Cyprus University of Technology
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MSc Interaction Design

ENGAGE OR ENRAGE:

HOW DIFFERING PRODUCT DESIGN AESTHETICS CAN INFLUENCE TRUST PERCEPTIONS OF THE END USER.

Master thesis

Author: Gerard McComish, BA (Hons)
Supervisors: Sónia Sousa, PhD and Daniel Irabien Peniche (MSc)

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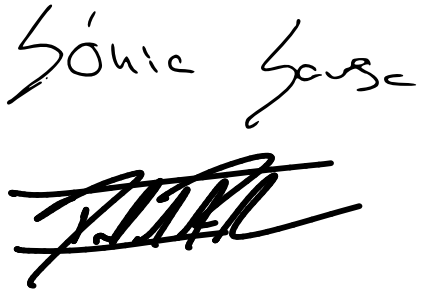

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Abstract

Millions of people globally have changed or are changing their shopping patterns and shifting to online retail away from ‘bricks and mortar’. Such increases in e-commerce raise interesting questions for the study of trust in transactions that involve payments which technically are classified as a form of risk. This study aims to determine how much influence aesthetic perception has on perceived trustworthiness. Specifically this study focuses on three different styles of aesthetic, these are illustrative UI style, photographic UI style and minimal UI style. In addition it aims to explore the relationship between gender and aesthetic perception.

A mixed methods approach was taken to test the three hypotheses to determine which UI style has the greatest influence on perceived trustworthiness an online survey was produced and distributed to a convenience sample of participants. The survey contained three UI prototypes based on the three styles of illustrative, photographic and minimal and collected both qualitative and quantitative data. Responses were analysed using correlation analysis, SUS analysis and sentiment analysis. The results showed a strong positive correlation for one of the UI styles' influence on perceived trustworthiness. Male participants also showed a stronger response to the aesthetic designs.

The results indicate that different aesthetic approaches can influence people differently and should be taken into account when designing digital products.

Keywords*:* aesthetics, trust, visual design, gender, e-commerce, interface, illustrative, photographic, minimal, graphics, interaction, halo-effect,

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List of Abbreviation

RQ - Research Question

RO - Research Objective

GDS - Government Digital Services.

UI - User Interface.

UX - User Experience.

GUI - Graphical User Interface

TAM - Technology Acceptance Model

SUS - System Usability Scale

UMUX - Usability Metric for User Experience

AA - Aesthetic Assessment

TP - Trust Perception

FG - Functionality Grading

QF - Qualitative Feedback

PCC - Pearson Correlation Coefficient

UL- UMUX-LITE

HCTM - Human Computer Trust Model

HCI - Human Computer Interaction

1. INTRODUCTION

In contemporary society we spend many hours engaged in online interactions. The majority of those interactions are via digital products or apps on our smartphones. The current COVID 19 pandemic has led to an increase in e-commerce. Millions of people globally are changing their shopping patterns in order to avoid close contact with each other. It was reported by the OECD that a shift to online retail away from 'bricks and mortar' retail increased by 30% in April 2020 (OECD, 2020). Such increases in e-commerce raise interesting questions for the study of trust in transactions that involve payments which technically are classified as a form of risk which is a prerequisite for trust (Mayer et al, 1995).

Many trust focused studies to date have looked at competence, benevolence and integrity, which often focus on functional aspects of digital products such as online security and web certificates. Others have looked at the role aesthetics play in trust perceptions. However, these studies mainly focus on how aesthetics compare to other system functions like usability. Few actually study how differing types of aesthetics can influence trust of a digital product.
One study that took a cultural approach concluded that trust is influenced by culture (Cyr, 2013). Another study by Tractinsky led to the potentially derisory term of "halo-effect". By which it is assumed the aesthetics of an interface can cloak flaws in its function (Tractinsky et al, 2000).

Nielsen & Pernice (2009) argue that content rather than design are important (Pernice & Nielsen, 2009). However, we know that aesthetics affects the emotions of users (Zhang, 2009). Most users judge the credibility of a product in a few seconds (Robins & Holmes, 2008). Some argue that UI 'eye candy' is needed to entice a user long enough to embrace a digital product (Steenbergen, 2010). As Don Norman puts it "Beauty and brains, pleasure and usability-they should go hand in hand." (Norman, 2004).

Based on this understanding of aesthetics role in UI trust formation, the following subsections discuss the research problem. Emphasise the research goal, list the research questions and research objectives. Then finally describe the research methodology.

1.1 RESEARCH PROBLEM AND SIGNIFICANCE

The current global pandemic has accelerated the transition from traditional brick & mortar businesses to online digital products at an unimaginable rate. With more users having to adapt to e-commerce who would have normally opted for traditional shopping. However, the same core issues of business remain. One such issue is trust. Trust is a key factor in e-commerce product retaining business and growing the customer base (Beatty et al, 2011).

Although experienced digital e-commerce users will be familiar with many products and their trust in them is already established, however many new adopters may be reluctant to part with their money via a digital product. One human trait is the reluctance to conduct business with an ecommerce digital product due to a perceived lack of trustworthiness (Fang et al, 2011).

Many studies have looked at competence, benevolence and integrity, which often focus on functional aspects of digital products such as online security and web certificates. However, how the visual perception or aesthetics of a digital product influences trustworthiness still offer room for research. Jacob Nielsen (2009) argued that content rather than design are important based on his eye tracking studies (Pernice & Nielsen, 2009). However we know that aesthetics affect the emotions of users as well (Zhang, 2009). In his study Tractinsky (1997) ran three experiments focusing on perceptions of interface aesthetics and usability of ATM machines. They were set in differing cultural settings of Japan and Israel. The aim was to validate a previous study by Kurosu and Kashimura (1995). Tractinsky (1997) found that attitudes toward aesthetics from his peers to be somewhat negative. He discussed how Jakob Nielsen (1993) defined the usability of a UI in five attributes: *Learnability. efficiency, memorability. errors. and satisfaction.* Tractinsky (2000) felt mainstream HCI of the time took an antiquated approach to aesthetics or ignored it altogether. Tractinsky's assumption was aesthetics influence a user's perceptions of user experience which could foster long term attitudes toward a UI (Tractinsky et al, 2000). Tractinsky's (1997) results found high correlations between perceived aesthetics of the UI and a perceived ease of use of the system and also showed aesthetic perceptions are not culturally dependent.

I would add this could then affect trust. A recent study by Fimberg and Sousa (2020) discovered evidence that design aesthetics do impact users' trust perceptions. Fimberg and Sousa (2020) discuss "screen-and-glean" a phenomenon discovered by a study conducted on UI dwell time conducted by Liu et al (2010). Nielsen (2011) adds to this by stating a UI has around 10 seconds to convey its value proposition. Fimberg and Sousa (2020) produced data from their study showing a strong correlation between perceived quality of website design and perceived trust. These results match the direction of my research question.

In addition, if according to Tractinsky (1997) aesthetic perceptions are not culturally dependent, we could assume the same for individual aesthetic taste. They could produce differing effects on trust.

So assuming the functional aspect of a digital product is sound, the role of the aesthetics in forming trust and consumer confidence is an important area of research. Yet to different people aesthetics can mean different things, particularly across cultures and ages (Cyr, 2013).

A small recent study by Fimberg (2019) showed a direct correlation between a users' aesthetic perception and their subsequent trust perception through correlation analysis. With this in mind I aim to expand this study to test different aesthetic styles on users' trust perceptions.

1.2 Research Goal and Motivation

The overarching purpose of this study is to determine whether or not differing styles of aesthetic visual user interface design can affect a user's perception of trustworthiness. As noted in my literature review, visual design can encompass: illustration, graphics, photography, colour balance, layout and typography.

This study will be built upon but not limited to three main sections. They are the Theoretical Background, the Case Studies Of UI Design and The Study (empirical) itself.
The Theoretical Background aims to reveal current and past studies that either cover or touch on similar strands of investigation and how they can influence this study. In the following

section, the Case Studies Of UI Design will separate the three types of UI design under study; minimal, illustrative and photographic in order to present the merits of each in isolation. The study then aims to examine these three separate types of visual design applied to the same structural content of a transactional financial services mobile application. The particular financial sector is pensions.

The final goal and motivation for the study is to hopefully identify how different (minimal, illustrative, photographic) visual styles can influence the trust perceptions of differing people across a broad demographic gamut. From this I hope to contribute evidence to the HCI community that tailored, bespoke aesthetic design can maximise trust perceptions for a target demographic. So for instance, a youth audience may trust illustrative UI over minimal. Such nuances would require further study but I hope to provide a basis for this.

To contextualise my choice of research and the links between trust and aesthetics I formed two supporting research objectives.

- RO1: Research and discuss how the HCI community have explored the relationship between aesthetics and trust perceptions through a literature review.

- RO2: Analyse and present three different types of aesthetic UI common in contemporary HCI.

  The three aesthetic styles will be categorised into:

  - Minimal (Typography, layout and shape only);
  - Illustrative (Typography, layout and supporting illustrations);
  - Photographic (Typography, layout and supporting photographic imagery);

- RO3: Build and design three different types of aesthetic UI prototypes based on the analysis in RO2 to be used in the study survey.

1.3 RESEARCH QUESTION

The main aim of the research is to explore how might different aesthetic styles affect a user's trust perception and of a transactional financial services mobile prototype.
With the aid of 3 high fidelity prototypes, an online survey and follow up interviews the study will aim to answer these three core research questions.

- RQ1: Do the aesthetics of a digital product influence trust perceptions?
    - H1: minimal aesthetic styles have a greater influence on trust?
    - H2: illustrative aesthetic styles have a greater influence on trust?
    - H3: photographic aesthetic styles have a greater influence on trust?

- RQ2: Does gender influence aesthetic taste?

- RQ3: Do the aesthetics of a digital product influence perceived functionality?

1.4 RESEARCH PROCEDURE

The research procedure will follow a four phase (Understand, define, Prototype & Evaluate) approach listed below (see Table 1).

***Table 1**: Research Procedure*

Research study phases	**Method**
Phase 1: Understand **Theoretical Background** On trust and how it may be influenced by the aesthetics of a digital product.	**Literature review** The literature review explores the opinions and studies involved around aesthetics and their influence on trust.

Phase 2: Define **Analysis of contemporary UI design** Explore contemporary digital products that harness the three different aesthetic styles under study.	**Exploratory analysis** The exploratory analysis aims to present the merits of different aesthetics in UI design.
Phase 3: Prototype & evaluate **The study** Produce a survey and 3 UI prototypes to explore the relationship between aesthetics influence over trust.	**Comparative analysis** The aim is to determine if different aesthetic styles of UI design have varying or different effects on an end user's trust perceptions and perceived functionality.
Phase 4: Deliver **Results & discussion**	

2 THEORETICAL BACKGROUND

In this chapter I will provide an overview of the relationship between aesthetics and how they influence trust perceptions, particularly of digital UI. Although I have found studies, articles and posts relating to aesthetics and their involvement in UX design, it has historically been absent from the vernacular.

2.1 UI AESTHETICS AND USABILITY

As previously mentioned Tractinsky (2000) found attitudes toward aesthetics from his peers to be somewhat negative. He discussed how Nielsen (1993) defined the usability of a UI in five attributes: *Learnability. efficiency, memorability. errors. and satisfaction* (Nielsen, 1993).

Tractinsky's (2000) assumption was that aesthetics influence users' perceptions of user experience, which could foster long term attitudes toward a UI such as trust (Fimberg & Sousa, 2020). Tractinsky's (1997) results found high correlations between the perceived aesthetics of the UI and the perceived ease of use of the system. Fimberg and Sousa (2020) also found high correlations between perceived aesthetics and perceived trust. Tractinsky (1997) also showed aesthetic perceptions are similar across two culturally different societies. A point argued by Zettl (1999), he states that if a message or communication goal is similar, then aesthetics will have the same outcome on user perceptions regardless of demographics (Zettl, 1999)

While some authors have found culture to play no significant role in the effect of aesthetics (Tractinsky,1997), other studies indicate that culture does play a role. (Karvonen (2000), Cyr(2013), requiring further research on this line of study. Karvonen et al (2000) ran a qualitative study and found that a specific UI aesthetic influenced trust perceptions similarly within two cohorts of participants from Finland and Sweden. The participants remarked that they preferred UI designs that were "clear" or "clean" and "simple" (Karvonen et al (2000). This would confirm what Cyr (2013) discovered yet contradict Tractinsky (1997).

2.1.1 AESTHETICS OF INTERACTION

Categorising and describing UI has been studied over the years (Hassenzahl et al (2003), Lavie, and Tractinsky (2004)). Hassenzahl et al. (2003) developed the model of attractiveness of a UI. It measured how hedonic and pragmatic qualities could influence attractiveness (aesthetic perception). This work was built upon by Mõttus et al (2016) when they used a repertory grid study to elicit participants' personal perceptions towards aesthetics of selected UI. This qualitative study specifically targeted aesthetic considerations and removed any data that didn't pertain to aesthetics of interaction. Mõttus et al (2016) produced 23 categories of personal constructs used to define aesthetic perceptions (see Table 2).

