

Responsive E-commerce - a study at Avensia AB

Sanne Bengtsson & Maja Håkansson

Master's Thesis

Department of Design Sciences
Lund University
ISRN:LUTMDN/TMAT-5169-SE

EAT 2013



Abstract

With today's big market of smartphones and tablets, computers are no longer the only device with a web browser. As a result of this more and more web pages are designed to adjust to the size and resolution available for a specific device. When a web page adjusts like this it is called responsive web design. E-commerce via computer has been around for a while and is now used by many for their everyday shopping and it is possible to buy basically everything over internet. This Master Thesis will explore how to make e-commerce sites attractive for the users of smartphones and tablets by using responsive web design. The main focus is on the layout for smartphones.

Through evaluation and mapping of existing solutions a number of prototypes have been developed. These have been carefully tested on a range of potential users. Based on the results of this test a new prototype could be developed and tested to come up with a final design proposal.

Although a final prototype could be developed the conclusion is that there is no ultimate way to design a responsive e-commerce site, since a page's design and layout depends a lot on what kind of product or service being sold. What definitely can be said of an e-commerce site, used via a smatphone is that it should be easily perspicuous and don't present too much information at once.

Sammanfattning

Med dagens stora marknad av smartphones och tablets är det inte längre bara på datorn som man använder webbläsare. Som ett resultat av detta designas allt fler webbsidor för att anpassa sig till den storlek och upplösning som en specifik enhet har, detta kallas för responsiv webbdesign. E-handel via datorn har blivit väl etablerat och idag det går att köpa i princip vad som helst på internet. Detta examensarbete utforskar hur man kan göra e-handelssidor attraktiva för användare av smartphones och tablets genom att använda responsive webbdesign. Huvudfokus ligger på att hitta en fungerande layout för smartphones.

Genom utvärdering och kartläggning av befintliga lösningar har ett antal prototyper tagits fram. Dessa har sedan noga testats på ett urval av potentiella användare. Utifrån resultatet av detta test kunde sedan en ny prototyp utformas och testas för att efter det komma fram till ett slutgiltigt designförslag.

Även om en slutgiltig prototyp kunde tas fram är slutsatsen att det inte finns ett ultimata sätt att utforma en responsiv e-handelssida. Detta då en sidas utformning beror mycket på vad det är för produkt eller tjänst som säljs. Det som definitivt kan sägas om en e-handelssida som används via en smartphone är att den bör vara lättöverskådlig och inte presentera för mycket information på en gång.

Acknowledgements

In this thesis project we have conducted three tests and in these tests we have a lot of participants who we really would like to thank for their involvement.

Thanks to Joakim Eriksson at IKDC for helping us with the preparations for our usability tests.

We would also like to thank our supervisor at Avensia AB, Johan Rosengren, who always has been there for guidance and also has supported us during the whole process.

We also want to thank all the other people who work at Avensia AB who have been supporting us and received us with open arms.

Sanne Bengtsson & Maja Håkansson

Lund, June 2013

Table of Contents

Abstract.....	i
Sammanfattning.....	ii
Acknowledgments	iii
1 Introduction	1
1.1 Goal.....	1
1.2 Background.....	1
1.3 Research questions.....	1
1.4 Constraints	1
2 Feasibility study.....	3
2.1 What is responsive web design?	3
2.2 Why responsive web design?	6
2.3 What solutions are available today?.....	7
2.4 Usability study 1 - Responsive vs. unresponsive.....	14
2.4.1 Goal	14
2.4.2 Research questions.....	15
2.4.3 Participant characteristics	15
2.4.4 Method.....	15
2.4.5 Task list	15
2.4.6 Results	16
2.4.7 Analysis	24
2.4.8 Conclusions.....	26
3 Prototype tests	28
3.3 Usability study 2 - Prototypes of different design solutions	28
3.3.1 Goal	28
3.3.2 Research questions.....	28
3.3.3 Participant characteristics	28

3.3.4 Method.....	28
3.3.5 Prototypes.....	29
3.3.6 Results of usability study 2	38
3.3.7 Analysis of usability study 2	46
3.3.8 Conclusions of usability study 2	50
3.4 Usability study 3 - The final prototype.....	55
3.4.1 Goal	55
3.4.2 Research questions.....	55
3.4.3 Participant characteristics	55
3.4.4 Method.....	55
3.4.5 Prototype.....	56
3.4.6 Results of usability study 3	67
3.4.7 Analysis of usability study 3	73
3.4.8 Conclusions of usability study 3	75
4 The final design choices	77
5 Discussion	81
6 Conclusions.....	84
7 References.....	85
Appendix A	86
Appendix B	95
Appendix C.....	107

1 Introduction

1.1 Goal

The main goal of this Master Thesis is to find out if responsive web design can be used to make e-commerce more attractive for users of smartphones and tablets.

