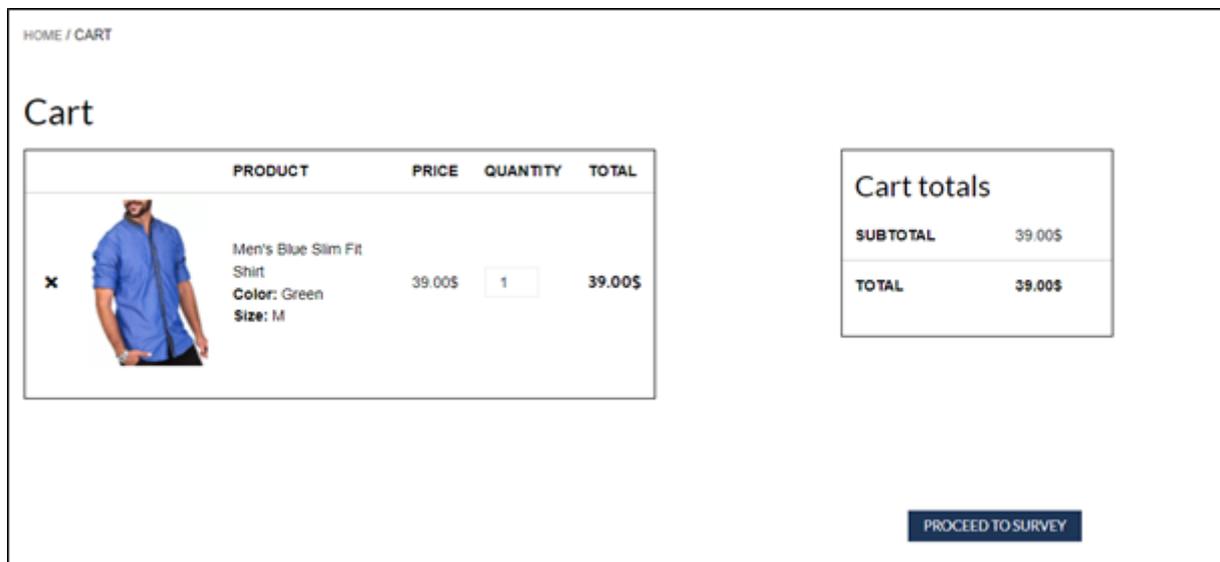
Figure 25. Custom design for men's shopping cart.

7 Test and Results

A test was carried out to test the research model, if the customised low task-relevant cues, compared to the default ones, have different influence on the internal states and resulting response behaviour, and if there are differences in terms of genders. The chapter first presents the data collection procedure and sample characteristics, and thereafter, the results of comparing if the designs have significantly different influence, and if genders' internal states and response are significantly different.

7.1 Data Collection and Sample Characteristics

Google Forms was used to create the online survey. The survey first inquired demographics of a participant, if one shops online, one's gender, and age, thereafter, the survey included questions with the measurement items.

Before conducting the main study, a pilot test was carried out. A male participant aged 32 was given the PoC site while a conductor observed. The test was completed without any issues, and as a result the PoC website along with the survey was confirmed usable for the main study.

The data for the main study was collected via Mechanical Turk (www.mturk.com), which is a crowdsourcing platform to create a project and assign a desired number of workers to complete the job (Ross et al., 2010). The platform has over 500,000 workers from 190 countries. The survey project created in Mechanical Turk requested the workers to complete the tasks in the PoC online store and thereafter fill the survey, each worker was paid $0.10 on completion. Initially 200 survey completions were requested, however, after 24 hours, 164 were completed, and due the time constraints the test was ended. All the completed surveys were found usable. However, it must be noted, that since the participants were rewarded on completing the test, possible bias could have occurred. Given that the participants were motivated by the money, they could have been interested in quickly completing the test to collect the reward. Furthermore, workers could have been biased to rate the survey items higher to satisfy the job requester.

All the 164 participants answered that they shop online. The responses included 72 women and 92 men, detailed demographics are seen on Table 29. Out of the 164 participants, 87 completed the default design test with 35 women and 52 men, and 77 completed the custom design test with 37 women and 40 men. See *Appendix D* for demographics of the default and custom design participants separately.

Table 29. Demographics of the whole sample.

Variable		Frequency	Percent
Gender	Female	72	44
	Male	92	56
Age	18 - 25	49	29.9
	26 - 35	76	46.3
	35 - 50	32	19.5
	50 +	7	4.3

7.2 Results of Comparing Internal States and Response

All the tests were conducted with Microsoft Excel, using XLSTAT software. The measurement items were tested for internal consistency using Cronbach's Alpha, which should provide a value between 0 and 1, and a value higher than 0.7 is considered acceptable. Table 30 shows the Cronbach's Alpha values for measuring all constructs with corresponding items. All the values are above 0.817, confirming the internal consistency of the items to measure the constructs.

Table 30. Validity of measurement scales.

Construct	Number of Items	Cronbach's Alpha
Pleasure	5	0.864
Arousal	5	0.837
Perceptual fluency	3	0.818
Satisfaction	4	0.845

Table 31 and 32 shows the means of genders' pleasure, arousal, perceptual fluency, and satisfaction resulting from both designs. Means for pleasure, perceptual fluency, and satisfaction are above 5.388, while the mean for arousal remained between 4.449 and 4.77. The default design resulted always in higher mean for women, compared to the custom design.

Thereafter, the data was used to run 16 two-sample t-tests, to compare the observed means and determine if they are significantly different. However, the t-test assumes normal distribution of the data, which the data was tested for, and it was found that the data does not follow normal distribution, nevertheless the t-tests were carried out. The alpha value for tests were 0.05, meaning there is a 95% confidence interval of making right decision. First 8 tests (Table 31 and 32) compared if the default design had significantly different influence on men's and women's internal states and response, and if the custom design had significantly different influence on genders' internal states and response. All the p-values are higher than 0.368. The lowest result of 0.369 from comparing arousal produced by the custom design to women and

men shows 36.9% risk to wrongly conclude that there is significant difference between the means. All the other results are higher and confirm that there is no significant difference in the measured internal states and response between women and men.

Table 31. T-test comparing gender differences in pleasure and arousal.

Variable	Operational variable	Pleasure		Arousal	
		Mean	p-value	Mean	p-value
Default d.	Women	5.600	0.572	4.514	0.595
	Men	5.554		4.665	
Custom d.	Women	5.389	0.526	4.449	0.369
	Men	5.525		4.770	

Table 32. T-test comparing gender differences in perceptual fluency and satisfaction.

Variable	Operational variable	Perceptual Fluency		Satisfaction	
		Mean	p-value	Mean	p-value
Default d.	Women	5.714	0.519	5.521	0.512
	Men	5.705		5.692	
Custom d.	Women	5.658	0.631	5.486	0.582
	Men	5.583		5.638	

The next 8 tests compared if the default and custom design had significantly different influence on women's internal states and response, and if the default and custom design had significantly different influence on men's internal states and response. Table 33 and 34 shows that all the p-values are above 0.355, meaning there is no significant difference between the influence of the default design and custom design on any of the internal state and response.

