Reducing gap between customers perception of the product online and the product in real

SAMAN ALI

ABSTRACT

Customer buying a product online creates a perception of that product in mind. If the product received in reality does not match their perception, it results in returning of that product. Small scale companies selling products online suffer if their return rates are high. Rabta is one such company who is facing this issue and want to minimize it through their product page design. It is interesting to study how a product must be displayed online such that it reduces this perception gap.

In this thesis a double diamond approach is used. Data was collected through interviews, observation and videos. Results show that pliable interactive display can solve this issue to some extent. A prototype was designed with easy to integrate functionalities. Feedback from prototype testing reveals that sense of touch, sound and vision combined together can help in perceiving material and color of the product. If these two properties are judged correctly by the user, it can reduce the gap of perception.

SAMMANFATTNING

Kunder som köper en produkt online skapar en uppfattning om den produkten i åtanke. Om den produkten inte stämmer överens med deras uppfattning, resulterar den i att produkten returneras. Småskaliga företag som säljer produkter online lider om deras returer är högre än försäljningen. Rabta är ett sådant företag som står inför den här frågan och vill minimera det genom deras produktsidesdesign. Det är intressant att studera hur en produkt måste visas online så att den minskar uppfattningsgapet. I denna rapport används en dubbel diamantmetod. Data samlades in genom intervjuer, observationer och video. Resultaten visar att (pliable) interaktiv skärm kan lösa problemet i viss utsträckning. En prototyp designades/utvecklades, med enkla integrerade funktionaliteter. Återkoppling från testet av prototyper indikerar att känslan av touch/rörelse, ljud och syn kombinerat tillsammans kan hjälpa till att uppfatta material och färg på produkten. Om dessa två egenskaper bedöms korrekt av användaren kan det minska uppfattningsgapet

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Customer buying a product online creates a perception of that product in mind. If the product received in reality does not match their perception, it results in returning of that product. Small scale companies selling products online suffer if their return rates are high. Rabta is one such company who is facing this issue and want to minimize it through their product page design. It is interesting to study how a product must be displayed online such that it reduces this perception gap.

In this thesis a double diamond approach is used. Data was collected through interviews, observation and videos. Results show that pliable interactive display can solve this issue to some extent. A prototype was designed with easy to integrate functionalities. Feedback from prototype testing reveals that sense of touch, sound and vision combined together can help in perceiving material and color of the product. If these two properties are judged correctly by the user, it can reduce the gap of perception.

Author Keywords

Human perception; Sound; Interaction; Material properties; Color perception; Visuals.

INTRODUCTION

Online shopping has gained immense popularity since the usage of smartphones and tablets increased. Reports show that in 2016, 51% of the total purchases were made online [6].

Convenience is amongst the biggest strength of online channel. In online shopping, a user[2] is not able to touch the product or feel its material and quality [1], making this a weakness of online shopping. Much research has been done in this area. Ecommerce websites have evolved over a period of time. Website designs are attractive, interactive and more user friendly now. These features attract customers, create a perception about the product (esp. product quality) and might lure them into buying one but what if the product (color, material and quality) is not as perceived by the customer or differs from how it appeared online? This results in losing a customer's trust, one of the most important factors in online shopping [3].

Rabta is a newly established small-scaled company. It sells laptop and mobile accessories online. Rabta buys products from China and sells them in Scandinavian countries through online marketplaces. One of the problems that Rabta has encountered while selling products online is that customers return their products saying *'the product received did not look like the one they saw online'.* Sometimes the color is not the same, sometimes the material is perceived differently. This issue has raised the number of returns and complaints. The company recently started selling products through their own website, rabta.se, where they are facing almost the same problem. As it is a small, low budget company, they want to design their product page with such functionalities that can be easily integrated in order to minimize this problem to some extent and gain their customers trust.

Rabta's main products for sale are laptop bags, which will be the focus of the study.

This paper studies the factors that play a part in reducing the gap between user's *perception* created by viewing the product online and the product in real.

The main aim of this study is to find how a user prioritizes features of a laptop bag and interacts with it both online and offline(physically). A prototype was designed and tested to understand user's ways of perceiving a product's material and physical properties. The following research question must be answered in

order to design for an enhanced perception of the virtual laptop bags.

- How to design a product page such that it reduces gap between a user's perception of the product displayed online and the real(tangible) product?