1.2 Background

With today's big market of smartphones and tablets, computers are no longer the only device with a web browser. As a result of this more and more web pages are designed to adjust to the size and resolution available for a specific device. When a web page adjusts like this it is called responsive web design. E-commerce via computer has been around for a while and is now used by many for their everyday shopping, it is possible to buy basically everything over internet. What has not yet been established is e-commerce on smartphones and tablets, therefore it would be interesting to explore how to make e-commerce sites attractive for the users of these devices as well. To explore this we intend to use responsive web design.

The thesis will be carried out at Avensia AB in Lund. The core business of Avensia is e-commerce solutions.

1.3 Research questions

To reach our goal we will try to find the answers to the following questions:

- What does online shopping behavior look like today, when using a smartphone/tablet?
- Is the market ready to shop via their smartphone and/or tablet?
- What information is expected by the buyer on a smartphone and on a tablet?
- How does a full width site differ from a smartphone/tablet site?
- How should different elements be placed on a smartphone and on a tablet?
 - Main navigating system (shopping cart, menu, search)
 - Product listing
 - Product page

1.4 Constraints

We have decided to make our solution for business to customer e-commerce and not for business to business sites. Since we will make a prototype for any type of e-commerce site the focus will be on the placement of functions rather than colors and other graphics. Also we will have a template shop made by Avensia in mind while making our design choices,

mainly for the purpose of knowing what elements to have in mind then designing the layouts. The prototypes will be developed for the browser Google Chrome version 26.0.1410.58 and no attempt will be made for the prototypes to work in other browsers or older versions.

Our main focus lays on making a working layout for smartphones, rather than full size layouts.

2 Feasibility study

2.1 What is responsive web design?

Computers are no longer the only device with a web browser since today's market of smartphones and tablets are growing. Also many new devices are able to switch from portrait to landscape mode at the user's whim. As a result of this, more and more web pages are designed to adjust to the resolution and orientation available for a specific device. When a web page adjusts like this it is called Responsive Web Design (RWD). RWD was first introduced in an article published by Ethan Marcotte in May 2010 at the well-respected online magazine *A List Apart* (Marcotte, 2010)(Joly, 2012). Today RWD has evolved and has become a development philosophy where a set of techniques and ideas forms a whole new way of approaching web design. The approach consists of a mixture of flexible layouts in form of fluid grids and images, and an intelligent use of CSS media queries. Fluid grids enables a website to change in width depending on the screen resolution the user's device has. Fluid images are simply images that are able to scale in size, both to smaller and larger images. Media queries are questions about the device the user uses, asked by the website, such as screen width and resolution. More can be read about fluid grids, fluid images and media queries in further on.

Besides the techniques Ethan Marcotte mentioned in his article, several other thoughts, such as content first and mobile first, has been integrated in the concept.

Mobile first means that you start with developing the mobile version since this device has the smallest screen resolutions and therefore the requirements for the structure, content etc. will be toughest. You need to really know your customers and your business to know what content matters the most (Wroblewski., 2010). If you design mobile first you are forced to think about this.

Content first means that you base the website on its content when developing it. For example, what information must be available on the website and based on this information build the website in the best possible way. According to Kristina Halvorsens book *Content strategy for the web*, less is better. In an article published by *internetworld.idg.se* Emila Blom, interface developer at the Malmö agency *Good Old*, stated that if the content do not help to achieve business goals or help the user to perform a task, it should be removed.

The development for a responsive website is different from when developing a traditional website. Design and development approach each other more and more, and to succeed you need to cooperate. The traditional waterfall process, where an art director or designer make one template for the site in Photoshop, which can then be given to development to

implement, does not work anymore, since RWD is all about a website changing and adapting to a specific device.