Table 33. T-test comparing the default and custom designs differences in pleasure and arousal.

Variable	Operational variable	Pleasure		Arousal	
		Mean	p-value	Mean	p-value
Women	Default d.	5.600	0.475	4.514	0.775
	Custom d.	5.389		4.449	
Men	Default d.	5.554	0.600	4.665	0.599
	Custom d.	5.525		4.770	

Table 34. T-test comparing the default and custom designs differences in perceptual fluency and satisfaction.

Variable	Operational variable	Perceptual Fluency		Satisfaction	
		Mean	p-value	Mean	p-value
Women	Default d.	5.714	0.356	5.521	0.895
	Custom d.	5.658		5.486	
Men	Default d.	5.705	0.552	5.692	0.822
	Custom d.	5.583		5.638	

8 Discussion

The purpose of the study is to apply the SOR paradigm to construct a model to customise e-commerce web-atmospherics to genders' internal states to improve their shopping outcomes, which lead to the formulation of the research problem (*1.2. Problem Formulation*). The problem is concerned with how e-commerce web-atmospherics influence genders' internal states which then determine shopping outcomes. To understand the variables of the problem and provide an answer to it, three research questions were asked, to which, possible answers are elaborated in the following section.

8.1 Answers to Research Questions

Current section is structured to first present a research question inside the quotation marks and in italics, and subsequently discuss possible answers to the question.

"What are the e-commerce web-atmospheric cues that influence genders' internal states"

The focus on the web-atmospherics is interested in low task-relevant cues, since compared to high task-relevant cues, changing the design of the former can potentially have positive impact on user (*4.1. Web-atmospherics*). The secondary research provided insights that colours, lines, shapes, and typography all have an influence on genders' internal states (*4.2. Stimulus – Low Task-Relevant Cues*). Moreover, an application of any of these cues can positively or negatively influence each of the internal states under investigation, pleasure, arousal, and perceptual fluency (*4.3. Organism*). Findings regarding the conveyed meanings and implications of using a certain colour, type of line, and type of shape (*5.2. Low Task-Relevant Cues Influencing Genders' Internal States*) suggest that using a particular cue which has characteristics that can be associated with pleasure, arousal, or easing cognitive effort, could by this association influence any of the internal states. Furthermore, by the same association, these connotations and implications of colours, types of line, and types of shape could be conveyed by applying them to typography. In addition, secondary research also found that genders have different preferences of all the low task-relevant cues (*4.5.1. Gender Differences Related to Low Task-Relevant Cues*).

The test results comparing the default and custom design's influence on the genders' internal states show no significant difference in the influence (*7.2. Results of Comparing Internal States and Response*). Since both, the default and custom design used lines, shapes, and typography, there are no grounds to speculate on their influence between the designs.

However, the difference in the use of colour for the designs is noteworthy, the default design used only white, grey, and black, whereas the custom design used chromatic colours customised for each gender (i.e., pink and turquoise for women, and blue and red for men) (*6.3. Default and Custom Design*). Although, the additional colours were used sparingly for the custom design, and based on this use and the test results, the additional colours did not have an influence on internal states or response. Colours' lack of influence is contradicting the findings from other studies, which have concluded that colours indeed influence the internal states and response (*4.2. Stimulus – Low Task-Relevant Cues*), for this reason, the speculation is that the use of colour and thus the difference between the designs was too small to have an impact. Furthermore, the same speculation must be made about other low task-relevant cues, the customisation difference with the default design was too insignificant.

The lack of significant difference between the default and custom design can be related to two points made in the *4.4. Response* section. It was opined that the first impressions formed within the first 50 milliseconds influence the attitude about rest of the website, and the main features and general appearance makes the difference to the visitor. The first impressions for both designs came from the same introduction page, and the general appearance between the default and custom design remained similar. Hence, while the first impression came from same page for both designs and the overall general appearance did not have enough differences, the customised low task-relevant cues did not have enough influence.

"*What are the differences in genders' internal states that determine shopping outcomes?*"

Provided that the second and third research question investigating gender differences regarding internal states and how the shopping outcomes that are determined by genders' internal states were not empirically tested as part of the primary research, the answers are based on the secondary research.

The secondary research revealed that in online shopping context, men's overall affective and cognitive evaluations are higher than those of women's (*4.5.2. Gender Differences in Organism's Internal States*). In addition, women's and men's information processing approach also differs, women as comprehensive processors, tend to process all available information, while men as selective processors rely on specific and readily available cues (*4.5.2. Gender Differences in Organism's Internal States*). Prior differences in the internal states also translate to genders' shopping outcomes (*4.5.3. Gender Differences in Responding to Web-Atmospherics*), which in overall is lower in women.

In contrast, the test results show no significant difference between genders' internal states. While it is contradicting what other studies have found about gender differences, it was also suggested in the *4.5.3. Gender Differences in Responding to Web-Atmospherics* sub-section, that because the gender differences in e-commerce adoption and online shopping are narrowing, the factors affecting e-commerce acceptance are disappearing.

"What are the possible shopping outcomes determined by genders' internal states?"

The *4.4. Response* section argues how satisfaction as response behaviour is influenced by web-atmospherics and the internal sates, and how it also leads to purchase intention. Furthermore, the *4.5.3. Gender Differences in Responding to Web-Atmospherics* sub-section suggests that men's overall higher internal states translate into higher satisfaction.

The mean of women's satisfaction was lower than men's for both designs, but the significance test concluded there is no meaningful difference. Again, this is contradictory what other researchers have suggested (*4.5.3. Gender Differences in Responding to Web-Atmospherics*), but again, could be the result of disappearing gender difference in online shopping.

8.2 Unexpected Results, Explanations, and Limitations

The secondary research indicated the potential influence of specific low task-relevant cues (*4.2. Stimulus – Low Task-Relevant Cues*), gender differences in the preference of low task-relevant cues, and differences in the genders' internal states (*4.5. Gender Differences Related to the SOR Model*). Which lead to the expectation that a significant difference should exist between either, between the designs used for the low task-relevant cues, or between the genders, or both. Yet, there was no significant difference in either of the dimension.

As speculated in the preceding section, the lack of difference between the designs could be contributed to the same first impressions and the lack of difference in overall appearance, however, it could be also contributed to the limited interactions the users had to carry out. The PoC website was tested by Mechanical Turk workers, who were paid to complete the tasks, whom might have quickly followed through the website. The tasks given could be considered trivial to a consumer who shops online, and therefore the tasks could be completed without engaging enough with the store, thus the difference in web-atmospherics did not have the possibility to have strong enough impact. Furthermore, opined in the *7.1. Data Collection and Sample Characteristics* section, the Mechanical Turk workers could have been biased to rate the survey items higher to please the job requester, who rewarded them for completing the job.

Since the study was investigating web-atmospherics influence, and the results show no difference in any of the dimensions, another alternative explanation arises related to the test sample. The test was measuring the influence of web-atmospherics, and all the participants started from the same environment, the Mechanical Turk website, and filled the survey in the same Google Forms environment, which could bias the users' evaluations of web-atmospherics beyond the PoC store.