BACKGROUND AND THEORY

Translating from physical to digital world

Shopping in a physical and a digital store[1] offers different kind of user[2] experiences. When translating physical experiences in digital form, it is important to build a connection between the two as the user is not directly experiencing the product. Jonas Löwgren in his paper [11] explains the importance of the connection between the digital product, with which we are interacting, and our fingers. He explained that while using a digital artifact, for example, an ecommerce website, there must be tight coupling between fingers and that artifact, it should be *pliable*. He defines interaction as pliable when the user can feel he is shaping digital information with his fingertips even though the actual product is non tactile. He further elaborates the concept by giving an example of digital maps. Plus, and minus button signs can be clicked to zoom in and zoom out of the map and same can be done by opening /closing the fingers. Second action looks more pliable(flexible). Imitating real life gestures does not necessarily mean that they would bring out similar results in online interaction. Interactions that provide flexibility and build a connection between a user and the digital product would enhance the digital experience.

Virtual Product Interactivity

Studies disclosed that 'interactive decision making' help users take better decisions with less effort [7]. Interactive product displays online can have two different levels of interactivity i.e. full interaction (a user has complete control over interaction) and triggered interaction (for example interactive videos). Chen and Izak [2] conducted two studies to find out which one of full interaction, triggered interaction or non-interactive virtual product experience is better. They concluded that incomplete interaction (not a complete active

experience) helps in "seducing" potential users. Seduction motivates users to find more about the product before buying it. The more a user explores the product, the more information can be retrieved.

Conveying visual information through product images

Images provide a profound medium for conveying visual information to the user [19]. Studies have proven that high quality and clear images reduce perceived risk and increase the user's trust to purchase the product [4]. A study [19] about effects of images on buying behavior shows that real product photos, large sized quality images, more than one photo to convey complete product information attract customers attention and influences their buying behavior. Focus of this research is to find ways to deliver right amount of information and close-to-real experience so that the user could perceive a product's characteristics accurately. Images can play a vital role in this process. As they are static displays in contrast to videos, one can look at them for a longer time without putting strain on one's eyes. Fine details can be seen by zooming in and scrutinizing each part.

Human Perception in online shopping

Both visuals and interaction with the product help customers interpret the product properties. This interpretation is called perception.

Perceiving material properties of a digital artifact by combining multiple senses

In online shopping, the most difficult process is perceiving material properties of the product. In everyday life senses of vision, touch, hearing and smell are usually combined together to aid this process. For instance, when buying fabric in a shop, the fabric could be seen, felt (by holding or rubbing it with hand/fingers) and sometimes smelled, for example in case of leather products, to determine fabric's material properties. During this procedure a, not very apparent but useful, sense is also playing its role i.e *hearing*. Moving hand on the product produces a sound, a sound that adds to other senses for perceiving material properties. Sound combined with the sense of vision can facilitate in perceiving material properties. In a detailed study [17], effects of sound on perception of digital materials was

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1 Digital Store refers to a website

2 The term user here refers to a person who interacts with the online product to purchase it. Term customer is avoided to avoid confusion as later in the paper the word user is used.

investigated. It was concluded that sound benefits this process. Participants were able to judge properties like hard/soft and rough/smooth more accurately when sound was added to the static images.

In a video along with the visuals, sound and pitch is also produced which aids in creating a perception about the material, whether its soft, furry, rough or hard. In a study Pawel and others [16] argued that the participants judged texture of the fabric (in terms of softness, roughness etc.) more accurately by watching the video than viewing still images.

The ability to perceive material properties is a complex multisensory skill [17]. Mobile devices and tablets have touch interfaces so the senses of touch, hearing and vision can be combined easily. Sense of smell has also been introduced but it is at a very early stage. Some devices can be attached to mobile phones which release fragrances according to the action performed on the device [14] but these are not used commonly.

Color perception of virtual products

Humans perceive colors differently based on their genders, cultural backgrounds and general education [9]. Brightness of the color can reflect a product's quality in an image or a video. Dark images can be perceived as low quality products whereas brighter images give an impression of high quality. Foreground and background color contrast can either make the product stand out or hide the details that must be conveyed to the user resulting in building an incorrect perception of the product. Providing accurate color information is crucial in online shopping. Kevin and Philip in their work [13] proved that negative shopping experience is a result of providing inaccurate color information that results in returns and complaints. In addition, environmental, device and human factors significantly influence color perception [8]. Colors are displayed differently on different device displays. Daylight, incandescent light, and fluorescent light result in different color perceptions. Environmental and device factors can be controlled to a certain extent but human factors are uncontrollable.