One thing to have in mind when developing a responsive website, is that smartphone users and computer users often have different desires when visiting a website. (Torberger, 2012)

Fluid grid

The basic capability of a grid is to provide a mechanism that allows us to divide available layout space into columns and rows by using a set of predictable sizing behaviors. Building block elements can then precisely be positioned and sized for an application.

A fluid grid is a part of the concept fluid design, also known as percentage based design. This is a design made entirely of percentages, thus making the grid fluid. Instead of setting a precise size or position, you use proportions when designing your layout. The components will then adapt and change depending on the device or screen size. To calculate the proportions for a certain page element the following formula can be used:

$$\text{target} / \text{context} = \text{result}$$

The result can then be multiplied by 100 to get the percentage value which then can be applied to the target element.

Fluid grids will follow naturally within the dimensions of its parent container, making the needed adjustments limited for various screen sizes and devices. A maximum layout size for the design is defined and to keep the layout clean and easy to handle the grid is divided into a certain number of columns.

It requires time and effort to create a fluid grid from scratch, but as help for the base of your layout, you can use an existing CSS Grid Framework or Grid Generator. Most CSS Grid Frameworks comes with built in features and have been tested across the majority of browsers. (Marcotte, 2009)(W3C, 2012)(Nimesh, 2009)

Fluid Images

Fluid images prevent images from exceeding the width of their container. By adding the following code to your CSS file, the `img` elements will be displayed at their original size as long as there is enough room in its containing element, if not the image's width will be forced to match the width of its container.

```
img {  
  max-width: 100%;
```

}

Images will scale proportionally as the browser window narrows to fit its flexible container when it resizes itself.

Other fixed-width elements, like video and other interactive multimedia, also apply to the `max-width: 100%` rule. (Marcotte, 2011)

Media queries

A media query is a logical expression that can be either true or false. It consists of a media type and zero or more expressions that checks for conditions of particular media features, such as width, height and color. The media features are often followed by a target value, for example `max-device-width: 480px`.

If the media type of the media query matches the media type of the device used to view a website, the media query and all its expressions are true. When a media query is true the corresponding style sheet are applied. Media queries that apply to all media types can use the keyword `all`. If the media type is not explicitly given, the keyword can be left out since it then automatically is `all`. More complex media queries can consist of logical operators, such as `not`, `and` and `only`. An example written in HTML can be seen below:

```
<link rel="stylesheet" type="text/css"
      media="screen and (color)"
      href="example1.css" />
```

Devices of a specific media type and a certain feature, in the above example 'screen' and 'color', namely it must be a color screen, will be applied with the style sheet `example1.css`.

Here is another example with a different media feature:

```
<link rel="stylesheet" type="text/css"
      media="screen and (max-device-width: 480px)"
      href="example2.css" />
```

In this example the style sheet `example2.css` will be applied for devices with a screen width of 480 pixels or less.

A third example shows how you can put media features together in the same media query:

```
<link rel="stylesheet" type="text/css"
      media="screen and (color) and (max-device-width:
      480px) "
      href="example3.css" />
```

This will load the style sheet `example3.css` if the device is a color screen and its horizontal resolution is 480 pixels or less.

If the media queries in the above examples are false the `link` will be ignored.

Media queries can also be included in CSS as part of a `@media` rule or as part as an `@import` directive, with the same effect as in previous examples. That is; if the media query is true, the relevant CSS is applied to our markup. (W3C, 2012)(Mozilla Developer Network, 2013)

In June 2012 media queries became a W3C recommended standard (W3C, 2012).

2.2 Why responsive web design?

There are many reasons why RWD should be used to develop future websites. Today's big market on smartphones and tablets are presenting us with a large amount of varying screen resolutions and orientations that web designers and developers will have to adapt to. To create a new website version for each and every screen resolution and new device will become nearly to impossible, or will at least require a lot of work and maintenance. RWD are presenting us with a flexible design that adapts to different devices with both portrait and landscape modes.

To only make one website for many devices compared to making many different websites for each device, will not only save us a lot of time and work but it will also be cheaper to both build and maintain. In addition to this a responsive website provides the opportunity for the same experience for all visitors regardless of which device is used.