Interestingly, most of the other studies insisted gender differences in all the relevant aspects, there was no significant difference in influencing women and men by neither design. This lack of difference can be attributed to the aforementioned disappearing online shopping differences between women and men. But again, the limited functionality of the store may not be enough to engage the cognitive faculty to the extent that the information processing differences in genders would have manifested in the results, as speculated in the *5.3. Differences in Genders' Internal States Determining Shopping Outcomes* section.

8.3   Summary and Future Research

The PoC website was designed to test the difference in influence of the default and customised low task-relevant cues to genders' internal states and response behaviour, and the results revealed that no significant difference existed under these conditions. There was no difference in the influence of the default and custom design, and there was no difference between the genders.

However, while the test revealed no significant differences, the study provides important lessons for future research. Selecting the appropriate meanings of individual cues and applying them based on these, requires investigation on how these cues create the overall appearance. While the gender differences exist in the preference of cues and internal states, according to the *4.5.1. Gender Differences Related to Low Task-Relevant Cues* section, the context and level of engagement of test should be considered, as this can possibly influence the degree to which the gender differences are taking effect. Finally, when customising the web-atmospherics to genders' internal states and response, to measure the influence, the customisation should focus on one cue per test, with different levels of customisation, for better assessment of specific cue's influences.

9 Conclusion

The purpose of this study was to use the SOR model to investigate how web-atmospherics influence genders' internal states that then determine the shopping outcomes, and use the knowledge to customise web-atmospherics for genders. This problem has been attempted to solve by researching influences of web-atmospherics, gender differences, popular online stores, and using the findings to develop a research model and a PoC online store to investigate customisation possibilities.

It was found from the literature that web-atmospherics indeed influence consumer's internal states and shopping outcomes, furthermore, the SOR model has been proven useful framework to investigate the effects of online shopping environment. One of the motivations for the project opined that perception of atmospherics is an individual matter, but an online store design is generally same for all consumers. Secondly, since gender is excessively used for segmentation, and findings suggest that genders are different in terms of online behaviour, e-commerce usage, information processing styles, and preferences related to web design, current study was motivated to address the gap in literature regarding how to customise web-atmospherics to genders in an online store.

The secondary research revealed that changing low task-relevant cues can have a positive effect on internal states, and that low task-relevant cues can have different influence on internal states. Furthermore, colour, line, shape, and typography became the low task-relevant cues under investigation, because these cues were found to effect internal states and shopping outcomes, and genders' preferences regarding these cues differ. Pleasure, arousal, and perceptual fluency became relevant internal states, as they are influenced by low task-relevant cues, and gender differences exist in these states, moreover, these internal states have found also to determine shopping outcomes. Additionally, research on popular online stores confirmed these differences, as one gender exclusive stores use the cues in a way that is consistent with the literature.

PoC online store was develop based on the individual characteristics of the cues, gender preferences of the cues, gender differences in internal states and response behaviour, and the assessment of the popular online clothes stores. Thereafter, the PoC website was used to measure the influence of low task-relevant cues on the genders' internal states and shopping outcomes, to find possible ways for customising and thus improving shopping environment for genders.

Survey was conducted to collect data from using the PoC store, and sixteen tests were run to compare the differences between the default and custom design's influence, and differences between the genders. All the tests found no significant difference between any of the measured groups.

Several lessons can be learned from this research. While changing the design of the low task-relevant cues for a specific purpose, the general appearance of a website is still likely the main contributor to the influence on the internal states and response behaviour. This is suggested by comparing the default and custom design, where the overall difference was insignificant, as the customisation of the low task-relevant cues was modest. Furthermore, while investigating the influence of web-atmospherics, users' first impressions must be considered, as these have lasting impact for rest of the site. Moreover, when investigating web-atmospherics, the test procedure must be designed accordingly, in terms of how the participants are directed to the environment, and the environment the survey is filled in. While the literature agrees in gender differences regarding online shopping related aspects, one study pointed out that the gender differences in this regard are decreasing. Thus, the attempts to test customisation, the design changes based on gender differences must be strong enough to be expressed in the influences. In addition to the level of design change, based on the developed PoC online store and the test results, it will be suggested that tasks given to a user should be engaging the user to an extent that requires enough cognitive effort to reveal gender differences regarding cognitive internal state.

While the primary research results are contradicting most of the findings of other studies, former are not sufficient enough to disprove other findings. From this report, it can be concluded, that in the context of online shopping low task-relevant cues have the potential to influence each genders' internal state, and therefore determine shopping outcomes, however, the customisation requires high degree of change and engaging enough interaction for the possibility to see the effects of customisation.

References

1. Ainsworth, J., & Ballantine, P. W. (2017). Consumers' cognitive response to website change. Journal of Retailing and Consumer Services, 37, 56-66.

2. Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. Psychological Bulletin, 84, 888-918.

3. Akcay, O. (2011). Perception of Color in Product Choice among College Students: A Cross-National Analysis of USA, India, China and Turkey, International Journal of Business and Social Science, 2: 42-49.

4. Appearance - definition of appearance in English | Oxford Dictionaries. (n.d.). Retrieved August 07, 2017, from https://en.oxforddictionaries.com/definition/appearance

5. Aslam, M. (2006). Are You Selling the Right Color? A Cross-cultural Review of Colour as a Marketing Cue, Journal of Marketing Communications, 12(1):15–30.

6. Attractiveness - definition of attractiveness in English | Oxford Dictionaries. (n.d.). Retrieved August 07, 2017, from https://en.oxforddictionaries.com/definition/attractiveness

7. Babin, B. J., Hardesty, D. M., & Suter, T. A. (2003). Color and shopping intentions: The intervening effect of price fairness and perceived affect. Journal of business research, 56(7), 541-551.

8. Baker, J., Levy, M., & Grewal, D. (1992). An experimental approach to making retail store environmental decisions. Journal of Retailing, 68(4), 445.

9. Ballast, D. K. (2002). Interior design reference manual. Professional Pub. Inc.: Belmont, CA.

10. Bar, M. & Neta, M. (2006). Humans prefer curved visual objects. Psychological Science, 17: 645–648.

11. Bauerly, M., & Liu, Y. (2008). Effects of symmetry and number of compositional elements on interface and design aesthetics. International Journal of Human–Computer Interaction, 24(3), 275–287.

12. Benlian, A. (2015). Web personalization cues and their differential effects on user assessments of website value. Journal of Management Information Systems, 32(1), 225-260.

13. Berlyne D.E. (1976). Psychological aesthetics, International Journal of Psychology, 11: 43–55.

14. Bonnardel, N., Piolat, A., & Le Bigot, L. (2011). The impact of colour on Website appeal and users' cognitive processes. Displays, 32(2), 69-80.

15. Bradley, S. (2013). Design Fundamentals: Elements, Attributes and Principles, VanseoDesign, Colorado-Boulder.

16. Carter, R., Meggs, P. B., & Day, B. (2011). Typographic design: Form and communication. John Wiley & Sons.

17. Cerrato, H. (2012). The meaning of colors.

18. Chandrashekar, J., Yarmolinsky, D., Von Buchholtz, L., Oka, Y., Sly, W., Ryba, N.J.P. & Zuker C.S. (2009). The taste of carbonation, Science, 326: 443–445.