METHOD

Double Diamond approach for research and design

Research and design approach of this study is based on *Double Diamond Model*. This model consists of four

stages. Discover, Define, Develop and Deliver. In the first stage, scope of the problem is expanded and issues are examined. In the second stage, the process is converged to define the actual problem [5]. Third and fourth stages are to find and deliver a solution.

In this research process, issues related to the problem were understood through literature reviews, Interviews and observations. In the second stage, data collected from interviews and observations was analyzed to define users desires and problems. Third stage comprised of Ideation (finding ideas to address the problem) and designing a high-fidelity prototype. In the last stage, prototype was tested and final conclusions drawn.

Data collection techniques

Data triangulation, combining several methods to collect data, was used for this study. This approach helps to get accurate information out of the participant [12].

Most potential customers of laptop bags are students and office going people. For this reason, 20 participants were recruited both male and female from age 21 to 35 years. They were interviewed in the company's office and KTH premises. The interviews comprised of three stages. One complete session took 25 to 30 minutes.

Interviews

Short interviews were conducted to figure out shopping behavior of the participants and to find out which products are mostly not bought online and why. It was essential to understand which features are missing in an online product page that compel customers to buy particular products from a physical store.
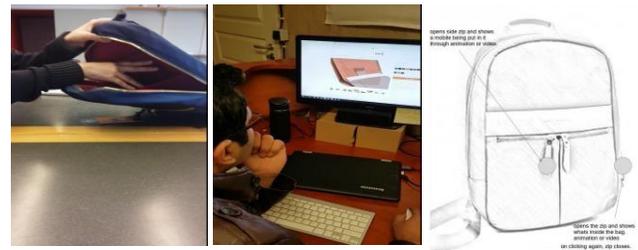

Figure 1. Center image shows a participant interacting on Bellroy website. Image at right shows the sketch of interactive display. Image on the left shows a participant physically interacting with the bag.

Physical interaction with the product

After asking a few questions, participants were given a laptop bag(tangible). They were asked to show how they

would interact with it in a physical store if they had to buy it and were instructed to speak out aloud [15] to get verbal and non-verbal information out of them. Their interaction behavior was observed and noted down.

Usability tests to observe interaction behavior

Last step was to show the participants two websites to conduct usability tests [10], Bellroy and Bugaboo. Bellroy sells bags and wallets, quite similar to Rabta.se. Their website displays products via videos and images.

The reason behind selecting this website was to observe response of participants to videos of laptop bags. Bugaboo sells travel bags and baby prams. This website was chosen as they have 360-degree interaction and shows functionality of the products in chunks of videos. Participants were asked to explore the product page and later questioned regarding interactions and features of the product page. They were engaged in a small conversation while they explored product pages to gain maximum insight.

Participants were shown another interactive approach that was labelled as full interactive display. It was shown through a sketch, as shown in Figure 1, and explained to the participants verbally.

RESULTS

Insights were collected in the form of observations, interviews, videos and notes. A small amount of important information regarding product page's features and interactive techniques was collected in quantitative form. Answers given by the participants were being analyzed at the field. 'Qualitative coding' [18] was used as a method to organize and categorize the data to give it a structure

Participants shopping behavior

46% of the total participants shopped online frequently i.e. once every other month. Participants who said they frequently shop online or answered '*we cannot say we shop online more but let's say half half'*, were both placed under same category. 38% of the users preferred going to the stores. Most of the participants said they buy things online that are inexpensive, for example, mobile covers, small Christmas presents and laptop sleeves, as they do not feel confident spending a lot of money online. Almost 5 participants stated that they would not buy

things online which have to be *tried on*. One of the female participants said

"I will not buy things that are a must to try on. I have to check their fitness etc. like undergarments. Later I can buy them online."

#Participant 1

Electronics were at the top of the list of the products bought online because according to the participants they already know how the machine functions for example a microwave, they just need to see how it looks and decide on the brand.

Objects like cables, speakers, chargers, keyboards etc. do not need to be scrutinized piece by piece, so those can be bought online easily. One of the participants said

"If something is expensive, I will go to a store. More difficult to return and easy to go back to store."

#Participant 10

Some participants have bought clothes online. Majority said they might/ would not buy clothes online because they prefer to feel the material themselves. A participant commented

"I have bought clothes online for my girlfriend but when it comes to buying my own clothes I prefer going to the store. My problem is I prefer trying stuff."

#Participant 5

Solid conclusions were drawn. Majority of the participants would not buy products online that

- Have to be tried on
- Requires a close look at the material
- Expensive products

These conclusions verify previous knowledge of customers having trouble mainly in judging material properties of a product online.