***Table 2**: Categories of personal constructs with semantic differential*

1	Arousal: exciting vs calm
2	Playfulness: playful vs sedate
3	Dynamics: dynamic vs static
4	Fashion: modern vs old fashioned
5	Natural realism: natural vs unnatural
6	Precision: precise vs imprecise
7	Congruence: appropriate vs inappropriate
8	Informativeness: informative vs arbitrary
9	Predictability: predictable vs unpredictable
10	Controllability: controlled vs uncontrolled
11	Time/Speed: fast vs slow
12	Delay: immediate vs delayed
13	Synaesthesia: synchronized vs unsynchronized
14	Smooth mechanics: continuous vs stepwise

15	Smooth phrasing: flowing vs dripping
16	Force: powerful vs gentle
17	Proximity: close vs distant
18	Smooth texture: smooth vs rough
19	Range: free vs limited
20	Dimensionality: 3D vs 2D
21	Personal relatedness: fits me vs doesn't fit me
22	Closure: complete vs incomplete
23	Complexity: complex vs simple

Although tested on touch interaction devices, these categories produced by Mõttus et al (2016) could be used in the classification and description of the three UI styles (minimal, illustrative, photographic) under study. The constructs are applied to the UI styles in 2.1.1.1, 2.1.1.2 and 2.1.1.3.

2.1.1.1 MINIMAL

We could describe Minimal UI (example: gov.uk) based on Table 2. This design approach uses simple graphics (23- Complexity) in order to be clear and informative (8 Informativeness). The approach of not adding visual clutter adds to a sense of sedate calmness (1 Arousal, 2 Playfulness). The content layout is informative and is presented to be clear and precise (8 Informativeness, 6 Precision). The functionality is predictable and simple (9 Predictability 23 Complexity).

2.1.1.2 ILLUSTRATIVE

Again, we could describe illustrative UI (example: mailchimp.com) based on Table 2. The design approach uses playful, modern and exciting (1 Arousal, 2 Playfulness, 4 Fashion) hand drawn illustrations to enhance the humane design approach taken. Yet the content is accurately laid out and the information is concise (8 Informativeness, 6 Precision) and easy to

understand. Although bright colourful and adorned with illustrations, the functionality is predictable and simple (9 Predictability 23 Complexity).

2.1.1.3 PHOTOGRAPHIC

Finally we could describe photographic UI (example: ing.com) based on Table 2. The design approach of photographic UI is more flexible and subjective than the other approaches. As the image choice is down to the personality of the user as to whether it will relate or be appropriate for them (21 Personal relatedness, 7 Congruence). This flexibility based on image choice can influence other hedonic characteristics such as realism, enjoyment, and style (1 Arousal, 2 Playfulness, 4 Fashion, 5 Natural realism). The content design however is more predictable and information is clear and well presented (8 Informativeness, 9 Predictability, 23 Complexity).

2.2 THE VARIOUS INFLUENCES ON OF AESTHETICS IN TRUST PERCEPTIONS

In the earlier days of HCI, the field in general was more concerned with function, learnability, task completion and all the factors that fall under the reliability and competency umbrella (Butler, 1996). Tractinsky however (1997), whose work appears often in this thesis champions the role aesthetics play in influencing trust and improving user experience in general. So much so that he discusses the teachings of an ancient Roman architect and author named Marcus Vitruvius Pollio c. 90 - c. 20 BCE (Cartwright, 2015). Vitruvius authored De Architectura, a book that covered architecture yet took influences from many sciences such as astrology and meteorology. Vitruvius created three core principles of good architectural design one of which was aesthetics and how it could improve the life of his fellow Romans (Cartwright, 2015).

Tractinsky (1997) discusses the relevance of these principles in relation to contemporary HCI. He compared the first core principle ‘Firmitas’ (strength, durability) to contemporary reliability and stability of digital artefacts. The second core principle ‘Utilitas’ (suitability, convenience) Tractinsky compares to usability engineering in terms of efficiency and effectiveness of a digital artefact. However as Tractinsky (1997) points out the third Vitruvius principles Venustas' (beauty, aesthetics) wasn't highly regarded in mainstream HCI research or studies of the time (Tractinsky, 2004). An omission that as will be discussed is unmerited as research has shown aesthetics play an important role in HCI (Tractinsky & Hassenzahl, 2005; Norman, 2002; Tractinsky, 1997; Karvonen, 2000). Although aesthetics have been

gaining traction within the HCI Community in the past years (Miniukovich, 2020, Wang, 2018, Thieslch, 2019) this original focus on usability over aesthetics is still felt in the relative immaturity of our current understanding of aesthetics of interaction. This is felt in the gaps in our theoretical and epistemological grounding of aesthetics (Wang, 2018) and inconclusiveness (Miniukovich, 2020).

The UX stalwart Nielsen (1993) created his five attributes to which many subsequent designers based their work. These are: learnability, efficiency, memorability, errors and satisfaction (Nielsen, 1993). The functionality-first argument was once the stance of Norman, who, although an advocate of well executed aesthetics, believed that too much emphasis was given to aesthetics and instead should be focused on usability. (Norman, 1988). Yet jump a few years ahead and Norman can be quoted as saying 'Happy people are more effective in finding alternative solutions and, as a result, are tolerant of minor difficulties', emphasising the necessity of positive emotions (Norman, 2004). Tractinsky (2000) also discussed this phenomena, labelling it the "halo-effect" by which it is assumed the positive effect of aesthetics can cloak functional flaws of an interface (Tractinsky & Hassenzahl, 2005). We can connect this theory to another phenomenon, that humans interpret people by their looks, termed "what is beautiful is good" (Lemay et al, 2010). This study showed that people attributed positive personal traits to those with physical good looks. Tractinsky et al published a paper in 2000 named 'What is beautiful is usable' that confirms this phenomenon called "what is beautiful is good" applies to HCI.

Norman (2002) explored the effects of positive and negative emotions when encountering a task. He discussed the work of Isen (1993). Isen showed that if a person is in a good mood based on an experience such as receiving a gift or watching comedy prior to a task they will achieve better results. However, if a person is in a state of heightened tension they will often compound this feeling if they encounter a problem which ultimately leads to poor task completion (Isen, 1993). Positive affect allows users to relax and tolerate problems better, often finding a work around or solution rather than becoming frustrated and focusing on the problem (Norman, 2002). This aspect of human behaviour is linked to the visceral part of the brain that responds positively to various stimuli such as: symmetry; comfortable lighting; smiling faces; and positive colours to name a few (Norman, 2002). Zettl (1999) also argues

the importance of aesthetics; he argues that visual design can heighten perception and aid interpretation.

It seems evident that there are two schools of thought when it comes to the importance of aesthetics in UI design. Nielsen mentions the ‘artistic ideal’ vs the ‘engineering ideal’. Although he feels the ‘artistic ideal’ is a designer's vanity exercise. Yet the ‘engineering ideal’ provides solutions for users. He is quoted as saying, “there is a need for art, fun, and general good time on the web, but the main goal of most web projects should be to make it easy for customers to perform useful tasks’’ (Nielsen, 2002). However, we find counter arguments to this, studies have shown how aesthetics are a key factor in good UI design (Tractinsky & Lavie, 2003).

The next paragraph provides an overview of the different studies and major findings that provide evidence on the influence of aesthetics in Trust perceptions.

2.2.1 PERCEIVED BEAUTY OF UI DESIGN AND TRUST

Hassenzahl (2004) in his two studies using AttrakDiff 2 questionnaires, found that beauty largely depends on hedonic attributes reflecting the product’s ability to communicate important personal values to relevant others. However, perceived usability as well as goodness was influenced by actual user experience of the product (Hassenzahl, 2004). The study focused on user-perceived usability hedonic attributes, goodness and beauty of 4 different MP3-player skins (Hassenzahl, 2004).

More, based on his previous research it was suggested there was a clear relation between usability and beauty, however Hassenzahl (2004) found this hypothesis was not supported. Overall the so called beautiful skins were perceived to be primarily better in providing identification followed by being more stimulating. In many cases a different user may perceive the same presentational style as amateurish (Hassenzahl, 2004). Interpretation is also argued by Zettl (1999) who believes that the influence of aesthetics on a person/user is subjective. This observation ties in with Karvonen (2000) who found regional differences in aesthetic taste. Although Karvonen (2000) didn’t touch on beauty’s effect on trust it did highlight how differing aesthetics can appeal to different people.

Furthermore Karvonen (2000) explored how the perceived beauty of UI design affects the feeling of online trust on users. Karvonen (2000) condensed previous works, including some by Tractinsky (1997). She discussed how users are likely to perceive a product as more easy to-use if it is considered beautiful or aesthetically pleasing. Karvonen (2000) points out cultural regional perceptions of aesthetics. Karvonen (2000) discovered a tendency from Swedish & Finish web users to associate ‘clean’ or ‘clear’ visual design with trust. Karvonen (2000) argued that further research could be conducted to decipher what type of simplicity is better for creating trustworthy design. This suggestion from Karvonen influenced my inclusion of minimal UI design as one of the three aesthetic styles to be studied.

In all these studies by Cyr (2013), Tractinsky (1997), Karvonen (2000) they touch on users' perception of UI whilst exploring demographic factors. Such perceptions are formed in a split second as discussed by Fimberg and Sousa (2020) and can have a lasting effect of a user's emotion toward an artefact, emotions such as trust (Lindgaard et al, 2006).

2.2.2 First impression and Trust

Lindgaard et al (2006) ran two studies within a research project in 2006. The first was to determine the speed at which people formed their impression of a UI design. The second objective was to understand what specific elements of UI design influence the participants' impressions. Lindgaard et al (2006) empirically recorded that users could form a ‘stable attractiveness’ judgements in a time of 50ms (Lindgaard et al, 2006).

The second part of the study proved inconclusive. Lindgaard et al (2006) attempted to evaluate the attributes such as hedonic or rational that influenced the users’ impressions. The genesis of the study was influenced by works already discussed by Karvonen (2000), Tractinsky (1997), also Lindgaard and Dudek, (2002) who all touched on issues such as appeal, reliability and trust. Lindgaard and Dudek (2002) studied websites with perceived high visual appeal, but yet poor task completion traits in user testing. This led Lindgaard and Dudek (2002) to conclude that visual perceptions are formed first and then hold sway over further perceptions of other factors including functionality. Lindgaard et al (2006) connect this with the work of Hassenzahl (2004) who evaluated ‘beauty & goodness’ based on

hedonic qualities; identification; stimulation; and pragmatic quality. One strand of Hassenzahl (2004) identifies initial visual judgments are made without interacting with a UI.

2.3 WEBSITE DESIGN AND TRUST PERCEPTIONS

One major index in measuring cultural effects on trust is Hofstede's Cultural Dimensions Theory (1991). Hofstede (1991) created the six cultural dimensions or categories.
They are:

- Power Distance Index - Refers to the extent to which inequality and power are tolerated.

- Individualism vs. Collectivism - The individualism indicates the importance of personal achievement and can be defined as "I." Collectivism indicates the importance of group achievements and can be defined as "We".

- Uncertainty Avoidance Index – Refers to the extent to which uncertainty and ambiguity are tolerated.

- Masculinity vs. Femininity - Also known as "tough vs. tender," and refers to attitudes such as sexuality equality, and behavior.

- Long-Term Orientation vs. Short-Term Orientation – A long-term orientation emphasizes persistence, perseverance, and long-term growth rather than short term gratification. Short-term orientation emphasizes quick results, gratification and respect for tradition.

- Indulgence vs. Restraint – Or impulses and desires, indulgence indicates gratification related to enjoying life and having fun. Restraint indicates suppression of gratification and instead regulates through social norms.

Examples of these dimensions could be pointed out in different cultures from American (Individualism) to Chinese (Collectivism).

In a study of website trust, and transaction security using an eight country sample with a total of 1156 participants Cyr (2013) found that countries high on individualism are usually low on uncertainty avoidance and countries that are low on individualism are usually high on uncertainty avoidance. This could be supported by the theory that disposition to trust and propensity to risk are influenced by culture (Vance et al., 2008).

Cyr (2013) found Japanese participants preferred a more aesthetic visual design, according to Hoffmann (2002) this could include imagery, colours, typography and shape. Through interviews they stated it appealed to their "emotion". Her study allowed her to conclude that trust is influenced by culture and that design should embrace unique cultural differences. Cyr's (2013) study adds to the nuanced approach and further studies needed to explore how trust is shaped by many differing factors including aesthetics. And that aesthetics themselves could be judged differently by users depending on various factors including culture. If this is the case, aesthetics need to be considered closely when targeting a global audience as subtle variations may be needed to engender trust in different global markets. However Tractinsky's (1997) study carried out previously to Cyr (2013), somehow provides conflicting results despite being done partly in Japan. The other sample population was in Israel.