19. Chang, H. H., & Wang, H. W. (2011). The moderating effect of customer perceived value on online shopping behavior. Online Information Review, 35(3), 333-359.

20. Choi, J. H., & Lee, H. J. (2012). Facets of simplicity for the smartphone interface: A structural model. International Journal of Human-Computer Studies, 70(2), 129-142.

21. Chowdhury, A., Karmakar, S., Reddy, S. M., Ghosh, S., & Chakrabarti, D. (2014). Usability is more valuable predictor than product personality for product choice in human-product physical interaction. International Journal of Industrial Ergonomics, 44(5), 697-705.

22. Clarke, T. & Costall, A. (2007). The emotional connotations of color: a qualitative investigation. Color Research and Application, 33 (5): 406–410.

23. Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications.

24. Cronbach, L. J. (1970). Essentials of Psychological Testing. New York, NY: Harper and Row.

25. Cyr, D. (2014). Return visits: a review of how Web site design can engender visitor loyalty. Journal of Information Technology, 29(1), 1-26.

26. Cyr, D. & Bonanni, C. (2005). Gender and Website Design in E-Business, International Journal of Electronic Business 3(6): 565–582.

27. Cyr, D., & Head, M. (2013). Website design in an international context: The role of gender in masculine versus feminine oriented countries. Computers in Human Behavior, 29(4), 1358-1367.

28. Cyr, D., Head, M., & Larios, H. (2010). Colour appeal in website design within and across cultures: A multi-method evaluation. International Journal of Human–Computer Studies, 68(1–2), 1–21.

29. Dailey, L. (2004). Navigational web atmospherics: Explaining the influence of restrictive navigation cues. Journal of Business Research, 57(7), 795-803.

30. Davis, L., Wang, S., & Lindridge, A. (2008). Culture influences on emotional responses to on-line store atmospheric cues. Journal of Business Research, 61(8), 806–812.

31. Deng, L., & Poole, M. S. (2011). Knowledge utilization in electronic networks of practice. Communication and Organizational Knowledge, 209.

32. Di Blas, N., Garzotto, F., & Poggi, C. (2009). Web engineering at the frontier of the Web 2.0: design patterns for online 3D shared spaces. World Wide Web, 12(4), 345-379.

33. Donovan, R. J., & Rossiter, J. R. (1982). Store atmosphere: An environmental psychology approach. Journal of Retailing, 58(1), 34-57.

34. Ecommerce Foundation. (2016). Global B2C E-commerce Report 2016.

35. Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2001). Atmospheric qualities of online retailing: A conceptual model and implications. Journal of Business research, 54(2), 177-184.

36. Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2003). Empirical testing of a model of online store atmospherics and shopper responses. Psychology & Marketing, 20(2), 139-150.

37. Eroglu, S., Machleit, K. A., & Kellaris, J. J. (1998). The impact of retail density and atmospheric music on retail shoppers' crowding perceptions and store satisfaction. Presentation to Academy of Marketing Science.

38. Faisal, C. N., Gonzalez-Rodriguez, M., Fernandez-Lanvin, D., & de Andres-Suarez, J. (2016). Web Design Attributes in Building User Trust, Satisfaction, and Loyalty for a High Uncertainty Avoidance Culture. IEEE Transactions on Human-Machine Systems.

39. Fishbein, M., & Ajzen, I. (1977). Belief, attitude, intention, and behavior: An introduction to theory and research.

40. Flavián, C., Guinalíu, M., & Gurrea, R. (2004). "Análisis empírico de la influencia ejercida por la usabilidad percibida, la satisfacción y la confianza del consumidor sobre la lealtad a un sitio web [Empirical analysis about the influence of user's perceived usability, satisfaction, and trust on loyalty towards a website]," in Proceedings of XVI Encuentros de Profesores Universitarios de Marketing, Alicante, 209–226.

41. Floh, A., & Madlberger, M. (2013). The role of atmospheric cues in online impulse-buying behavior. Electronic Commerce Research and Applications, 12(6), 425-439.

42. Fortmann-Roe, S. (2011). Effects of hue, saturation, and brightness on color preference in social networks: Gender-based color preference on the social networking site Twitter. Color Research & Application, 38(3), 196–202.

43. Fraser, T. & Banks, A. (2004). Designer's color manual: The complete guide to color theory and application. Chronicle Books, San Francisco.

44. Garrett, J. J. (2003). The elements of user experience. Indiana: New Riders.

45. Gofman, A. (2008), "Improving the 'stickiness' of your website. Part 2: If they like A and B, would they like 'A þ B'?", Financial Times, available at: www.ftpress.com/ articles (accessed September 21, 2008).

46. Gofman, A. (2007a), "Consumer driven multivariate landing page optimization: overview, issues and outlook", IPSI BgD Transactions on Internet Research, Vol. 3 No. 2, pp. 7-9.

47. H. Evanschitzkya, G. R. Iyerb, J. Hessea, and D. Ahlerta, (2000). "E-satisfaction: An initial examination," J. Retailing, vol. 76, no. 3, pp. 309–322,

48. Ha, Y. (2006). The influence of online visual merchandising on consumer emotions: moderating role of consumer involvement (Doctoral dissertation, The Ohio State University).

49. Ha, Y., & Lennon, S. J. (2010). Online visual merchandising (VMD) cues and consumer pleasure and arousal: Purchasing versus browsing situation. Psychology and Marketing, 27(2), 141-165.

50. Hasan, B. (2010). Exploring gender differences in online shopping attitude. Computers in Human Behavior, 26(4), 597-601.

51. Hasan, L., & Abuelrub, E. (2011). Assessing the quality of web sites. Applied Computing and Informatics, 9(1), 11-29.

52. Hausman, A. V., & Siekpe, J. S. (2009). The effect of web interface features on consumer online purchase intentions. Journal of Business Research, 62(1), 5-13.

53. Hostetler, S.C. (2011). Learning Design Basics in Foundations Education Utilizing Digital Media, Design Principles and Practices: An International Journal, 5(6): 543-552.

54. Hsu, H. Y., & Tsou, H. T. (2011). Understanding customer experiences in online blog environments. International Journal of Information Management, 31(6), 510-523.

55. Huang, W. H. D., Hood, D. W., & Yoo, S. J. (2013). Gender divide and acceptance of collaborative Web 2.0 applications for learning in higher education. The Internet and Higher Education, 16, 57-65.

56. Jacobs, L., Keown, C., Worthley, R. & Ghymn, K. (1991). Cross-cultural colour comparisons: global marketers beware!, International Marketing Review, 8(3): 21–30.

57. Kawaf, F., & Tagg, S. (2012). Online shopping environments in fashion shopping: An SOR based review. The Marketing Review, 12(2), 161-180.

58. Kaya, N., & Epps, H. H. (2004). Color-emotion associations: past experience and personal preference. In AIC 2004 Color and Paints, InterimMeeting of the International Color Association, Proceedings, 31–34

59. Koo, D. M., & Ju, S. H. (2010). The interactional effects of atmospherics and perceptual curiosity on emotions and online shopping intention. Computers in Human Behavior, 26(3), 377–388.