Observations and think aloud comments made by physically interacting with the bag

Participants held the bag up, front side towards the face. They first looked at it for a couple of seconds and then started checking inside of the bag. Opened and closed zips to see how they work and checked space inside the bag. For two of the male participants, similar pattern was

observed, they moved their thumbs on the bag at fast speed, both voluntarily and involuntarily to check the material of the bag. One of the female participants moved her hand over the front of bag but rest of them just held it normally. The interactions with physical bag were sketched and combined to form a visual interactive behavior.
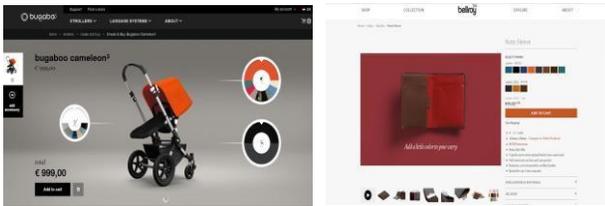
Usability tests results

Fig1.1 Bugaboo, on left, and Bellroy, on right, websites were shown to the users

All of the participants responded positively about videos. One of them said

"I prefer videos as I don't like to click".

#Participant 3

23% of the users made similar comments like *'the video is too fancy and long', 'got bored' etc.*

38% of the users liked video because they could view detailed information about the product, its size etc. in a short period of time with less clicks.

One participant highlighted an issue of photos taken in studio

"it can show how the product looks in daylight because pictures are taken in studio and photoshopped a lot".

#Participant 16

A number of participants said it is necessary to have static images of the product. A participant stated

"I have to pause the video again and again to see details".
#Participant 10

Video feature received a positive response overall but many of the users recommended improvements. Zoom in feature was missing on both websites but the participants were asked to comment on it during the conversation. Almost 50% of them said

'it is a good feature to see tiny details and quality of the product.'

Four of them tagged it as an 'unwanted feature'. A participant pointed out the general problem of knowing what is real in today's age.

"Image will be photoshopped so you cannot be sure if in reality the quality is as good as it seems.

#Participant 18

Bugaboo website has a 360-degree interaction but it also had a different color interaction feature. Colors are not presented in the form of a rectangular palette but instead in a round one where you can hover over and that part changes its color, *no clicking* required. 25% were neutral and 75% said symmetrical color interaction is complicated *'rectangular is simple and better'.*

Rating interactions and features of the product page
For rating, 4 indicated highest rated and 1, the lowest rated.

On the basis of participants interaction with the websites shown and their personal preferences, they rated product page's basic features and interaction techniques. As seen from the Bar and Pie chart, visuals were labelled as the most important feature and size the least. Similarly, for interactive and non-interactive techniques to unfold product properties, interactive display was placed at the top and static images at the bottom most position.
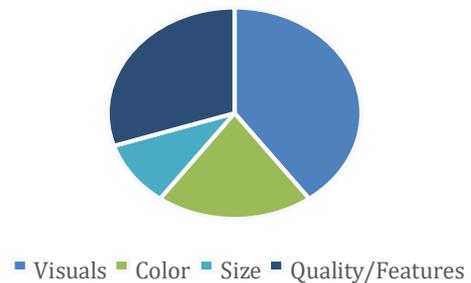

■ Visuals ■ Color ■ Size ■ Quality/Features

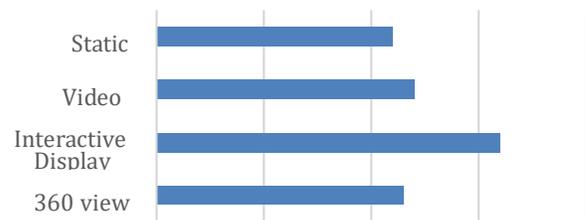**Figure 1.2 shows ratings for different features**

Figure 1.3 shows ratings for different interactive and noninteractive techniques to unfold the product's features and properties

DESIGNING THE PROTOTYPE
A few insights were gathered from the results and summarized as below.

Key Insights

1. Videos are one quick way to present product features but should not be very long.

2. Static images cannot be ignored as zoom in and zoom out feature can help to view product details closely.

3. 360-degree interaction and full interactive display can be used to reveal product information.

4. Photoshopped images create a perception that the product displayed online is not in its 'real' form.

5. Participants follow quite a similar pattern while interacting with the bag physically.

6. Material must be '*felt*' by the user. These points were taken into consideration for designing the prototype.

Software and Hardware used in High fidelity prototype.