A study by Fimberg (2019) showed a direct correlation between a users' aesthetic perception and their subsequent trust perception. Fimberg (2019) conducted correlation analysis of two websites. The difference in trust perception between the two websites was almost 2:1 in favour of the website with a professional contemporary design compared with the second website with a poor standard of visual design (Fimberg, 2019)

2.3.1 AESTHETICS IN VISUAL LANGUAGE

In his book Sight, Sound, Motion: Applied Media Aesthetics, Herbertt Zettl (1999) discussed the importance of aesthetics in visual language. Although Zettl's book is intended for film studies, many of the concepts are universal. Reyna (2013) discusses how the implementation of good visual design and aesthetics such as layout, colour and typography can improve e-learning products. Zettl discusses the process by which people process visual aesthetics, not as an abstract construct but as an interpretation of the subject. The subject in our case is a UI.

Zettl advocated aesthetics as a vessel for effective communication. According to Zettl (1999) designers need to convey the message with relative aesthetics or they risk ineffective communication. This ineffective communication pitfall can be caused by irrelevant ornamental graphics (Spool, 2009).
Jared Spool (2009) determined there are 3 categories of UI graphics, these are: *navigation graphics, content graphics and ornamental graphics*. In a study Spool (2009) found that the incorrect use of imagery, in particular ornamental graphics could detract from a user's overall interaction experience. Spool (2009) conducted in person user testing for a T-Mobile desktop website. They overused ornamental graphics of a celebrity rather than informative imagery which as observed irritated the users (Spool, 2009).

One elderly test participant was eager to buy an accessible phone with large buttons. However, could not source any pictures, but instead got ornamental imagery of a celebrity. The test participant was quoted “She’s a very pretty woman,” the shopper told us, “I just wish I could see her buttons” (Spool, 2009). According to Spool (2009) ornamental imagery had no benefit and in particular engendered trust in users.

2.4 MEASURING TRUST

Muir and Moray (1996) conducted one of the earliest studies to measure trust. The context of their study was factory automation. HCI has evolved a long way since then. In recent years the work of Sousa, Lamas, Dias and Gulati (2014,2017,2018,2019) have focused on testing the HCTM (Human Computer Trust Model). Sousa, Lamas, and Dias (2014) initially defined seven attributes of the HCTM as motivation, willingness, competence, benevolence, predictability, honesty and reciprocity. Three subsequent studies have followed attempting to empirically assess to see if the HCTM attributes confidently predict trust.

Gulati, Sousa, and Lamas (2017) tested HCTM with the Estonian i-voting system. They found shortcomings with all but competence, benevolence and honesty. Then Gulati, Sousa, and Lamas (2018) put the HCTM under further rigorous testing with the Apple OS voice assistant Siri. The results of this Gulati et al (2018) refined the attributes of the HCTM down to competence, benevolence, reciprocity and risk perception.

Gulati, Sousa, and Lamas (2019) conducted a further study on the HCTM and refined it further until only the three attributes of benevolence, competence and perceived risk proved statistically relevant. The HCTM became the Human Computer Trust Scale (HCTS) (Gulati et al, 2019).

An interesting limitation discussed by Gulati et al (2019) touches on the influence culture has on trust, a factor which connects to Cyr (2013) and influences the direction of this study will take by testing different aesthetic styles.

2.5 FINAL CONSIDERATIONS

"What, for instance, does it mean when a man feels a strong conscious impulse to straighten the crookedly hung picture on the wall?" (Maslow, 1954).

In his 1954 book 'Motivation And Personality' Maslow discusses aesthetics briefly yet the importance of aesthetics was not underestimated by him. In his limited studies at the time he argued the case that humans have an aesthetic need, even to the point where poor visual surroundings could affect the mental health of a human (Maslow, 1954; p.51).

Considering such a profound statement from Maslow, subsequent researchers have bemoaned the lack of studies that focus on aesthetics particularly in HCI (Lavie & Tractinsky, 2003). The Nielsen school of thought promotes the importance of competence, function and ease of use (Nielsen, 2000), whereas the others such as Karvonen, Krauss and Zettle have all shown evidence that visual aesthetics can manipulate viewers perceptions (Karvonen, 2002; Krauss, 2005, Zettle, 1999).

Whilst arguing for the importance of aesthetics Tractinsky and Hassenzahl (2005) discussed the evolution and proliferation of digital consumer products. In a crowded market where most options offered similar specification and reliability, the only aspect that could appeal on the visceral level was aesthetics (Tractinsky & Hassenzahl, 2005). Rotoet al (2018) discuss how brand experiences that transcend bricks and mortar into UI design can affect customers

emotionally, influencing loyalty. Yet they concluded there was a gap in both practice and study of branded online interaction aesthetics.

Similar to the explosion of the iPhone in modern times, in 1983 Swatch released a wrist watch for $30. Almost 30 times more expensive than its competitors. It offered the same reliability, usability, and accuracy. Its unique difference was visual design - aesthetics. This could indicate that initial visual appeal of these Swatches were more important to many people than functionality. Tractinsky & Hassenzahl (2005) argued that aesthetics are as important as functionality and utility. Tractinsky (1997) discussed how Gestalt theory could be applied to aesthetics.

Tractinsky & Hassenzahl, (2005) indicated the obvious advantage aesthetics have over functionality. It is easier and quicker for a user to observe and evaluate the aesthetics of a product than it is the internal intrinsic values such as usability. Thus they coined the phrase “what is beautiful is usable.

So Tractinsky & Hassenzahl (2005) among others touched on a theme that appears throughout this thesis. The initial focus within the HCI community was usability. Overlooking the influence of aesthetics in UI design leaving some gaps and contradictions in the literature. Yet, several studies signal how aesthetics can impact mood and enjoyment (Karvonen (2000), Tractinsky & Hassenzahl (2005), Fimberg & Sousa (2019)) and thus can impact the perception of trustability.

3 EXPLORATORY ANALYSIS OF AESTHETIC UI DESIGN

3.1 MINIMAL UI DESIGN

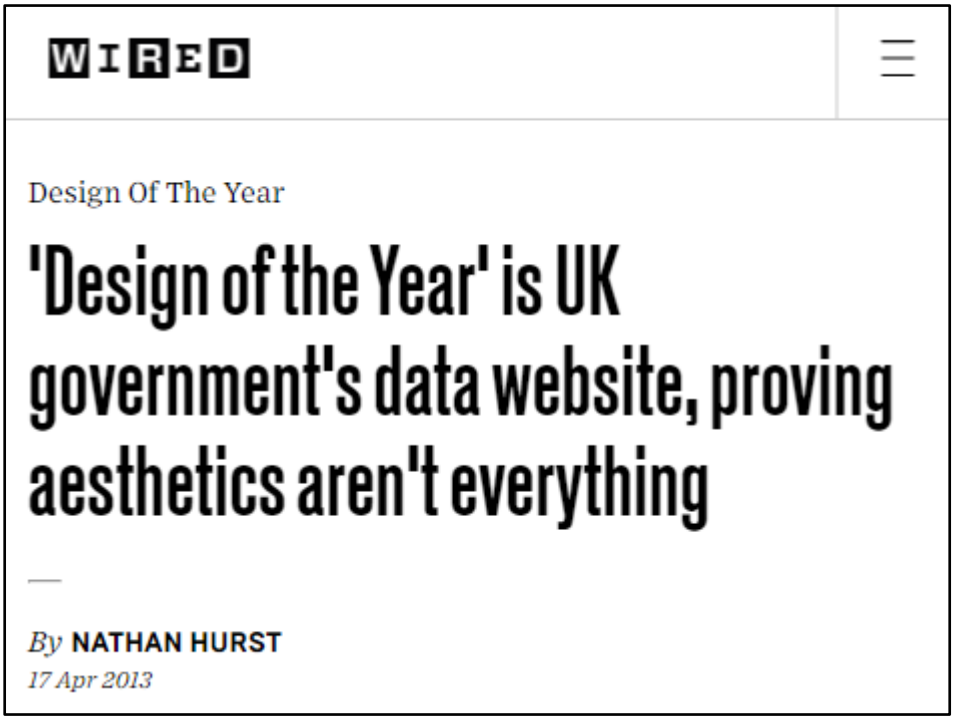


***Figure 1**: Head line from WIRED regarding the design success of gov.uk:*
Article here:https://www.wired.co.uk/article/design-of-the-year

The first example of UI design under study is minimal design. By this we mean an aesthetic approach to UI design that strips back many visual elements in order to present information only. The case study for this style of UI design is www.gov.uk (see Figure 2). This web service was launched to the UK public on the 16th of October 2012 (Maude, 2012).

The aim of the gov.uk web service was to provide a portal to most government departments and their various services from financial to civil. It took a user first approach to UI design and a definite influence from the school of Jakob Nielsen. This is evident in its content only design approach. Using only the information in text format with no imagery or illustration. This UI design treatment is backed up by Nielsen's eyetracking studies that promote the importance of content over aesthetics (Pernice & Nielsen, 2009).

According to the people behind gov.uk, Mike Bracken and Ben Terret who head up GDS they did make aesthetics a priority. However they prioritised function first and they believed elegance came from this functionality (Hurst, 2013).

To stay true to their design principles GDS published the principles they follow (GDS, 2019):

1. Start with user needs
2. Do less
3. Design with data
4. Do the hard work to make it simple
5. Iterate. Then iterate again
6. This is for everyone
7. Understand context
8. Build digital services, not websites
9. Be consistent, not uniform
10. Make things open: it makes things better

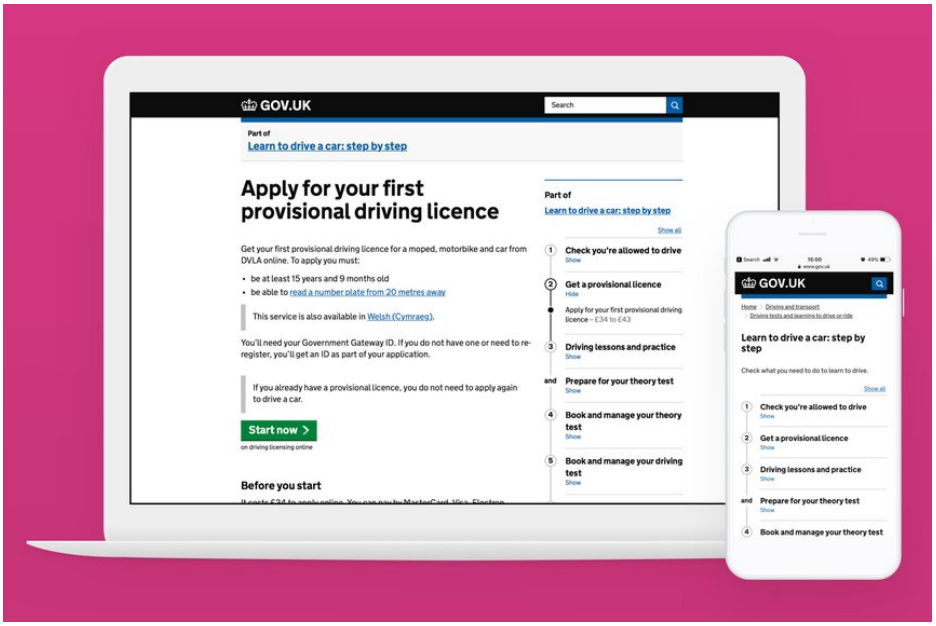


***Figure 2**: UI design example of gov.uk:*
Article here:https://www.dandad.org/awards/professional/2019/digital-design/231113/govuk-step-by-step-journeys/

Below are negative comments made about gov.uk not long after its launch.

"Yes, it looks more like an expired domain page than an integrated central location for government services.

Then again, it's a little like the DVLA: you're not going to spend any more time there than you have to. Wham, bam, thank you for registering your vehicle with us, ma'am. (Hurst, 2013)"

Regardless of personal preference toward UI design the functionality of the service succeeded. In 2013 the gov.uk design was awarded one of the most prestigious design awards in the UK. The Design Museum in London made it design of the year beating many entries across the world of design (Wainright, 2016).

This minimalist design approach clearly worked in the case of gov.uk. It made information clear and easily accessible. Gov.uk was designed based on inclusion and high accessibility standards. Once could say a 'less is more' (Smith, 2019) aesthetic was employed. According to Tolbert & Mossberger, e-government can influence trust in users. In a survey they conducted 78% of respondents considered e-government and using online government a positive option to have (Tolber & Mossberger, 2006).

So in the context of this study a minimal approach influenced by the gov.uk design approach and principles will be applied. This will then be added to the survey with the other two examples in order to see which design is received best in terms of users' perceptions of trust.