Many larger retailers have introduced apps to complement their website, since this alternative is rarely feasible for smaller retailers, they can benefit from RWD.

Even though there are many advantages with RWD there are still some disadvantages.

There are those that mean that visitors of a website have different purposes or needs when visiting the site via various devices. Others believe that a responsive website cannot replace everything you can do in apps. But RWD still looks like it has a bright future, despite its limitations.

2.3 What solutions are available today?

There are already some e-commerce sites that use responsive design. We have been looking at five of them to see different solutions and to get inspired.

The pages we have been looking more closely at are: *biltema.se*, *unitedpixelworkers.com*, *indochino.com*, *skinnyties.com* and *byggmax.com*.

The factors we mainly tried to investigate were: shopping carts, search functions, mega menus, “add to cart”-buttons and product listing.

In this section there is some screen shots of those websites, some text about their differences for wider and smaller screens and little more information about the solutions for smaller screens. Some sites often have more than two breakpoints of responsive design but we have decided to just show the widest and smallest solutions.

biltema.se

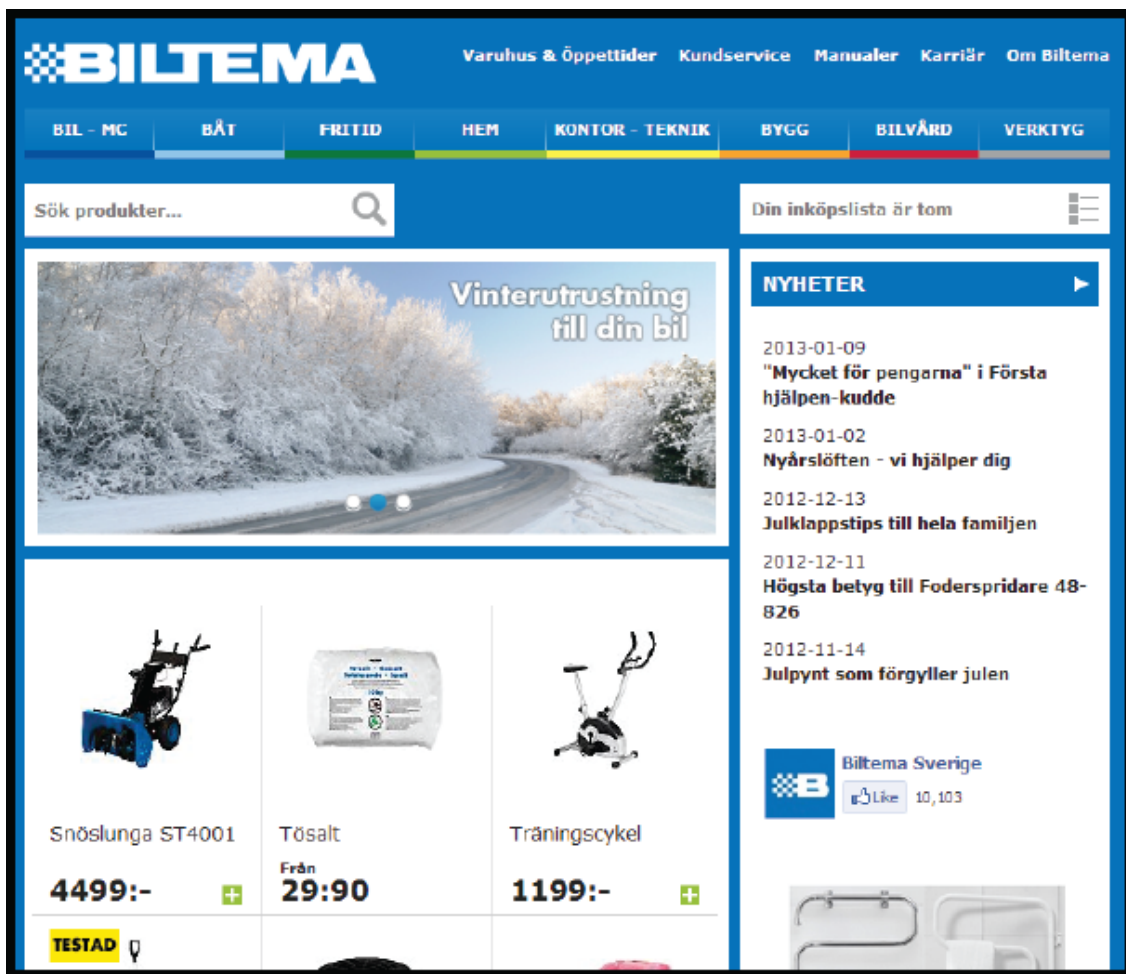


Figure 2.1: Biltema's start page in a wider screen