Canon EOS 600D was used for making videos and taking photos. Using DEEP professional photo studio and IKEA's rotating board, a number of photos were clicked for 360degree spin. The spin was then generated using an online software *Sirv*. Audio was recorded in a professional recording studio using Microphone: Neumann TLM103 as shown in the figure 1.4.

Fig1.4: Audio recording for *feel the material* feature

Design Implementation

Final prototype was developed in HTML, CSS and JavaScript.

All the features in this design are being used on different websites, not3common though, except *feel the material* feature. Overall, the basic page structure has been designed using common ecommerce trends to make it easy to use. Guidance to use the new feature has been provided, in the form of text, for the user so that the user does not find it difficult to use [20].

360-degree spin

Considering the results, visuals were given maximum space on the landing page. Moving the hand right and left rotates the bag smoothly so that the user can view it from all angles. Spin is generated by a number of high-quality images taken from different angles.

Interactive display for product features

This interaction technique is used to unfold product's features through videos and some text as shown in figure 1.5.
Each part that needed elaboration is highlighted with a hotspot, a plus sign inside a circle. On clicking the plus sign, a video related to that particular area emerges to reveal feature details, the plus sign gets replaced by a minus sign once the video is visible. Minus sign acts like a cross that is generally used for closing the video. Videos can also be enlarged.

Figure 1.5: Interactive Display

Short clips of videos
Short videos have been added in the prototype. One video is longer than the rest i.e. the video that shows inside space of the bag. This video is interactive, it provides user with the option to view or not to view all the parts inside the bag.

All videos contain *natural background sounds* to see how a customer's perception about product's material properties gets affected by this.

Image comparison slider

The blue slider can be dragged right and left to reveal images. It is a quick, easy and pliable way of comparing images. One container compares the photo taken in sunlight with the photo taken while the sun is setting. The second container compares bag in fluorescent light with the bag in incandescent light bulb. Figure 1.6a shows the icons used in image comparison containers. Figure 1.6b shows the image container slider transition of comparing images taken fluorescent light and incandescent light.

Figure 1.6 a. icons used in image comparison containers

Feel the material by moving cursor on the bag As the user moves the cursor or finger (in case of touch screens) on the bag image, a sound of rubbing/scratching can be heard. Audio speed and volume is directly related to the movement of the cursor so that a sound effect, as close to real as possible, is created.

Figure 1.6 b: Image comparison container

Size comparison

Product page also contains a button for size comparison. When clicked, shows a model wearing the bag. Height of model and dimensions of bag are shown so that the size could be interpreted.

User testing with prototype

The high-fidelity prototype was tested on 4 participants. All four participants were male, used laptop bags and had shopped online before.

These participants were divided into two groups. One group was shown the prototype first and then the company's website and vice versa for the second group. Prior to testing, participants were explained the purpose behind the study. Product page for the bag on company's website (rabta.se) was shown to the participants. The product page on this website includes photos provided by the retailer and a video with background music. Second step was to show them the prototype. After the participants had explored the features completely, they were asked to fill in the questionnaire. Real bag was presented after they had filled in the answers. After viewing the bag, they were again asked to answer some questions.

Data was collected in the form of precise written answers, observations and through verbal communication.

Feedback from user testing

All participants judged the color and material of the bag more accurately with the prototype than with the company's website. The figure 1.8 and 1.9 below shows the comparison in terms of color and material between Rabta and prototype.
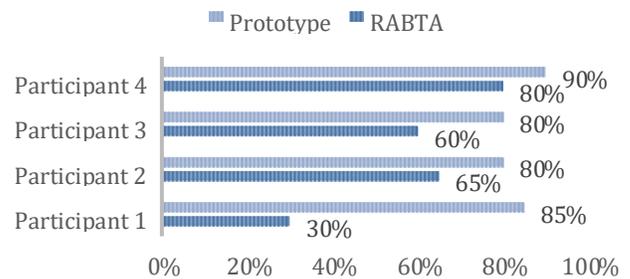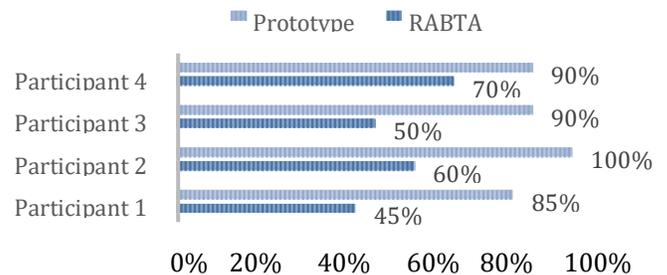

Figure 1.7: Color

Figure 1.8: Material

50% of the participants stated that the bag has Red color on Rabta website while the other half said red or dark orange.