3.2 ILLUSTRATED UI

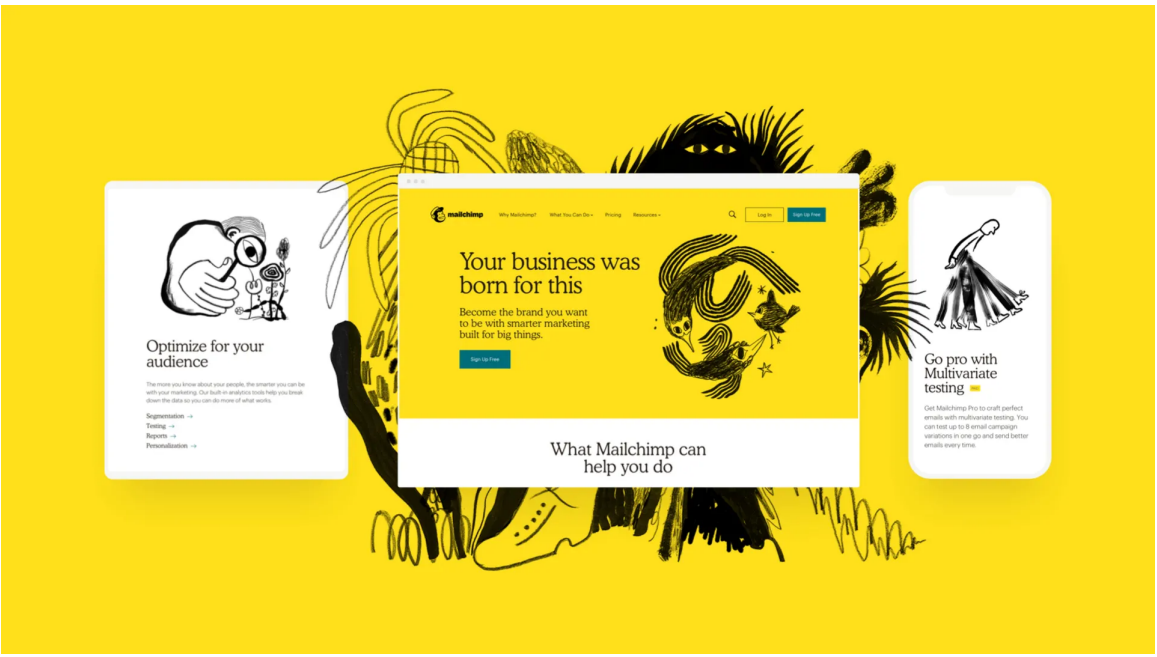


***Figure 3**: UI design example of mailchimp.com*
Article here: https://www.rga.com/work/case-studies/more-than-mail

The next example of UI design under study is illustrative. This UI style involves blending illustrated imagery and iconography to help convey such things as meaning, context, emotion and direction.

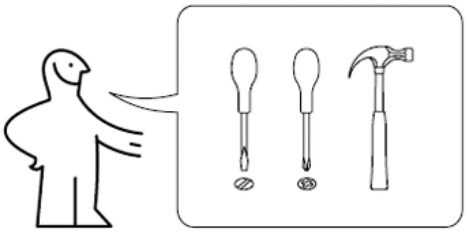


***Figure 4**: Example of illustrated Ikea instructions*
Source: https://www.ikea.com

Above is the iconic illustration that greets people as they begin to build a piece of Ikea furniture. Illustrated throughout, the instructions clearly guide people all the way to a complete build. Now, imagine attempting to build the same piece of furniture with text only instructions. The outcome would be different. No doubt longer and with some frustration. Ikea employs illustrations not just for their pleasing aesthetic but for their functionality. The illustrated instructions reduce cognitive load and work across language barriers. Many people around the world now trust in their ability to construct a piece of furniture from Ikea simply because of the helpful illustrated instructions that are a brilliant example of inclusive design (Danzico, 2018).

When considering digital product design, illustration is a great vessel to explain or signpost all types of concepts or instructions. This is why many of today's UX designers turn to original illustration to aid their complex designs. In fact, studies have shown that carefully curated illustrations can reduce user frustration (something that affects trust in a product) of certain ‘pain points’ throughout user journeys. Examples like humorous illustrated error messages and purchase screens, which support the idea that emotional impact and mood modulation are attainable with the clever use of aesthetics. Results from one such study found users still had a positive opinion and we’re more trusting of an interaction in the face of poor usability as long as illustrations we’re thoughtfully integrated (Evans, 2018).

The case study for illustrative UI design is Mailchimp.com (see Figure 3). Mailchimp is a tech company that allows businesses to automate email and marketing campaigns. They were founded in 2001. According to their co-founder Ben Chestnut design was at the heart of the business. Since 2001 they have seen variations of humorous and playful illustration intertwine their UI designs. The current UI uses bespoke illustrations from various artists that dovetail with the different functions of the service. Making it easier for customers to navigate and understand the processes in a more human way (Polianskaya,2018).

This humane approach was championed for many years at Mailchimp by Arron Walters who wrote the book ‘Designing For Emotion’ in 2011. This book extols the importance of UX design bringing pleasure to users. Whilst at Mailchimp he saw the importance of considered illustrations and how they could engender trust and “act as a safety net” when functionality would encounter a bug (Walter, 2011). He believed in a modification of the ‘Hierarchy Of

Needs'. One where emotions such as fun, joy and humour are the top tier. Walter champions the notion that casual users can become fanatical if an interaction is enjoyable and therefore engender trust (Walter, 2011).

3.3 PHOTOGRAPHIC UI

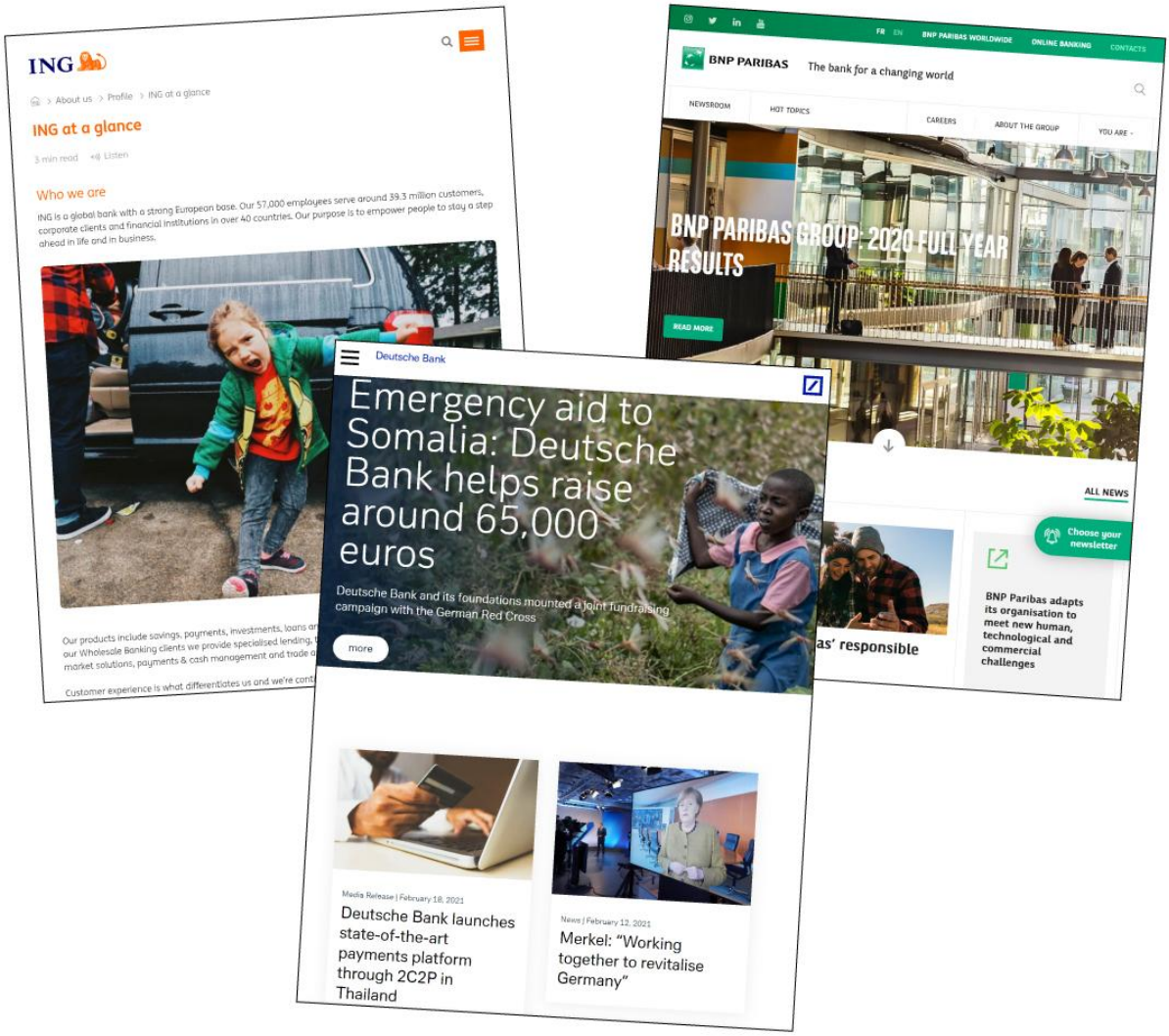


***Figure 5**: Example of Photographic UI designs for various banks.*

Source: https://www.ing.com/About-us/Profile/ING-at-a-glance.htm

Source: https://group.bnpparibas/en/

Source: https://www.db.com/index?language_id=1

The next example of UI design under study is photographic. This UI style relies heavily on photography to set tone and describe context. Images are rapidly deciphered by our subconscious brain, this emotional response can be referred to as ‘system 1’ thinking.

System 1 refers to a brain operating system coined by Daniel Kahneman. He showed that our brain has two operating systems, system 1 and system 2 (Groenewegen, 2019). Designers can exploit this knowledge and use photography in UI design to build trust. The technique often used is to employ imagery of people in real life scenarios. Allowing a user or customer to relate to a business through photography.
As a case study for photographic UI design I will focus on an industry rather than a specific website. We’ve already discussed how and why many corporate websites turn to photography, no more so than the finance industry (see Figure 5).

For instance companies often include real photographs of employees on their about us pages in order to build a trusting relationship with customers (Whelan, 2019). However, this approach can backfire if employed incorrectly. Corporate websites can often exhaust the use of insincere imagery in their attempts to build trust. It is better to gain trust through relatable imagery (Babich, 2017).

UI photography can be broken into three categories: *navigation, content,* and *ornamental*. User research has shown the benefits of well curated navigation and content graphics however no real value from ornamental (Spool, 2009). In terms of navigational photography, an eye tracking study showed that an area of text gained more focus from users due to the gaze of a face that looked toward it rather than away from it (Breeze, 2010).

Some designers explain the reasons behind ornamental imagery as a way to connect with users on an emotional level (Spool, 2009). This is reinforced by the 4 factors of trustworthiness discussed by Jakob Nielsen and colleagues (Harley, 2016). In various studies they conducted, users preferred UI designs that used better quality imagery. In particular users wanted to see images that depicted business processes as it helped build trust (Harley, 2016).

3.4 THOUGHTS ON THE THREE STYLES

As Karvonen discovered in 2000, Swedish & Finish web users tend to associate ‘clean’ or ‘clear’ visual design with trust (Karvonen, 2000). Lavie and Tractinsky (2003) also discuss this as the ‘first dimension’ aesthetic attributes that appeal to a viewer. They would typically be pleasant, clean, clear and symmetrical qualities (Lavie & Tractinsky, 2003). The ‘second dimension’ Lavie and Tractinsky (2003) discuss is one represented by aesthetic attributes such as ornamentation, expression, creativity and originality. Lavie and Tractinsky (2003) did this by using exploratory and confirmatory factor analyses. The names given to these two dimensions were ‘classical aesthetics’ and ‘expressive aesthetics’ (Lavie & Tractinsky, 2003).

The three styles of UI design under study can be categorised either ‘classical aesthetics’ or ‘expressive aesthetics’ according to the rationale of Lavie & Tractinsky (2003). The UI design style of GDS falls under ‘classical aesthetics’ and those of Mailchimp and the Financial industries could be categorised as ‘expressive aesthetics’.

GDS completely redesigned the online portals for the UK government. In 2012 they launched their first beta version of gov.uk (Hurst, 2013). Since then it has won accolades for its design even though it has been described as bland and similar in design to an expired domain page (Hurst, 2013). It may split opinion but this refined design is based on many hours of research and attempts to streamline and simplify online government services.

Mailchimp has shown how an illustrated UI design can bring a humane approach to complex interactions. They employed illustration to help build trust by bringing a sense of empathy to their designs (Walter, 2011). In the studies discussed previously users in a study still trusted the functionality of a UI even when it didn’t perform properly due to the presence of carefully curated illustrations.

Clearly the finance world has embraced ornamental imagery in UI design to express intangible emotions that help connect with customers and build trust (see Figure 5). The simple fact that so many financial institutions use this style reflects a belief in their effectiveness.