60. Kotler, P. (1973). Atmospherics as a marketing tool. Journal of retailing, 49(4), 48-64.

61. Kotler, P. (2012). Marketing Management, millenium edition: Custom Edition for University of Phoenix.

62. Kuzu, E. B., & Ceylan, B. (2010). Typographic properties of online learning environments for adults. Procedia-Social and Behavioral Sciences, 9, 879-883.

63. Lai, V., Theppitak, C., Makizuka, T., Higuchi, Y., Movahed, M., Kumudini, G., ... & Kumashiro, M. (2014). A normal intensity level of psycho-physiological stress can benefit working memory performance at high load. International Journal of Industrial Ergonomics, 44(3), 362-367.

64. Lal, R. (2013). Digital Design Essentials: 100 ways to design better desktop, web, and mobile interfaces. Design Essentials.

65. Lieven, T., Grohmann, B., Herrmann, A., Landwehr, J. R., & van Tilburg, M. (2015). The effect of brand design on brand gender perceptions and brand preference. European Journal of Marketing, 49(1/2), 146-169.

66. Lin, C. J., & Hsieh, T. L. (2016). Exploring the design criteria of website interfaces for gender. International Journal of Industrial Ergonomics, 53, 306-311.

67. Lin, C. P., & Ding, C. G. (2005). Opening the black box: Assessing the mediating mechanism of relationship quality and the moderating effects of prior experience in ISP service. International Journal of Service Industry Management, 16(1), 55–80.

68. Lin, S. W., Lo, L. Y. S., & Huang, T. K. (2016, January). Visual Complexity and Figure-Background Color Contrast of E-Commerce Websites: Effects on Consumers' Emotional Responses. In System Sciences (HICSS), 2016 49th Hawaii International Conference on (pp. 3594-3603). IEEE.

69. Lindgaard, G., Dudek, C., Sen, D., Sumegi, L., & Noonan, P. (2011). An exploration of relations between visual appeal, trustworthiness and perceived usability of homepages. ACM Transactions on Computer–Human Interaction (TOCHI), 18(1), 1.

70. Liu, W., Guo, F., Ye, G., & Liang, X. (2016). How homepage aesthetic design influences users' satisfaction: Evidence from China. Displays, 42, 25-35.

71. Liu, Y., Li, H., & Hu, F. (2013). Website attributes in urging online impulse purchase: An empirical investigation on consumer perceptions. Decision Support Systems, 55(3), 829–837.

72. Lorenzo-Romero C, Alarcón-del-Amo M-d-C & Gómez-Borja M-Á (2016) Analyzing the User Behavior toward Electronic Commerce Stimuli. Front. Behav. Neurosci. 10:224. doi: 10.3389/fnbeh.2016.00224

73. Machleit, K. A., & Eroglu, S. A. (2000). Describing and measuring emotional response to shopping experience. Journal of Business Research, 49(2), 101-111.

74. Madden, T. J., Hewitt, K. & Roth, M. S. (2000). Managing images in different cultures: a cross-national study of color meanings and preferences, Journal of International Marketing, 8(4):90–107

75. Mahzari, A., & Ahmadzadeh, M. (2013). Finding gender preferences in e-commerce website design by an experimental approach. International Journal of Applied Information Systemes, 5(2), 35e40.

76. Manganari, E. E., Siomkos, G. J., & Vrechopoulos, A. P. (2009). Store atmosphere in web retailing. European Journal of Marketing, 43 (9/10), 1140–1153.

77. McDowell, W. C., Wilson, R. C., & Kile, C. O. (2016). An examination of retail website design and conversion rate. Journal of Business Research, 69(11), 4837-4842.

78. Mehrabian, A., & Russell, J. A. (1974). An approach to environmental psychology. the MIT Press.

79. Menon, S., & Kahn, B. (2002). Cross-category effects of induced arousal and pleasure on the Internet shopping experience. Journal of retailing, 78(1), 31-40.

80. Monetate (Rep.). (2016). ecommerce report EQ42016. Retrieved July 1, 2017, from http:// http://info.monetate.com/ecommerce-quarterly-report-eq4-2016.html.

81. Moser, M. (2003). United we Brand: How to Create a Cohesive Brand that's Seen, Heard and Remembered, Harvard Business School Press, Boston, MA.

82. Moshagen, M., & Thielsch, M. T. (2010). Facets of visual aesthetics. International Journal of Human-Computer Studies, 68(10), 689-709.

83. Moss, G., Gunn, R., & Heller, J. (2006). Some men like it black, some women like it pink: consumer implications of differences in male and female website design. Journal of Consumer Behavior, 5(4), 328e341.

84. Mosteller, J., Donthu, N., & Eroglu, S. (2014). The fluent online shopping experience. Journal of Business Research, 67(11), 2486-2493.

85. Mummalaneni, V. (2005). An empirical investigation of Web site characteristics, consumer emotional states and on-line shopping behaviors. Journal of Business Research, 58(4), 526-532.

86. Myers-Levy, J. (1989). Gender differences in information processing: A selectivity interpretation. In P. Cafferata &A. Tybout (Eds.), Cognitive and affective responses to advertising (pp. 219–260).MA: Lexington.

87. Myung, R. (2003). Conjoint analysis as a new methodology for Korean typography guideline in Web environment. International journal of industrial ergonomics, 32(5), 341-348.

88. Nicholson, M. (2002). How do colors affect out moods, Bloomsburg University Virtual Training Help Cente, available at: http://iit.bloomu.edu/vthc/design/psychology.htm (accessed 15 Septermber 2010).

89. Nielsen, J. (2008). How little do users read. Retrieved May, 12, 2009.

90. Ong, C. S., & Lai, J. Y. (2006). Gender differences in perceptions and relationships among dominants of e-learning acceptance. Computers in human behavior, 22(5), 816-829.

91. Palmer, S. E., & Schloss, K. B. (2010). Human preference for individual colors. In IS&T/ SPIE Electronic Imaging (pp. 752718–752718). International Society for Optics and Photonics.

92. Palmer, S. E., Schloss, K. B., & Sammartino, J. (2013). Visual aesthetics and human preference. Annual Review of Psychology, 64, 77–107.

93. Papachristos, E., Tselios, N., & Avouris, N. (2006). Modeling perceived value of color in web sites. In Advances in Artificial Intelligence (pp. 567–570). Berlin, Heidelberg: Heidelberg.

94. Parmar, A. (2004). Marketers ask: Hues on first? Marketing News, February: 8-10.

95. Pascual-Miguel, F. J., Agudo-Peregrina, Á. F., & Chaparro-Peláez, J. (2015). Influences of gender and product type on online purchasing. Journal of Business Research, 68(7), 1550-1556.

96. Paul, P. (2002). Color by Numbers, American Demographics, February: 30-34

97. Pelet, J. É., & Papadopoulou, P. (2012). The effect of colors of e-commerce websites on consumer mood, memorization and buying intention. European Journal of Information Systems, 21(4), 438-467.