From the prototype, 75% perceived it as a shade of red as '*orangish red*'. Only one participant described it as red on both product pages.

The participants were unable to determine material of the bag on company's product page. 50% recognized it as *leather*. A participant penned down his view as

"Not Sure, could be leather, could be any other material."

#Participant 1

One participant recognized it as material similar to what parachutes are made of, another one judged it as Polyester/ smooth. The prototype produced better result. Almost all of the participants judged it as smooth material or Polyester. One participant wrote

"The bag is probably made of polyester and it sounds rough. The bag looks smooth but sounds rough having a pattern within the fabric".

#Participant 4

75% of the participants found *360-degree spin* as the best feature to judge color. This might be because it consists of images that could be zoomed in to see details [18]. Only 25% labelled *image comparison* as the most helpful feature for recognizing accurate color. 75 % of the participants argued that

'image comparison container presents a real picture of the product but is not helpful in determining the color of the bag.'

50% of the participants declared sound produced by moving cursor on the bag as 'most helpful' in perceiving material of the bag.

The video that showed a person moving her hand on the bag to feel material was rated as second-best feature that could be used to perceive material.

Only 25% marked video as their first and 'sound produced by moving cursor' as second best. 25% said zoom in feature was the best feature for judging material. In general comments section, all four participants agreed that the prototype was easy to use. They described the overall experience as good. Table 1 and Table 2 shows the results.

	Priority 1	Priority 2
Participant 1	Diff Lights	Zoom
Participant 2	3D	Diff Lights
Participant 3	3D	Diff lights
Participant 4	Pictures	3D

Table 1: Which feature of the prototype shown, was the most helpful to judge bag's material?

	Priority 1	Priority 2
Participant 1	Sound	3D
Participant 2	Video	Sound
Participant 3	Sound	Zoom
Participant 4	Zoom Function	Sound

Table 2: Which feature of the website shown, was the most helpful to judge bag's correct color?

During verbal communication, participants responded positively to 'feel the material' feature. A participant recorded his views as

"Unique feature. Sound is kind of making a connection with this image.

#Participant 1

Participants were observed while they moved the cursor on bag's image. All four followed a similar pattern, they moved the cursor *fast*.

It was noted that two of them tried rubbing the physical bag to hear the sound. During verbal communication a participant told the interviewee

"wanted to compare the original sound produced, with the sound that was heard online".

 # Participant 4

Videos with natural background sound did not have any effect other than giving a natural feel. Participant wrote his comment

"Prototype pretty much covers all requirements .. videos with bags on gives the size indication .. actual sounds give more natural feel …"

#Participant 3

Another one stated

"I like music as a background sound. Sometimes I would want to listen to the natural sounds but it should be a mixture of two. I kind of got bored with the same pattern of sounds in all videos".

<div align="right">

#Participant 4

</div>

Overall the feedback was very positive.

DISCUSSION

This study was conducted to find solutions for reducing gap between a customer's perception of product displayed online and the real product. Using insights from participants behaviors, desires and observing their offline/online interaction with the product, a high-fidelity prototype was designed to address the problem.

Cost Benefit Analysis

Cost benefit analysis of the design is important for the company as it will be implemented only if it provides them a financial gain. According to the data provided by Rabta, the cost of packing a 0.5Kg bag is as below:

If the package is to be delivered within Sweden, 6 tickets are required. Each ticket cost SEK 7 which makes a total of SEK 42.

If the package is received back, again SEK 42 has to be paid by the company. Packing cost is SEK 10 and unpacking is also the same (this includes putting it back in the storage area, updating inventory etc). Total cost is 42+ 42+ 10+10= SEK 104.

If the package is to be delivered outside Sweden, in another Scandinavian country, the cost is 84 +84+ 10+10= SEK 188.

Recording a sound in studio for this thesis cost SEK 1000 (this amount could be less depending on which studio has been chosen). Minimum two sounds could be recorded and edited in one hour (for two different materials). A sound for one particular material can be recorded once and used for all the bags made of that material, thus making it cost effective.

Time is money. The energy and time spent on receiving the bag and replying to the complaints, is another cost that cannot be excluded from the analysis. Thus, the design can prove to be cost effective for the company.

Translation from physical to digital product display

Feedback from the prototype testing showed that it was 'easy to use'. Pliability [11], as mentioned in the theoretical section, played an important role in designing an easy to use prototype thus supporting the theoretical knowledge gained.