These three differing UI design approaches all have merits. Yet when the goal is building trust with the users, they may perform differently. Therefore, the subsequent study aims to compare how they perform in Trust when compared side by side using the same basic content, with the goal of advancing our understanding of the impact of aesthetic choice and style in trust-building and offering guidance for future design projects.

I aim to neither champion or detract from any approach but to extrapolate user opinion on all three.

4 THE STUDY - COMPARATIVE ANALYSIS

The aim of this study was to explore the relationship between three different aesthetics of UI design (minimal, illustrative, photographic) and the resulting influence each had on trust perceptions of the end users. In addition does gender and age have any influence on aesthetic perception and finally does aesthetic perception influence perceived functionality.

4.1 THE METHODOLOGY

The following three research questions and subsequent hypotheses were created:

- RQ1: Do the aesthetics of a digital product influence trust perceptions?
    - H1: minimal aesthetic styles have a greater influence on trust?
    - H2: illustrative aesthetic styles have a greater influence on trust?
    - H3: photographic aesthetic styles have a greater influence on trust?

- RQ2: Does gender and age influence aesthetic taste?

- RQ3: Do the aesthetics of a digital product influence perceived functionality?

In order to answer the research questions and examine the differences between the three UI styles and they're respective influences on user trust perceptions a two part within-subjects comparative study approach was chosen to gather both quantitative and qualitative data.

This mix methods approach aimed to provide data that could present a better understanding between the relationship of aesthetics perceptions and trust perceptions. To carry out the study three prototypes were developed using different aesthetic styles (minimal, illustrative, photographic), but built around the exact same content, so the focus should be the aesthetics and not functionality.

One key factor in choosing the comparative study technique is the ability to establish a relation between subjects, are they opposed or are they linked (Bukhari, 2011). The Within-subjects study design was employed to counteract the possibility of small participation levels. As the author had to rely on various social and communication platforms to share the questionnaire. This is important as a Within-subjects study can still produce statistically sound results between variables even with a smaller sample size. Within-subjects study designs also aid in the reduction of random noise in the collected quantitative data (Budiu, 2018).

1.1.1 4.1.1 THE STUDY PROCEDURE

The study procedure consisted of three phases as described below (see Table 2).

Phase 1 assessed aesthetic perception, trust perception and perceived functionality.
To better understand the relation between aesthetics and trust perception three prototypes were developed as stimuli. Theses prototypes portrayed three distinctive aesthetic styles:

- Minimal (Typography, layout and shape only);
- Illustrative (Typography, layout and supporting illustrations);
- Photographic (Typography, layout and supporting photographic imagery);

The online unmoderated survey which was distributed online via social media and communication channels such as WhatsApp, Slack, Instagram and LinkedIn. The quantitative and qualitative data gathered aimed to answer RQ1-3.

Phase 2 complemented the survey questionnaire with informal follow-up interviews of participants who volunteered via the option in the questionnaire. The qualitative data gathered aimed to answer RQ1-3, with a particular focus on RQ2.

Phase 3 Data analysis, the final phase, correlation and regression analysis of the quantitative data was carried out. Sentiment analysis was carried on the qualitative data. The results are presented and findings discussed.

Phase 1 - Online unmoderated survey	**Phase 2 - Follow up interviews**	**Phase 3 - Data analysis**
Goal: Structure Introduction text, Author introduction and study explanation. followed by demographic data collection .	Think out loud, self-recorded interviews - participants own discretion. All watched and qualitative data coded.	Descriptive statistics for each of the three UI under study. Employing PCC to determine Pearson's r value.
Tasks: Aesthetic assessment (AA) Navigate through each UI prototype then complete subsequent aesthetic assessment for each.	Informal interviews via Google Chat, gathered by request.	Regression analysis for each of the three UI under study.
Assess trust perceptions: Trust perception (TP) Navigate through each UI prototype then score subsequent trust perception for each.		UL analysis for each of the three UI under study. The result of each converted to a SUS score.

Assess prototype Functionality grading (FG) Navigate through each UI prototype then complete subsequent UMUX-Lite assessment.		Sentiment analysis and coding of qualitative written and verbal feedback.
Assess Qualitative feedback (QF) Navigate through each UI prototype then leave written feedback for each.		

***Table 3**: Study Procedure*

1.1.2 4.1.2 PROTOTYPE -1 - ILLUSTRATIVE UI

Based on 'expressive aesthetics' (Lavie & Tractinsky, 2003) and potentially exploiting 'ornamental'(Spool, 2009) design techniques this UI style relies heavily on illustrated imagery for its aesthetics. This embrace of illustrative styles reflects the approach taken by Mailchimp discussed in 3.2. The author created bespoke illustrations, characters, and icons mixed with soft calming pastel hues. The aim is to induce a feeling of fun and calmness within the user. The functionality and content will not differ from the others. As explained before, this was created in Adobe XD and Adobe illustrator.

***Figure 6**: The illustrative UI design style.*

1.1.3 4.1.3 PROTOTYPE -2 PHOTOGRAPHIC UI

Based on ‘expressive aesthetics’(Lavie & Tractinsky, 2003) and employing ‘ornamental’ graphics (Spool, 2009). This UI design style uses real imagery of scenes and people for its aesthetics. A technique discussed by Nielsen et al (2016) in various studies they conducted. In particular users wanted to see images that depicted business processes as it helped build trust (Harley, 2016). This direction is also similar to the approach taken by the finance and corporate worlds as discussed in 3.3. This prototype was produced by sourcing royalty free imagery that is free to use. The images were sourced from Adobe Stock. Then they were amended in Adobe Photoshop and finally imported to Adobe XD. Once imported to Adobe XD the design was created. Using a clear layout and a friendly colour scheme.

***Figure 7**: The photographic UI design style.*

1.1.4 4.1.4 PROTOTYPE-3 MINIMAL UI

Based on 'classical aesthetics' (Lavie & Tractinsky, 2003) the minimal design approach mimics the UX approach taken by GDS and their work on gov.uk discussed in 3.1. Using clear typography and whitespace the aim is to make the UI clear and easy to interpret. This UI design treatment is backed up by Nielsen's eyetracking studies that promote the importance of content over aesthetics (Pernice & Nielsen, 2009).

***Figure 8**: The minimal UI design style.*

4.2 THE SURVEY

4.2.1 METHOD

The study was an unmoderated survey with the option of a follow up interview via online chat. Part one of the survey which focused on RQ1 & RQ2, the data was captured using two ten point Likert scales. The questions read as so:

- On a scale from 1-10 (1=lowest) how did you rate the visual aesthetic of this app design?

- On a scale from 1-10 (1=lowest) how likely would you be to trust this app for a financial transaction?

This data was then analysed using Google Sheets and a statistical analysis software called PSPP (GNU PSPP, 2020). These tools allowed for both regression and correlation (PCC) analysis to be conducted on this first data set.

Part two of the survey focused on RQ3, the data was captured using two seven point Likert scales and employed a UMUX-LITE study design. The reason for this approach will be discussed in 4.4.1. The questions read as so:

- This app (Pension Buddy) is easy to use.
- This app (Pension Buddy) meets my needs.

Part three of the survey collected user feedback. The question read as so:

- What are your general thoughts toward this app design? Please write below, and remember this is about honesty and is not a right or wrong scenario. Thank you.

Due to the ongoing Covid-19 pandemic follow up interviews were limited. Those that occurred were a mixture of informal interviews carried out using Google Chat or similar depending on participant's discretion. Participants could also record themselves if they wished and were asked to think aloud as they completed the UI interactions. All qualitative data was analysed using inductive content analysis. From this analysis a codebook was created (Burnard et al, 2008). The analysed data was sorted and an affinity map was produced to help visualise and contextualise the patterns in qualitative feedback. (Friis Dam, R., & Yu Siang, 2020).

4.2.2 THE SURVEY PROCEDURE

The survey was created in Google Forms (see appendix A) and contained the links to the three prototypes and the corresponding questionnaires.

Goal: Structure Introduction text, Author introduction and study explanation. Followed by demographic data collection.
Tasks: Aesthetic assessment (AA) Navigate through each UI prototype then complete subsequent aesthetic assessment for each.
Assess trust perceptions: **Trust perception (TP)** Navigate through each UI prototype then score subsequent trust perception for each.
Assess prototype Functionality grading (FG) Navigate through each UI prototype then complete subsequent UMUX-Lite assessment.

Assess Qualitative feedback (QF) Navigate through each UI prototype then leave written feedback for each.

***Table 4**: The survey procedure*

4.2.3 MATERIAL AND APPARATUS

The survey was produced using Google Forms, and contained three identical questionnaires that gathered data on the three different UI design styles (minima, photographic, illustrative). Each survey section consisted of a 2 question 10 point Likert scale. Then a 2 question 7 point Likert scale and finally a qualitative open question input.
The prototypes were created using Adobe XD with some supplementary design and illustration created in Adobe Illustrator and Adobe Photoshop.
The prototypes were circulated via social media and communication applications, they were:

- Gmail
- Slack
- WhatsApp
- LinkedIn
- Internal company intranet (author's company)
- Facebook
- Instagram.

4.2.4 THE QUESTIONNAIRE

The questionnaire was split into three parts based around the three UI prototypes. Each section consisted of an author introduction, explanation of the study, instructions, a link to

each prototype and the set of questions. Demographic questions such as age group and gender were only required in part one of the questionnaire.

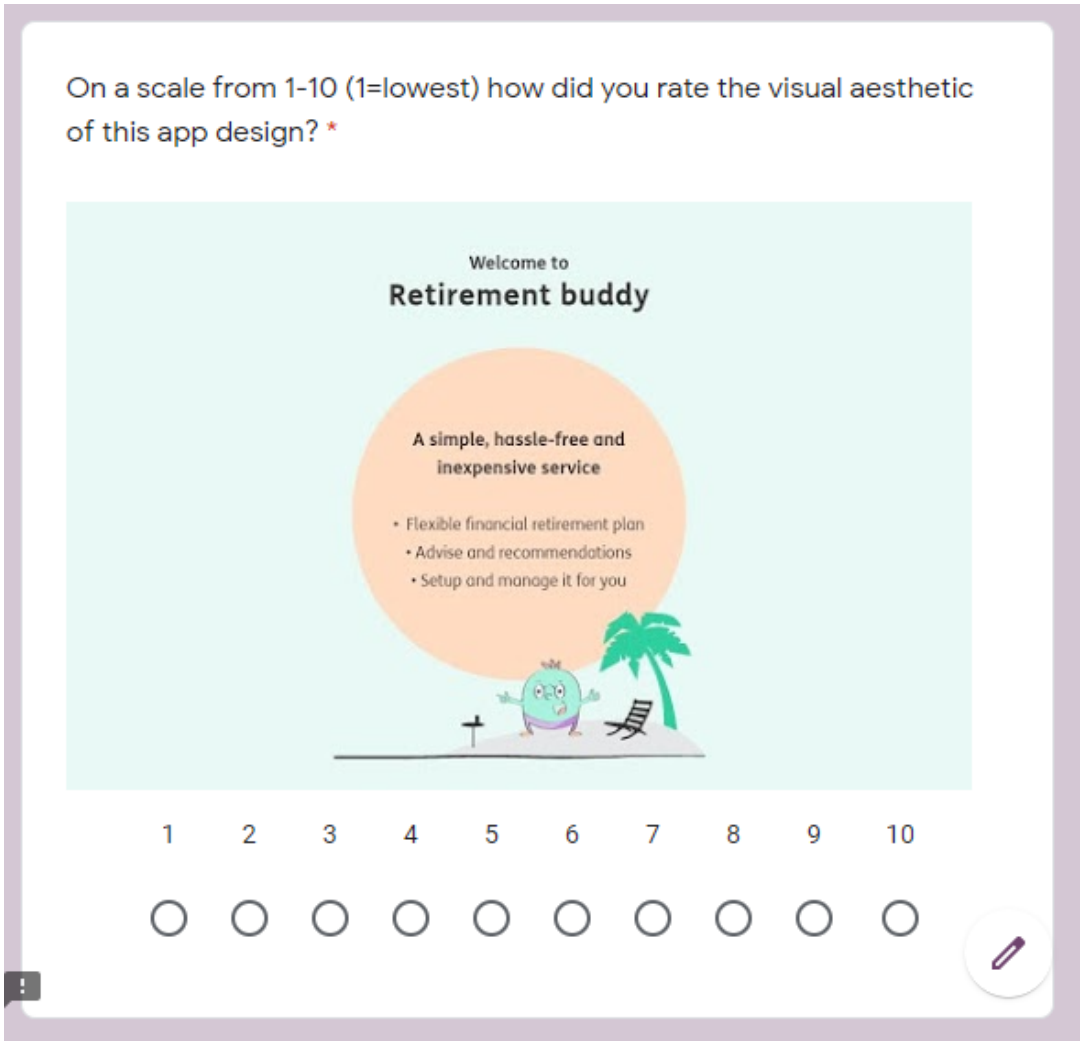


***Figure 9**: Example section from the study questionnaire*

4.2.5 PILOT STUDY

To test the validity of the survey and the appropriateness of the questionnaires a pilot study was carried out with 6 participants who were known to the author.