98. Porteous, J. D. (2013). Environmental aesthetics: Ideas, politics and planning. Routledge.

99. Postnord (Rep.). (2016). E-commerce in Europe. Retrieved July 1, 2017, from http://www.postnord.com/en/media/publications/e-commerce/E-commerce-in-Europe-2016/.

100. Prashar, S., Sai Vijay, T., & Parsad, C. (2017). Effects of Online Shopping Values and Website Cues on Purchase Behaviour: A Study Using S–O–R Framework. Vikalpa, 42(1), 1-18.

101. Putrevu, S. (2001). Exploring the origins and information processing differences between men and women: Implications for advertisers. Academy of marketing science review, 2001, 1.

102. Readability - definition of readability in English | Oxford Dictionaries. (n.d.). Retrieved August 07, 2017, from https://en.oxforddictionaries.com/definition/readability

103. Reber, R., Schwarz, N., & Winkielman, P. (2004). Processing fluency and aesthetic pleasure: Is beauty in the perceiver's processing experience? Personality and Social Psychology Review, 8(4), 364–382.

104. Richard, M.-O. (2005). Modeling the impact of Internet atmospherics on surfer behavior. Journal of Business Research, 58(12), 1632-1642. doi: http://dx.doi.org/10.1016/j.jbusres.2004.07.009

105. Richins, M. L. (1997). Measuring emotions in the consumption experience. Journal of consumer research, 24(2), 127-146.

106. Ross, J., Irani, L., Silberman, M., Zaldivar, A., & Tomlinson, B. (2010, April). Who are the crowdworkers?: shifting demographics in mechanical turk. In CHI'10 extended abstracts on Human factors in computing systems (pp. 2863-2872). ACM.

107. Sautter, P., Hyman, M. R., & Lukosius, V. (2004). E-Tail Atmospherics: A Critique of the Literature and Model Extension. J. Electron. Commerce Res., 5(1), 14-24.

108. Schmitt, B. H. & Simonson, A. (2002). Estetica în marketing, Teora, Bucureşti.

109. Schmitt, B. H. & Simonson, A. (1997). Marketing Aesthetics: The Strategic Management of Brands, Identity, and Image. The Free Press, .New York.

110. Seckler, M., Opwis, K., & Tuch, A. N. (2015). Linking objective design factors with subjective aesthetics: An experimental study on how structure and color of websites

affect the facets of users' visual aesthetic perception. Computers in Human Behavior, 49, 375-389.

111.   Shankar, V., Smith, A. K., & Rangaswamy, A. (2003). Customer satisfaction and loyalty in online and offline environments. International Journal of Research in Marketing, 20(2), 153–175.

112.   Shaouf, A. (2016). Analysing the effects of website design elements on online purchase intention: a cognitive-affective perspective (Doctoral dissertation, Brunel University London).

113.   Singh, S., Dalal, N., & Spears, N. (2005). Understanding web home page perception. European Journal of Information Systems, 14(3), 288–302.

114.   Sismeiro, C., & Bucklin, R. E. (2004). Modeling purchase behavior at an e-commerce website: A task-completion approach. Journal of Marketing Research, 41(3), 306–323.

115.   Sommerville, I. (2011). Software Engineering, Boston, Massachusetts: Pearson Education.

116.   Speichert, G. (2005). The Color of Marketing, American Nurseryman, October 15: 16-20.

117.   Student. (1908). The probable error of a mean. Biometrika, 1-25.

118.   Sullivan, E.A., (2008). Color Me Profitable, Marketing News, 15 October – Section: CoreConcept (:8).

119.   Sundar, A., & Noseworthy, T. J. (2014). Place the logo high or low? using conceptual metaphors of power in packaging design. Journal of Marketing, 78, 138e151.

120.   This chart ranks China's largest B2C e-commerce platforms in terms of market share 2016. (n.d.). E-Commerce. Retrieved April 05, 2017, from https://www.statista.com/markets/413/e-commerce/.

121.   Tsichla, E., Hatzithomas, L., & Boutsouki, C. (2016). Gender differences in the interpretation of web atmospherics: A selectivity hypothesis approach. Journal of Marketing Communications, 22(6), 563-586.

122.   Tuch, A. N., Presslaber, E. E., Stöcklin, M., Opwis, K., & Bargas-Avila, J. A. (2012). The role of visual complexity and prototypicality regarding first impression of websites: Working towards understanding aesthetic judgments. International Journal of Human–Computer Studies, 70(11), 794–811.

123.   Valdez, P., & Mehrabian, A. (1994). Effects of color on emotions. Journal of Experimental Psychology: General, 123(4), 394–409.

124. Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. MIS Quarterly, 36(1), 157–178.

125. Veryzer, R. W., Jr. & Hutchinson, J. W., (1998). The Influence of Unity and Prototypicality on Aesthetic Responses to New Product Designs. Journal of Consumer Research, 24(4): 374–394.

126. Waters, K. (2009). Prioritization using moscow. Agile Planning, 12, 31.

127. White, A. W. (2011). The elements of graphic design: space, unity, page architecture, and type. Skyhorse Publishing, Inc.

128. Yoon, E. (2012). Effects of Website Environmental Cues on Consumers' Response and Outcome Behaviors.

129. Zhang, Y., Feick, L. & Price, L. J. (2006). The impact of self-construal on aesthetic preference for angular versus rounded shapes. Personality and Social Psychology Bulletin 32 (6): 794–805.

Appendix A

Measurement items of constructs of internal states and responses from the research model.

Table 35 shows the constructs used by authors to measure internal states and response behaviour. Pleasure and arousal are both rated on five scale items, perceptual fluency is rated on three scale items, and satisfaction is rated on four scale items.

Table 35. Measurement items of constructs of internal states and responses from the research model.

Source	Construct	Scale Item
Mehrabian & Russell (1974)	Pleasure	My shopping experience was contented.
		My shopping experience was happy.
		My shopping experience was satisfying.
		My shopping experience was pleasing.
		My shopping experience was relaxing.
	Arousal	My shopping experience was stimulating.
		My shopping experience was exciting.
		My shopping experience was arousing.
		My shopping experience was frenzied.
		My shopping experience was wide awake.
Mosteller (2014)	Perceptual Fluency	Information presented on each page was uncluttered, not cluttered.
		Information presented on each page was spacious, not crowded.
		Information presented on each page was easy to view, not hard to view.
Cyr & Head (2013)	Satisfaction	Overall, I am satisfied with the interface of this website.
		My current experience with this website is satisfactory.
		Overall, I am satisfied with the amount of time it took to complete the tasks.
		Overall, I am satisfied with accuracy for this website related to the buying process.

Appendix B

The designs of the prototype, constructs and scale items with sources addressing web-atmospherics, and quantitative and qualitative responses.

Figures 26 – 29 illustrate the designs of the prototype, Figure 26 shows the original boohoo.com design for men's product page, Figure 27 shows the customised men's product page, Figure 28 shows the original women's product page, and Figure 29 shows the customised women's product page. Table 36 presents the constructs to assess web-atmospherics, with the scale items and respective sources. Table 37 shows the average ratings from testing the prototype, by using the instrument from Table 36. Finally, Table 38 includes the summarising interpretations of qualitative interview with the five prototype participants (three women and two men).