Pliability also reflected in 360-degree spin feature where the user moves his hand on the touchpad from right to left and left to right and the bag rotates clockwise or anticlockwise. The faster the hand moves, the faster the bag rotates and vice versa, making a tight coupling between fingers and the product on screen. Another feature 'feel the material' represents pliability. Connection between finger's speed and audio's speed and volume creates a tightly coupled effect. The gesture also depicts a natural way of moving hand on the bag. Observation from the prototype test revealed that the participants moved their hands/fingers on the bag to hear sound. Video recordings of the physical interaction with bag presents a similar behavior to the above.

Full interactive display

According to the quantitative data produced by participants in the first part of study, full interactive display was given the highest rating. After implementing the same feature on the high-fidelity prototype, no negative feedback regarding the interaction was received. This contradicts the knowledge gained through theoretical research [2] where the study proves that incomplete interaction is better than complete/full interaction. Natural sounds were used in all the videos. Aim was to check which, background music or natural sounds, has a better effect, if any.

Goal was also to analyze if natural sounds help users feel the material as argued by Pawel and others [16]. Video, that showed a hand moving on the bag presents what kind of sound is produced so that the user can perceive the material, proved that it was helpful for the participants in recognizing the material.

Sound as a facilitator for perceiving material properties of the product

From the feedback sound produced by moving the cursor on the bag was a major facilitator. It not only supports the theory that sound can help in judging material properties of digital artifacts [17] but also demonstrates the effect of multisensory interaction.

Some comments made about the video on Bugaboo and Bellroy, built an impression that music was annoying and the video was too fancy. Feedback from the prototype test showed that original sounds give a natural feeling to the website but make it a bit dull but no participant mentioned that music was annoying. It is apparent that,

the opinion about background music is not general but varies from person to person.

Prototype testing produced results in favor of '*feel the material*' feature where sound could be heard by moving cursor on the bag. Participants moved their fingers or finger on the touchpad, looked at the image on the screen and could hear the sound generated. All of the three senses namely vision, touch and hearing, worked at the same time in this case. Majority of the participants found this feature most helpful in perceiving the material properties. From the theory, it was learnt that the material properties can be perceived better through videos because the user can see and hear the sound at the same time [16]. Prototype feature '*feel the material*' also gave similar results.

Interactions for perceiving color
Color was given a lot of importance in this study as a substantial amount of returns were linked to color matching complaints by the Rabta. Participants were shown a range of images taken in various light conditions. Feedback from the prototype test showed that it was of great help to reduce the gap mentioned in the research question. Participants argued that they will not be surprised to see the received product because it has already been viewed in different lights. It also supports the theoretical knowledge gained [13] that providing inaccurate color information provides a negative shopping experience.

Image comparison was also aimed to facilitate in judging accurate color of the bag but it was not very helpful for this particular purpose. As concluded from the feedback of prototype test, it reduces the gap but it can raise confusion regarding the actual color of the bag. was used in the high-fidelity prototype. Flow of the prototype was deduced from observing the physical interaction with the bag as shown in Figure 1a. Collecting data through interviews also helped in designing the final solution.

Critical discussion of method
Method used in this study produced satisfactory information. The task of physically interacting with the bag could have yielded even more information if 'real' customers were observed shopping for a laptop bag/ backpacks in a physical store. This would have only been done with the permission of the shop owner. It was tried but the response was not positive as the owner could not let a stranger observe his customers. Otherwise, videos

revealed new and fruitful information that was used in the high-fidelity prototype. Flow of the prototype was deduced from observing the physical interaction with the bag. Collecting through interviews also helped in designing the final solution.

Future work recommendations
For future work, 'feel the material by moving cursor on the bag' should be tested using a number of different materials and sound. The relation of touch with the speed and volume of the sound should be studied more so that sound could be edited in such a way that makes a stronger connection between cursor/fingers and the product. Further investigation is needed to know which type of videos are better with music as background and which ones are better presented by using natural sounds so that the element of 'interest' could be enhanced in the prototype.

CONCLUSION
Sound and images together proved to be an effective facilitator in perceiving material qualities of the product. Image comparison slider can be helpful because the user views the product in different shades of light and will not be surprised to see the product in reality but a product displayed in so many lights can confuse the user. Images proved to be an essential part of the product page. 360-degree spin is a composition of several images presented with a natural, more flexible interacting technique rather than clicking. The spin generated positive results in perceiving material and color properties of the product.