Once the pilot study was complete the participants were asked for feedback. They were asked questions to help paint a picture of the survey, questionnaire and any potential issues. Questions included:

- How long did it take you?
- Did the prototypes work on your phone?
- Were the questions too long?
- Was the questionnaire easy to comprehend?

4.2.6 Pilot study Results

Feedback from the pilot study produced clear clusters of similar issues. Obvious grammatical mistakes were corrected. Confusion with the written content presented in the app prototypes was deemed too technical and complicated. This was amended and simplified to a basic consumer level. A similar issue for all pilot study participants was that the questionnaire was too long to complete. It led some participants to lose concentration and they began to tick the same grade on each Likert scale as they reached roughly the halfway point. It was concluded that trying to run three consecutive SUS questionnaires was too intensive as each contained 10 questions which meant a total of 30 for each participant. So the survey needed an alternative that would yield the same result but in less time and effort. The solution was to employ UMUX-Lite. UL employed two questions using a 5 or 7 point Likert scale and is based on the original UMUX. In 2010 Kraig Finstad at Intel created UMUX as a shorter alternative to the SUS. Based on a 7 point Likert scale and containing two positive and two negative questions aimed at the ISO 9241 definition of usability (Finstad, 2010). In 2015, this was reduced to two positive questions by Lewis et al when they created UMUX-Lite. UL had a reliability similar to the SUS (UL alpha= .86 vs. SUS alpha = .91). It also had similarities to the TAM which also measured perceived usefulness (Lewis et al, 2015).

4.3 THE FOLLOW UP INTERVIEWS (SELECTED PARTICIPANTS)

In addition to the qualitative segment of the questionnaire follow-up interviews were carried out with participants who volunteered. In total 3 participants were interviewed. These were predominantly conducted through Google Chat. The interviews allowed for further informal interviews based around the participant's initial qualitative response in the questionnaire.

4.3.1 QUALITATIVE AND QUANTITATIVE DATA ANALYSIS

Both qualitative and quantitative data were collected from a total of 79 respondents. This was analysed using the various methods discussed and the results are presented in chapter 5.

4.4 STUDY DEMOGRAPHICS

4.4.1 PARTICIPANT SAMPLE - CONVENIENCE SAMPLING

Taking into consideration the authors limited resources and current Covid-19 pandemic it was concluded that convenience or availability sampling would be the best option for participant inclusion. This form of sampling allowed the author to use digital communication apps such as WhatsApp to quickly run the pilot study with an initial survey. Then to harness social media to circulate the subsequent revised final survey. As the line of questioning in the study is limited the author felt convenience sampling would yield sufficient primary data that could be analysed to help answer the research questions.

To mitigate the negative aspects of convenience sampling such as sampling bias and poor representation of the general population (Gall et al, 1996), the author exploited multiple unconnected social media and communication channels in order to reach a broad demographic. This included, but was not limited to, employer intranet, educational institution social media, personal social media and digital communication.

4.4.2 SELECTION CRITERIA

There were no specific selection criteria. However, the assumption was made that anyone participating was over 18, had a reasonable ability in the English language and was competent with smartphone usage and digital UI. These selection criteria presented no issues and all respondents completed the entire survey.

5 FINDINGS

In this chapter the results will be presented and analysed using the methods discussed in chapter 4.

5.1 PARTICIPANT DESCRIPTION

Once the survey was finally closed to responses a total of 79 participants had completed it. This was slightly under the projected 100 plus aimed for but due to time restraints the survey had to close in order for analysis to begin. Of the 79 respondents one declined to give consent (see Figure 11). A potential flaw and will be discussed further in the findings.

Of the 79 respondents 36 (45.6%) were aged between 31-45 years old (see Figure 10). A further 23 (29.15%) were in the 46-60 age range (see Figure 10). The oldest age range of 60 years plus was made up of 12 (15.2%) respondents (see Figure 10). The youngest age range of 18-30 years old returned 8 (10.1%) respondents (see Figure 10).

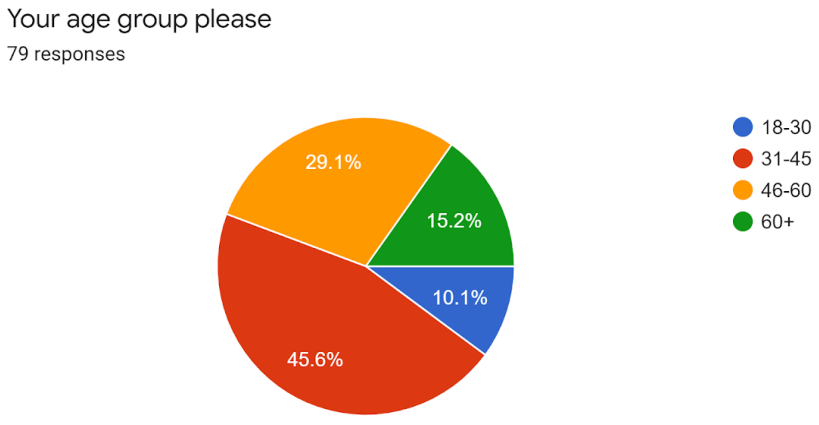


***Figure 10**: Participants age breakdown*

Participants' country of residence was mainly in Europe and in particular Éire-Ireland. A total of 53 (41.87%) participants came from Ireland (see Table 5). The next country by combined total was the UK with 15 (11.85%) participants (see Table 5). Over in the Americas 3 participants came from Canada (see Table 5). Following on from that, a selection of countries returned 1 participant except Greece which returned 2 participants (see Table 5).

Current country of residence	Amount
Ireland	53
United Kingdom	15
Canada	3
Greece	2
Columbia	1
Croatia	1
Spain	1
Australia	1
Poland	1
Germany	1

Table 5*: Participant location*

Participants' gender breakdown was an almost 60% to 40% split. The exact percentage was 47 (59.5%) female respondents, and 32 (40.5%) male respondents (see Figure 11).

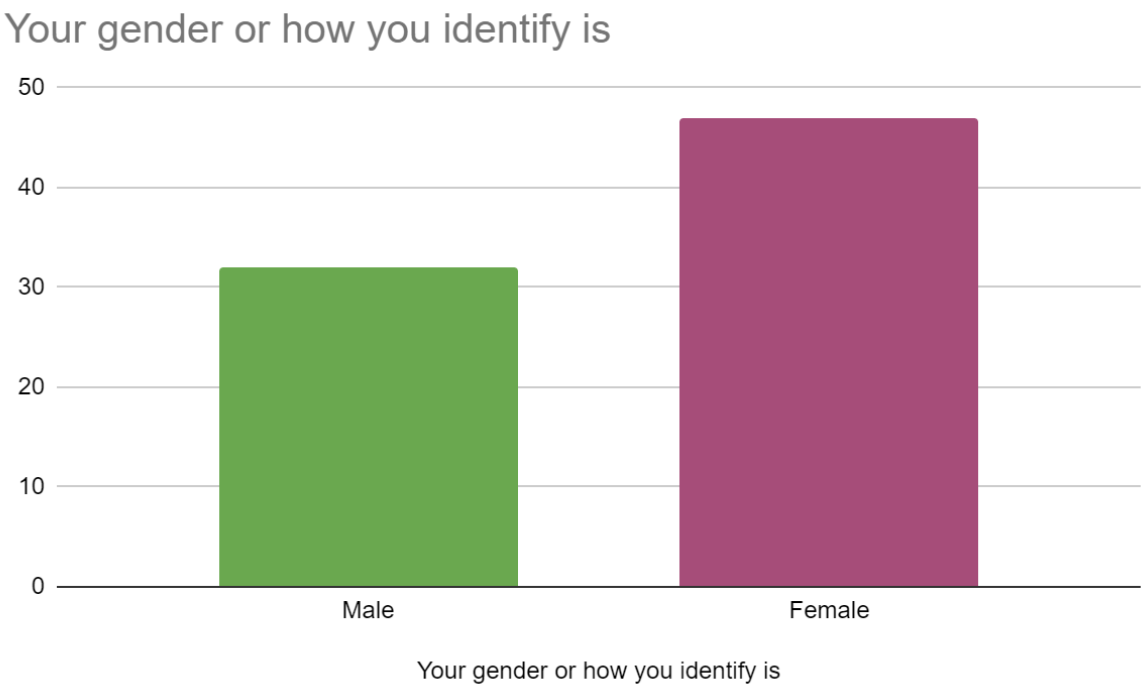


***Figure 11**: Participant gender breakdown*

5.2 ILLUSTRATION UI STYLE CORRELATION & REGRESSION ANALYSIS

The first section of the questionnaire related to prototype 1 asked the participants to score the aesthetics (AA) and trust perception (TP) on a 10 point Likert scale. This is summarised below (see Table 6).

Questions	N	Mean	Std. Deviation (S)
On a scale from 1-10 (1=lowest) how did you rate the visual aesthetic of this app design?	79	7.25	2.20
On a scale from 1-10 (1=lowest) how likely would you be to trust this app for a financial transaction?	79	5.86	2.51

***Table 6**: Descriptive statistics for UI Prototype 1*

The mean AA was 7.25 and the corresponding mean TP was 5.86 (see Table 6). PCC analysis was then conducted to help answer RQ1 and RQ2 (see Table 7).

	Aesthetic	**Trust**
Aesthetic Pearson Correlation	1.000	.682
Trust Pearson Correlation	.682	1.000
N	79	79

Table 7*: Pearson Correlation coefficient for UI prototype 1*

A Pearson's correlation coefficient of 0.682 meant that AA and TP were found to have a 'strong' (.60-.79) positive correlation, r(77) = .682, p = < .01.
This result is significant at p < .05.
A simple linear regression was calculated to investigate the relationship between TP and AA. The regression scatterplot displayed a strong positive linear relationship between the two.
A polynomial regression yielded the best fit and highest R^2 value. (see Figure 12).
A moderate regression equation was found ($F(1,77)= 66.82$, $p < .000$), with an R^2 of .46 (see Table 8). Participants' predicted TP is equal to .23+.78 (aesthetics) when TP is measured on a scale of 10 point Likert scale (10 highest). TP increased .78 for each positive Likert scale placement of aesthetics. If we refer to RQ1, these results would suggest that aesthetics do influence trust perception in a positive way.

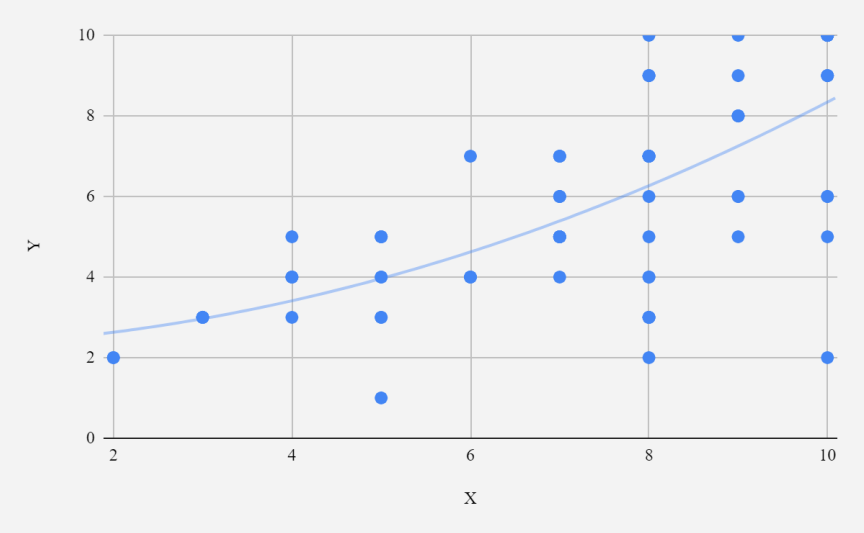


***Figure 12**: Illustration UI Prototype 1 polynomial regression line, R^2 = .46.*

Model Summary (Trust)

R	R Square	Adjusted R Square	Std. Error of the Estimate
.68	.46	.46	1.84

ANOVA (Trust)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	227.42	1	227.42	66.82	.000
Residual	262.05	77	3.40		
Total	489.47	78			

Coefficients (Trust)

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.23	.72	.00	.32	.753
Aesthetic	.78	.10	.68	8.17	.000

***Table 8**: UI prototype 1 regression analysis tables*

5.2.1 UMUX-LITE & SUS ANALYSIS

To produce the UL score, the mean for item1 (6.06) and item 2 (5.16) had to be calculated. A value of 1 was then subtracted from each value to give 5.06 and 4.16 respectively.
The UL equation could be run as follows.