Figure 26. Original produce page design of boohoo. From www.boohoo.com.

Figure 27. Customised product page design for men.
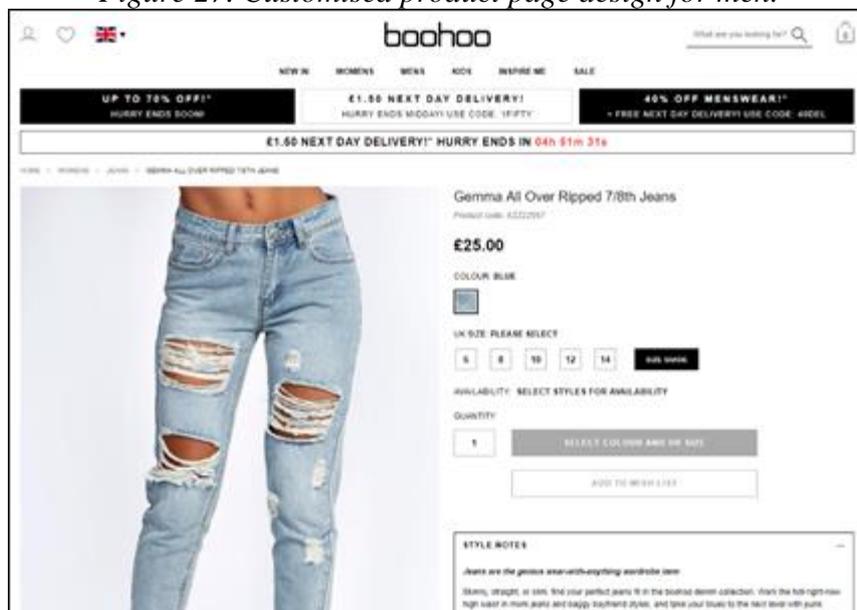
Figure 28. Original product page design. From www.boohoo.com.
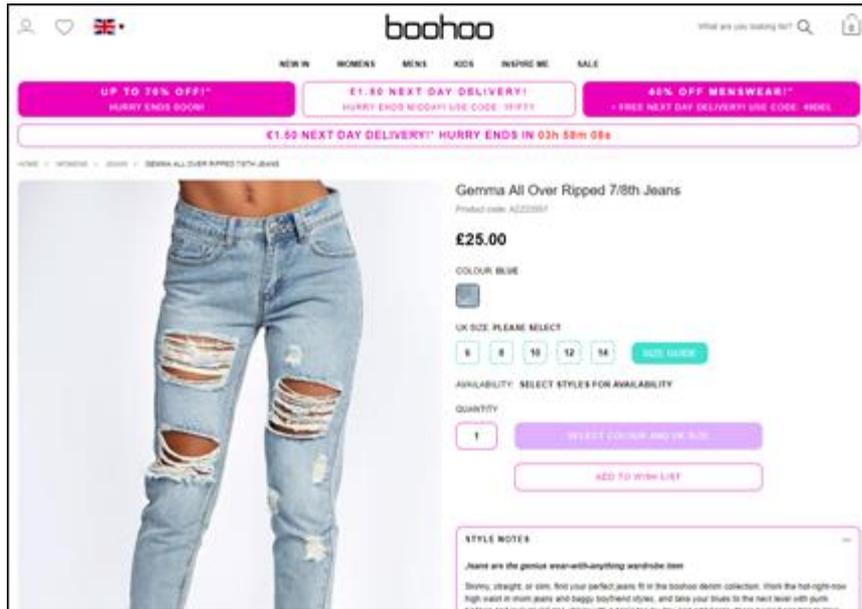
Figure 29. Custom product page design for women.

Table 36. The constructs and measurement items for web-atmospherics.

Source	Construct	Scale Item
Ha & Lennon, 2010	Low task-relevant cues	The web site looks organised.
		The web site uses fonts properly.
		The web site uses colours properly.
Demangeot & Broderick, 2010	Visual design	The Web site had a visually pleasing design.
	Page clarity	There was an awful lot of things on every page. (Reverse coded)

Table 37. Average ratings by genders to the original and custom design.

	Organised	Fonts	Colour	Pleasing	Lot of things (inverted)
Men original					
women average	2.75	3.25	2.75	2.75	4.5
men average	5	4.25	4.5	4.5	4.75
Men Custom					
women average	3	3.75	4	3	4
men average	5	3.75	4.5	3.75	4.25
Women Original					
women average	3.75	3.75	3	2.25	4
men average	4.5	4.25	4.5	4.5	4
Women Custom					
women average	3.25	4	4.25	3	4.75
men average	3.75	4	3.5	4.25	3.75

Table 38. The interpretation of the qualitative responses from 3 women and 2 men.

Interpretations of the qualitative responses
Men thought the original designs are fine, however bigger font of important info and maybe some colours would not be bad, moreover, men though there are little too many things.
Men thought the women's custom design has benefits of organising information due the colours, but the colour pink is not good choice.
Men though the custom design for men is like the original, however, the font was not as good and the red stands out better.
Women were not happy with the original design, in terms of organisation, colours, nor appeal. The dislike came from the grey scale colours used, and mostly to extensive use of black.
Women also though the font is too small on all designs.
Women liked their custom design more due to the use of colour, but overall, the colours were not the best choice for the interviewees.
Women also thought that the use of colour on women's custom design made things more organised and made other cues, like font, look better.
As with originals, women did not like the custom design for men, and for the same reasons, the grey scale colours and the use of black made everything disorganised, unpleasant, and messy.

Appendix C

The default design for the PoC online store.