Small companies like Rabta, can benefit by using these techniques as they could be easily integrated in the product page. Overall, results show that the study moved in right direction producing solid conclusions.

REFERENCES

[1]   Anjan Goswami, Naren Chittar, Chung H. Sung. March 2011.A Study on the Impact of Product Images on User Clicks for Online Shopping. WWW '11: Proceedings of the 20th international conference companion on World wide web.

[2]   Cheng Yi, Zhenhui Jiang, Izak Benbasat. May 2011.Enticing consumers via incomplete product experience: an investigation of online product interactivity designs. CHI '11: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems.2679-2688.

[3]   Cynthia , Susan, Beverly. The elements of online Trust. March 2001.CHI'01 Extended Abstracts on Human Factors in Computing Systems, 504-505.

[4]   D. Koehn. March 2003. The nature of and conditions for online trust. Journal of Business Ethics, Volume 43, Issue 1–2, 3–19.

[5]   Don Norman. November 2013. The Design of Everyday things, Revised and Expanded version. Chapter 6, Page 220.

[6]   Fortune. November 2016. Consumers Are Now -Doing Most of Their Shopping Online. http://fortune.com/predictions-2016-future-business/. Retrieved on 15th February, 2019.

[7]   Häubl, G., Trifts, V. February 2000. Consumer Decision Making in Online Shopping Environments: The Effects of Interactive Decision Aids, Marketing Science, Volume. 19, No. 1, Special Issue on Marketing Science and the Internet , 4-21.

[8]   Jaejeung Kim, Sergey Leksikov, Punyotai Thamjamrassri, Uichin Lee, Hyeon-Jeong. August 2015. CrowdColor: Crowdsourcing Color Perceptions Using Mobile Devices. MobileHCI '15: Proceedings of the 17th International Conference on Human-Computer Interaction. 478-483.

[9]   Jean Eric and Panagoita. July 2011. The effect of ecommerce website colors on customers trust. International Journal of E-Business Research. Vol 7, Issue 3. 1-8.

[10]   Jeffrey Rubin and Dana Chisnell. August 2008. Handbook of usability testing: How to plan, design, and conduct effective tests. Second edition. Wiley.

[11]   Jonas Löwgren. October 2007.Pliability as An Experiential Quality: Exploring The Aesthetics Of Interaction Design. Vol 1 No 2: Soft Artifacts. 85-95.

[12]   Kara Pernice. October 2018. User Interviews: How, Why and When to conduct them, Retrieved on 10th April, 2019. https://www.nngroup.com/articles/user-interviews/.

[13]   Kevin R. Parker, Philip S. Nitse, and Albert S. M. Tay. 2009.The Impact of Inaccurate Color on Customer Retention and CRM. Informing Science: The International Journal of an Emerging Transdiscipline, Volume 12, 105-121.

[14]   Marianna Obrist. September 2017.Mastering the Senses in HCI: Towards Multisensory Interfaces. CHItaly '17: Proceedings of the 12th Biannual Conference on Italian SIGCHI Chapter. Article No. 2.

[15]   Thinking Aloud; The #1 Usability Tool, Retrieved on 12th May 2019. From https://www.nngroup.com/articles/thinkingaloud-the-1-usability-tool/.

[16]   Pawel M. Orzechowski, Douglas Atkinson, Stefano Padilla, Thomas S. Methven, Sharon Baurley, Mike Chantler. August 2011.Interactivity to Enhance Perception:Does increased interactivity in mobile visual presentation tools facilitate more accurate rating of textile properties?.MobileHCI'11: Proceedings of the 13th International Conference on Human Computer Interaction.629-634

[17]   Rodrigo Martín, Julian Iseringhausen, Michael Weinmann, Matthias B. Hullin. September 2015.Multimodal Perception of Material Properties. SAP '15: Proceedings of the ACM SIGGRAPH Symposium on Applied Perception. 33-40.

[18]   Sheelagh Carpendale, Søren Knudsen, Alice Thudt, Uta Hinrichs. October 2017.Analyzing Qualitative Data. ISS'17: Proceedings of the 2017 ACM International Conference on Interactive Surfaces and Spaces.471-481.

[19]   Wei Di, Neel Sundaresan, Robinson Piramuthu, Anurag Bhardwaj. February 2014.Is a picture really worth a thousand words?: - on the role of images in e-commerce.WSDM '14: Proceedings of the 7th ACM international conference on Web search and data mining.633-642.

[20]   Steve Krug. Don't make me think. 2014.3rd Edition. Page 47.

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