Item 1 (5) + Item 2 (4) /12 (×) 100 = 76.83

According to Lewis et al UL scores were on average lower than SUS scores. To convert the UL to a SUS score a regression equation was used (Lewis et al, 2015).

$$UL = .65 \times ((Item\ 1 + Item\ 2 - 2) \times (100/12) + 22.9) = 71.65$$

The results are presented below (see Table 9).

UMUX-LITE	System Usability Score
75	*72.84*

***Table 9**: UL & SUS scores for UI prototype 1*

5.3 PHOTOGRAPHIC UI STYLE CORRELATION & REGRESSION ANALYSIS

The first section of the questionnaire related to prototype 2 asked the participants to score the aesthetics (AA) and trust perception (TP) on a 10 point Likert scale. This is summarised below (see Table 10).

Questions	**N**	**Mean**	**Std. Deviation (S)**
On a scale from 1-10 (1=lowest) how did you rate the visual aesthetic of this app design?	79	7.27	2.22
On a scale from 1-10 (1=lowest) how likely would you be to trust this app for a financial transaction?	79	6.48	2.47

***Table 10**: Descriptive statistics for UI Prototype 2*

The mean AA was 7.27 and the corresponding mean TP was 6.48 (see Table 10). PCC analysis was then conducted to help answer RQ1 and RQ2 (see Table 11).

	Aesthetic	**Trust**
Aesthetic Pearson Correlation	1.000	.727
Trust Pearson Correlation	.727	1.000
N	79	79

***Table 11**: Pearson Correlation coefficient for UI prototype 2*

A Pearson's correlation coefficient of 0.727 meant that AA and TP were found to have a 'strong' (.60-.79) positive correlation, r(77) = .727, p = < .01.
This result is significant at p < .05.

A simple linear regression was calculated to investigate the relationship between TP and AA. The regression scatterplot displayed a strong positive linear relationship between the two. A polynomial regression yielded the best fit and highest R^2 value. (see Figure 13).
A moderate regression equation was found (F(1,77)= 86.26, p < .000), with an R^2 of .53 (see Table 12). Participants' predicted TP is equal to .60+.81 (aesthetics) when TP is measured on a scale of 10 point Likert scale (10 highest). TP increased .81 for each positive Likert scale placement of aesthetics. If we refer to RQ1, these results would suggest that aesthetics do influence trust perception in a positive way.

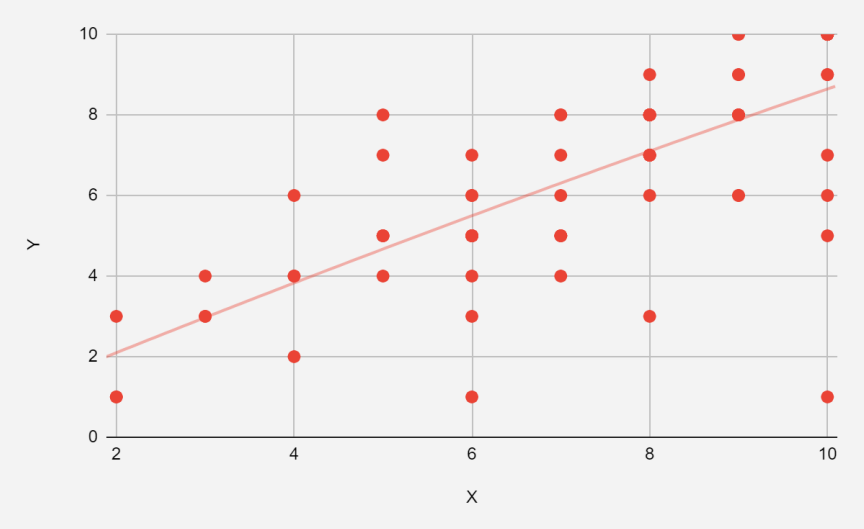


***Figure 13**: UI Prototype 2 polynomial regression line, R^2 = .53.*

Model Summary (Trust)

R	R Square	Adjusted R Square	Std. Error of the Estimate
.73	.53	.52	1.71

ANOVA (Trust)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	252.40	1	252.40	86.26	.000
Residual	225.32	77	2.93		
Total	477.72	78			

Coefficients (Trust)

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.60	.66	.00	.91	.366
Aesthetic	.81	.09	.73	9.29	.000

***Table 12**: UI prototype 2 regression analysis tables*

5.3.1 UMUX-LITE & SUS ANALYSIS

To produce the UL score, the mean for item1 (5.98) and item 2 (5.27) had to be calculated. A value of 1 was then subtracted from each value to give 4.98 and 4.27 respectively.
The UL equation could be run as follows.

Item 1 (5) + Item 2 (4) /12 (×) 100 = 77.08

According to Lewis et al UL scores were on average lower than SUS scores. To convert the UL to a SUS score a regression equation was used (Lewis et al, 2015).

$$UL = .65 \times ((Item\ 1 + Item\ 2 - 2) \times (100/12) + 22.9) = 62.2$$

The results are presented below (see Table 11).

***Table 13**: UL & SUS scores for UI prototype 2*

UMUX-LITE	System Usability Score
77.08	*73.04*

5.4 MINIMAL UI STYLE CORRELATION & REGRESSION ANALYSIS

The first section of the questionnaire related to prototype 3 asked the participants to score the aesthetics (AA) and trust perception (TP) on a 10 point Likert scale. This is summarised below (see Table 14).

Questions	N	Mean	Std. Deviation (S)
On a scale from 1-10 (1=lowest) how did you rate the visual aesthetic of this app design?	79	5.19	2.76
On a scale from 1-10 (1=lowest) how likely would you be to trust this app for a financial transaction?	79	5.20	2.94

***Table 14**: Descriptive statistics for UI Prototype 3*

The mean AA was 5.19 and the corresponding mean TP was 5.20 (see Table 14). PCC analysis was then conducted to help answer RQ1 and RQ2 (see Table 15).

	Aesthetic	Trust
Aesthetic Pearson Correlation	1.000	.856
Trust Pearson Correlation	.856	1.000
N	79	79

***Table 15**: Pearson Correlation coefficient for UI prototype 3*

A Pearson's correlation coefficient of 0.856 meant that AA and TP were found to have a ‘very strong’ (.80-.1.0) positive correlation, $r(77) = .856$, $p = < .01$. This result is significant at $p < .05$.

A simple linear regression was calculated to investigate the relationship between TP and AA. The regression scatterplot displayed a strong positive linear relationship between the two. A polynomial regression yielded the best fit and highest R^2 value (see Figure 14).
A moderate regression equation was found ($F(1,77)= 211.26$, $p < .000$), with an R^2 of .73 (see Table 16). Participants' predicted TP is equal to .49+.91 (aesthetics) when TP is measured on a scale of 10 point Likert scale (10 highest). TP increased .91 for each positive Likert scale placement of aesthetics. If we refer to RQ1, these results would suggest that aesthetics do influence trust perception in a positive way.

As a result H1 is confirmed with minimal UI design aesthetics having the greatest influence on trust perceptions.

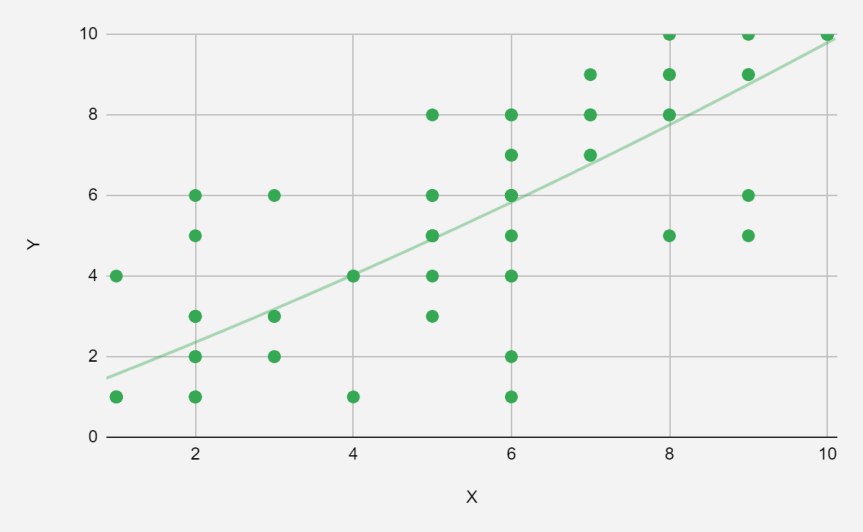


***Figure 14**: UI Prototype 3 polynomial regression line, $R^2 = .73$.*

Model Summary (Trust)

R	R Square	Adjusted R Square	Std. Error of the Estimate
.86	.73	.73	1.53

ANOVA (Trust)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	494.52	1	494.52	211.26	.000
Residual	180.24	77	2.34		
Total	674.76	78			

Coefficients (Trust)

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.48	.37	.00	1.29	.200
Aesthetic	.91	.06	.86	14.53	.000

***Table 16**: UI prototype 3 regression analysis tables*

5.4.1 UMUX-LITE & SUS ANALYSIS

To produce the UL score, the mean for item1 (5.39) and item 2 (4.59) had to be calculated. A value of 1 was then subtracted from each value to give 4.39 and 3.59 respectively.
The UL equation could be run as follows.

Item 1 (5) + Item 2 (4) /12 (×) 100 = 66.5

According to Lewis et al UL scores were on average lower than SUS scores. To convert the UL to a SUS score a regression equation was used (Lewis et al, 2015).

$$UL = .65 \times ((Item\ 1 + Item\ 2 - 2) \times (100/12) + 22.9) = 66.12$$

The results are presented below (see Table 17).

***Table 17**: UL & SUS scores for UI prototype 3*

UMUX-LITE	System Usability Score
66.5	*66.12*

5.5 COMPARING AESTHETIC PERCEPTION BETWEEN GENDERS

Additional analysis was carried out to determine any differences in aesthetic perception between male and female participants.

1.1.5 5.5.1 OVERALL COMPARISON

On average male participants had a higher aesthetic perception across the 3 UI styles. The mean for male participants was 6.9 in comparison the mean for female participants was 6.3. When split between the three UI styles the female participants only ranked the photographic style higher (see Table 18).

	illustrative UI style	photographic UI style	minimal UI style
Female (mean)	7.1	7.3	4.5
Male (mean)	7.4	7.1	6.1

***Table 18**: Aesthetic perception, gender comparison*

5.6 QUALITATIVE ANALYSIS

For the qualitative data sentiment analysis was carried out and the written feedback coded into five categories. They are as follows:

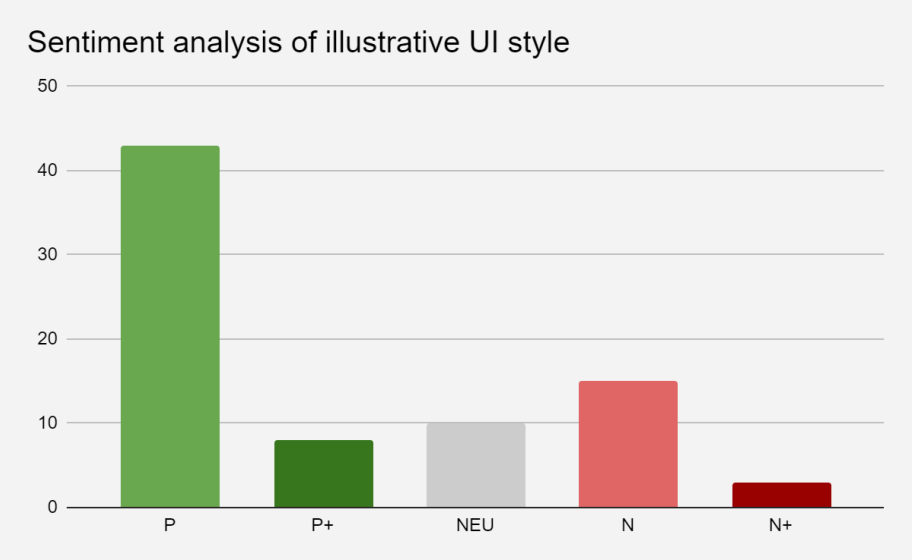
- Positive + (P+)
- Positive (P)
- Neutral (NEU)
- Negative (N)
- Negative + (N+)

1.1.6 5.5.1 ILLUSTRATION UI STYLE QUALITATIVE ANALYSIS

The following results were collected from the quantitative feedback collected in the survey in relation to the photographic UI style.

Positive feedback was the predominant consensus totalling 43. Followed by negative feedback at 15. Neutral feedback was 10 respondents. The positive-plus category tallied to 8. Then finally those who dislike it most in the negative-plus category made 3 (see Figure 15).