Figure 30 illustrates the introduction page with the tasks, the page user starts the test. Figure 31 and 32 show the default design for the header and footer respectively, Figure 33 shows the custom design for the catalogue page, Figure 34 illustrates the custom design for the product page, and finally Figure 35 shows the custom design for the shopping cart page.
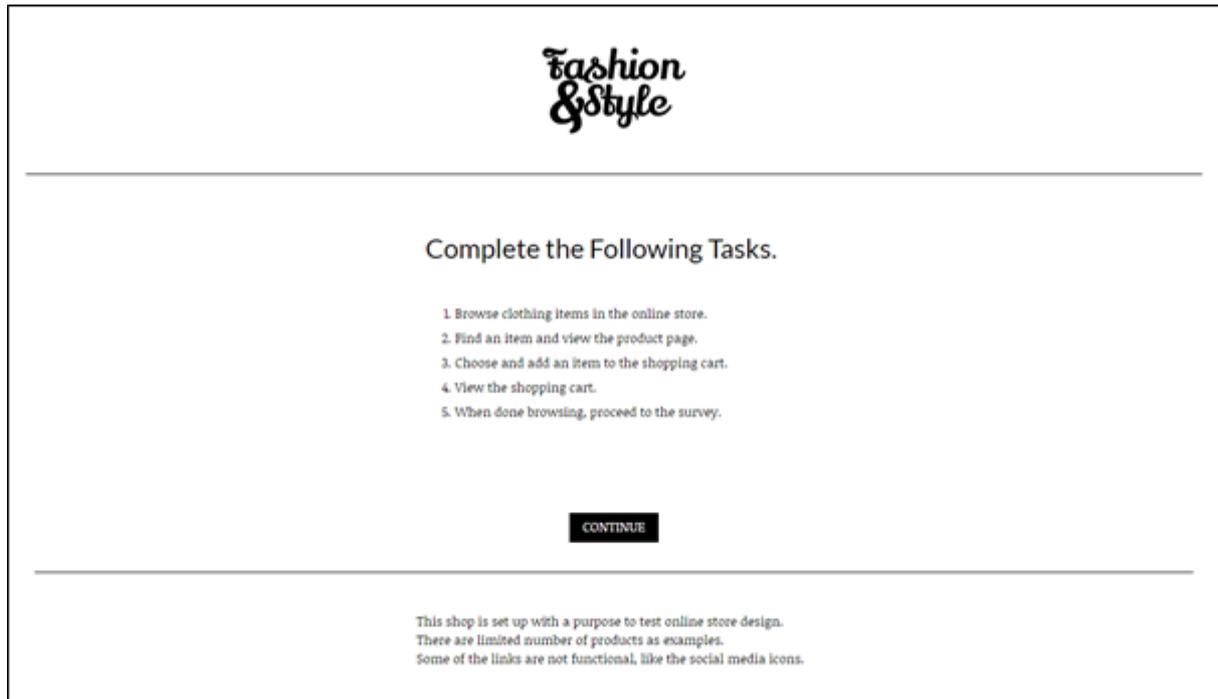

Figure 30. PoC store Introduction page.

Figure 31. PoC store default design header.

Figure 32. PoC store default design footer.
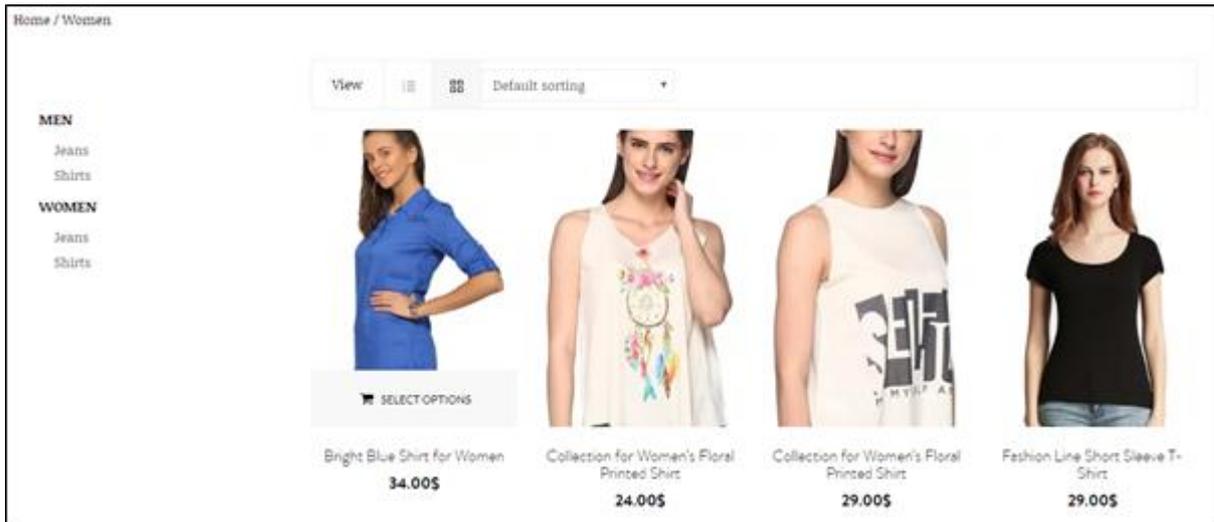

Figure 33. PoC store default design catalogue page.
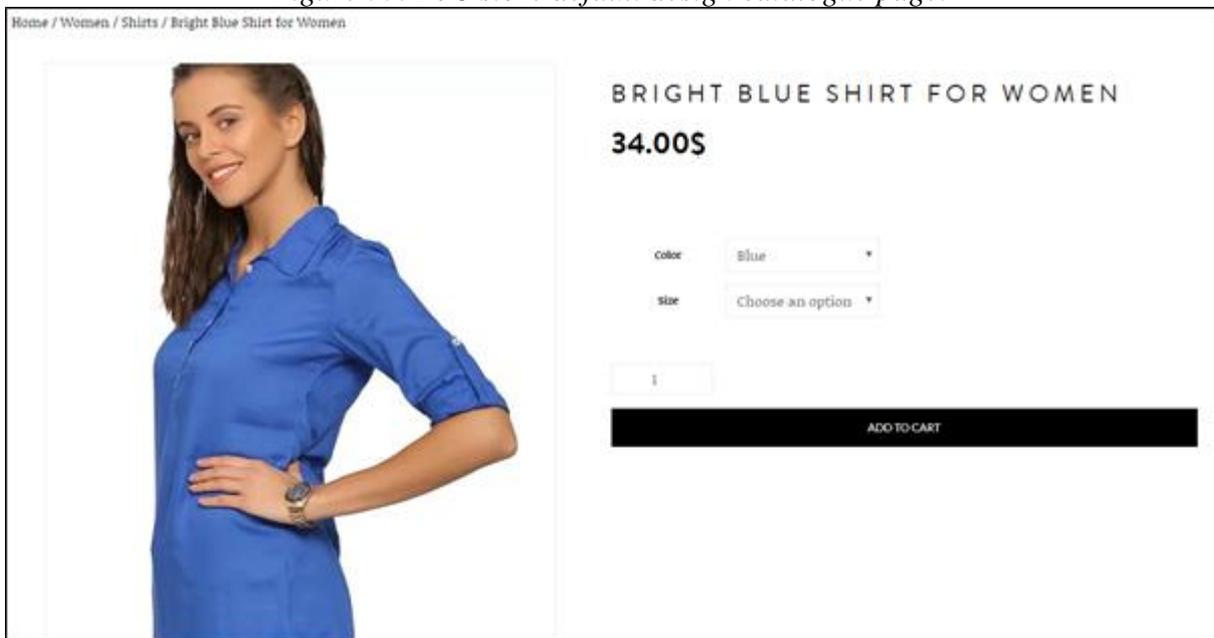
Figure 34. PoC store default design product page.

Figure 35. PoC store default design shopping cart.

Appendix D

Demographics of the main test participants divided by the default and custom design,

Table 39 demonstrates the demographics of the test participants based on the design they were exposed to, how many women and man, and which age group experienced the PoC online store with the default design and with the custom design.

Table 39. Demographics divided by the default and custom design.

Variable			Frequency	Percent
Default design	Gender	Female	35	40.2
		Male	52	59.8
	Age	18 - 25	30	34.5
		26 - 35	38	43.7
		35 - 50	16	18.4
		50 +	3	3.4
Custom design	Gender	Female	37	48
		Male	40	52
	Age	18 - 25	19	24.7
		26 - 35	38	49.6
		35 - 50	16	20.7
		50 +	4	5.2