***Figure 15**: Sentiment analysis of illustrative UI style*

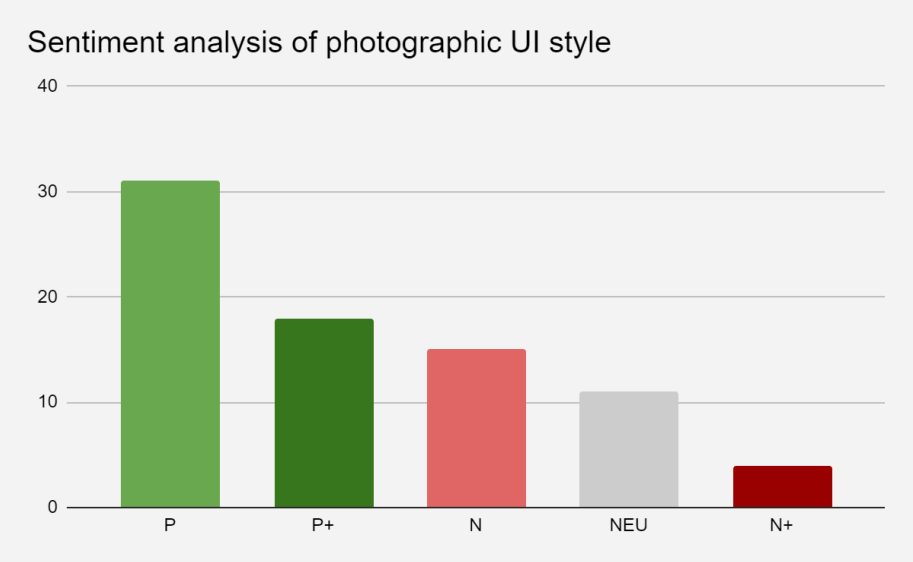


1.1.7 5.5.2 PHOTOGRAPHIC UI STYLE QUALITATIVE ANALYSIS

The following results were collected from the quantitative feedback collected in the survey in relation to the photographic UI style.

As with the illustrative UI style positive feedback was the predominant consensus totalling 31. The positive-plus category came second with 18. Followed by negative feedback at 15. Neutral feedback was similar to illustrative feedback at 11 respondents.Then finally those who dislike it most in the negative-plus category made 4 (see Figure 16).

***Figure 16**: Sentiment analysis of photographic UI style*

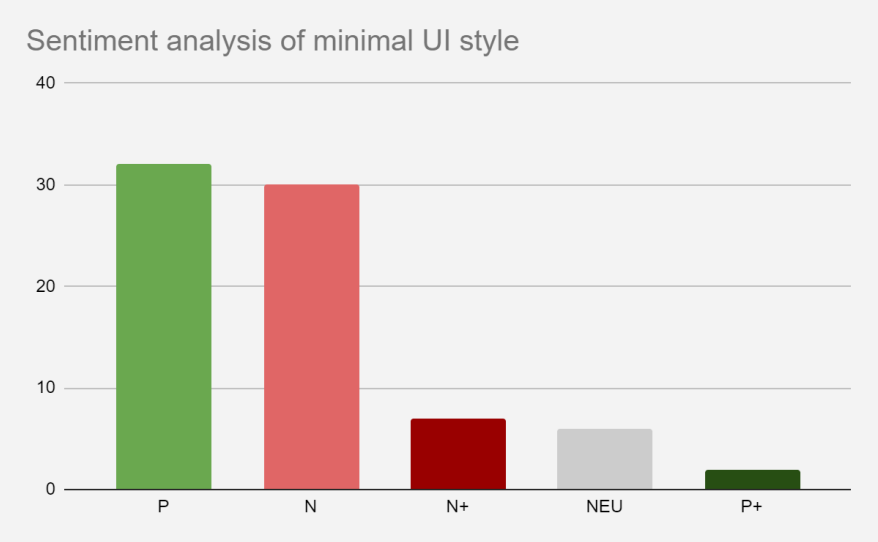


1.1.8 5.5.3 MINIMAL UI STYLE QUALITATIVE ANALYSIS

The following results were collected from the quantitative feedback collected in the survey in relation to the minimal UI style.

Positive and negative feedback were similar with the minimal UI style. However positive feedback came in first at 32. Closely followed by negative feedback at 30. Unlike the other styles those who dislike it most in the negative-plus category increased to 7. Neutral feedback was less than the others again at 6. The positive-plus category came last with 2 (see Figure 17).

***Figure 17**: Sentiment analysis of minimal UI style*



5.7 QUALITATIVE FOLLOW UP INTERVIEWS

Follow up interviews were conducted to supplement the written qualitative feedback. Unfortunately only 3 participants volunteered to be interviewed. The line of questioning was open ended and informal. The feedback has been paraphrased and categorised by UI style.

- illustrative UI style
    - The design is happy, colourful and friendly
    - The buddy could have been a woman
    - The buddy is like a cartoon character and the colours don't seem appropriate for this topic
    - "I don't trust the round person"

- photographic UI style
    - It looks professional and much more business appropriate
    - This looks like a bank website and seems credible
    - Don't like the stock photos, these look "very cheesy"

- minimal UI style
    - It's too simple, not very convincing and Looks like a fake website
    - Clear and well set out for easily understood

- No graphics to indicate organisation, “Looks like a Powerpoint presentation”

This feedback from the limited interviews potentially points to subjective taste between participants based on such things as cultural background., a factor discussed by Cyr (2013) and Karvonen (2000).

6 DISCUSSION

The following discussion chapter will explore the findings from the survey, discuss the major findings and limitations, present the implications and then propose future research.

The core research problem focused on customer reluctance to conduct financial transactions with a digital product due to a perceived lack of trustworthiness (Fang et al, 2011). The study then attempted to determine the influence of three different styles of aesthetic (illustrative, photographic, minimal) UI design can affect a user’s perception of trustworthiness.colour

The results indicate that a higher aesthetic perception does influence trustworthiness of a UI. Correlation analysis demonstrates a moderate positive correlation between aesthetics and trust. This analysis supports the theory raised by RQ1, that aesthetics of a digital product influence trust perceptions. The data also suggests that H1, minimal aesthetic UI styles exert a greater influence on trust perceptions.

6.1 MAJOR FINDINGS

The positive relationships from across the three separate Pearson correlation analyses show that higher aesthetic perceptions of a digital product or UI influence the trust perceptions of that product? Thus answering RQ1. A result echoed by Fimberg (2019) who showed a difference in trust perception between the two websites was almost 2:1 in favour of the website with a perceived better design.

When the three UI prototypes are tallied the minimal aesthetic style of prototype three recorded the highest PCC of .856. This was followed by the photographic aesthetic style of UI prototype two came second with a PCC of .727. Finally the illustrative aesthetic style of UI prototype three recorded a PCC of .682. All three results were significant at $p < .05$.

Based on the results of minimal UI prototype three with a PCC of .856 and significant at $p < .05$, we can support the hypothesis for H1 and can conclude that a greater influence on trust does exist between it and H2 and H3.

This result came as a surprise to the author who assumed a more humane interface style as discussed by Walter (2011) and depicted in illustrative prototype one may have had the greatest influence on trustworthiness. In line with H1 the clean and simple interface of minimal prototype three connects to the study by Karvone et al (2000). They found that participants of a study between Finland and Sweden preferred UI designs that were "clear" or "clean" and "simple" (Karvonen et al (2000).

Contrary to H1 the qualitative data contradicts the significant PCC. The minimal UI style of prototype one had the highest tallied negative feedback of 30 and 7 in the negative-plus category in terms of aesthetic perception. Tet still exerted the highest influence on trustworthiness. Could this be explained by Nielsen (2011) who tells us that a UI has around 10 seconds to convey its value proposition. Could a value proposition be reflected by trust yet differ from aesthetic taste? Or could this be gender related? According to Oyibo and Vassileva (2017) the effect of aesthetic perception on the credibility of UI design is higher among women than men. So based on the work of Oyibo and Vassileva (2017) we could conclude that credibility or trust in our case is influenced at a disproportionate level by lower aesthetic perceptions in the case of female participants.

The results gathered on gender differences (see Table 18) concerning aesthetic perceptions present higher perceived aesthetic quality among the male participants than female. Thus suggesting that the male participants are affected more by the halo-effect phenomenon (Soper, 2014), which causes a cognitive bias of perception. In this case the halo-effect was strongest with the illustrative prototype one with a mean score of 7.4.

In terms of functionality perception the results contradict the supported hypothesis H1. The SUS scores (see Table 17) which were calculated from running the UMUX analysis show the minimal UI style of prototype three to have the lowest perceived functionality with a SUS score of 66.12. This discrepancy could be supported by the work of Oyibo and Vassileva (2017) who empirically show that the effect of aesthetics on credibility is greater than the effect of usability on credibility and that the direct effect of aesthetics on usability is lower among females. This cognitive bias known as "aesthetic-usability effect" (Moran, 2017) could be creating the discrepancy we see in this study.

The qualitative data gathered from the follow up interviews was limited but did seem to show a clear split in opinion between the three UI styles. No one style was liked equally by all interviewees.

6.2 IMPLICATIONS

These results build on the existing evidence of Cyr (2013), Karvonen et al (2000) and Oyibo and Vassileva (2017). These works show cultural differences on aesthetic perceptions favoured a particular style of UI aesthetics "clear" or "clean" and "simple" (Karvonen et al (2000). That countries high on individualism such as America have a greater propensity to trust digital UI. However countries that are low on individualism have a lower propensity to trust digital UI (Cyr, 2013). The work Oyibo and Vassileva (2017) showed differences of aesthetic and credibility perception between the genders.

Yet these results do not fit with the theory of Tractinsky (1997), who argues that cultural differences have no effect on aesthetic perception.

The study provides a new insight into the relationship between different styles of UI design and their effect on trust. For instance when looking at the nuances between reactions to photographic imagery in UI design. This design approach can have negative reactions if overused or inappropriate imagery is presented (Babich (2017), Spool (2009)). The results also shine new light on the halo-effect (Soper, 2014), due to the higher aesthetic perceptions recorded by the male participants.

6.3 STUDY LIMITATIONS

The reliability of this data is impacted by the participant sample being too heavily reliant on Irish respondents, in total 53 of the 79 came from Ireland. It was hoped that respondents would be spread more easily across Europe and potentially the Americas. This limited the chances of extrapolating any link to cultural differences on aesthetic perceptions and its link to perceived trustworthiness.

The methodological choices were constrained by the choice to use two different Likert scales. One was a measure between 1-10 (aesthetics - trust) and the other was between 1-7 (functionality). This prevented correlation analysis to be carried out between the three data sets.

Another minor limitation was the consent issue that arose when one respondent declined consent. However no option was offered to identify this participant and remove their inclusion from the study.

The generalizability of the results is limited by the simplicity of prototypes. The focus on aesthetic styles overlooked the need for more complex UI prototypes that could have allowed for task completion and recorded more detailed user response. An example would be the study by Fimberg and Sousa (2020).

6.4 SUGGESTIONS FOR FURTHER RESEARCH

Based on the results concerning gender and aesthetics perception further research is needed to establish an empirical connection between the two. Oyibo and Vassileva (2017) have gone some way towards this but as the data in this survey shows, male participants have a higher aesthetic perception overall but in particular for illustrative UI styles. However female participants responded more positively to photographic UI styles. This could be a future line

of exploratory study. Potentially different aesthetic styles have greater influence on trust perceptions across gender.

The conflicting results regarding supporting H1 yet the minimal UI style getting the lowest SUS score could present a nuanced line of further investigation. A future study could explore the relationship between aesthetic perception and its potential contradictory influence on trust vs perceived functionality. Can a person both like and trust the visual design of a UI design yet perceive it to be poor functionally?

7 CONCLUSION

This study aimed to identify if the aesthetics of a digital product influence trust perceptions? To do this quantitative and qualitative analysis was conducted using the data collected from the survey that studied three different visual UI styles. It can be concluded that the aesthetics of a digital product do influence trust perceptions based on strong positive correlation analysis? The results also showed differences between gender and aesthetic perception.

Three hypotheses were also presented with H1 supported by showing a preference of minimal UI design having a greater influence on perceived trustworthiness. This was achieved by producing three different UI prototypes influenced by illustrative, photographic and minimal design styles.

This research clearly illustrates a relationship between aesthetics and trust, but it also exposed potential contradictions between perceived trustworthiness and functionality. This could forma potential research topic in the future.

Based on these conclusions, UX/UI designers could run sample tests of their designs among customers of different genders. There is potential for differences of perception in terms aesthetics, trust and functionality between differing visual UI styles that could affect the success of a digital product. To better understand the implications of this study, future research could be conducted in more detail to explore visual preference between genders and or cultures.

It has been shown that users can have a reluctance to conduct financial transactions with an ecommerce digital product due to a perceived lack of trustworthiness (Fang et al, 2011). So the need is there to understand how to address the many factors involved. This study has shown that aesthetics and in particular certain visual styles can exert a greater influence on trust perceptions. Similar to Cyr (2013), Tractinsky (1997), Karvonen et al (2000) and Oyibo and Vassileva (2017) who studied cultural and gender related influences on the trustworthiness of digital UI. This study added to the consensus that aesthetics play a pivotal role in the psychology of human computer interaction.

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A Appendix A

Example segment from Google Forms survey