The site from Biltema for wider screens is displayed in figure 2.1. At the top of biltema.se there is a logotype and menu with information about the concern. Then they have a menu with all the different sub categories from their range of products. There is also a search field and a shopping list (they have a list instead of a cart).

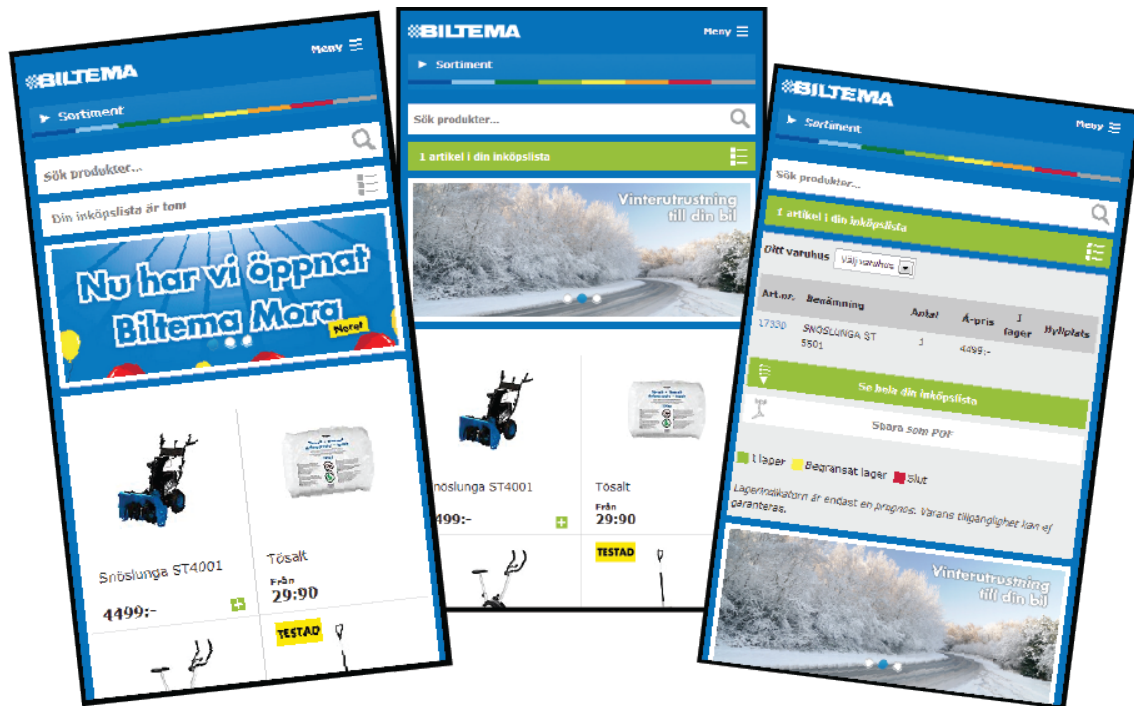


Figure 2.2a: Biltema’s start page for smaller screens. **2.2b:** One item in shopping list. **2.2c:** Shopping list unhidden.

For the smallest version of the site the top menu and the product range menu is hidden under drop down menus (figure 2.2a). The products are listed with less columns than in figure 2.1 and other, maybe less relevant, information like “nyheter” (eng. news) has been moved further down. The search field and the shopping list are bigger than before and are now placed underneath each other.

When adding a product to the shopping list the list turns green (see figure 2.2b) and displays how many items that is stored. To add an item to the list the user can press the green plus sign that belongs to the item. Figure 2.2c shows that the shopping list also is a drop down menu that lists stored items. The user cannot modify or delete the list in this mode. To modify it the user has to click on the green button that says “Se hela din inköpslista” (eng. “See your whole shopping list”) and there he/she can modify how many items of a kind he/she wants or delete items from the list.

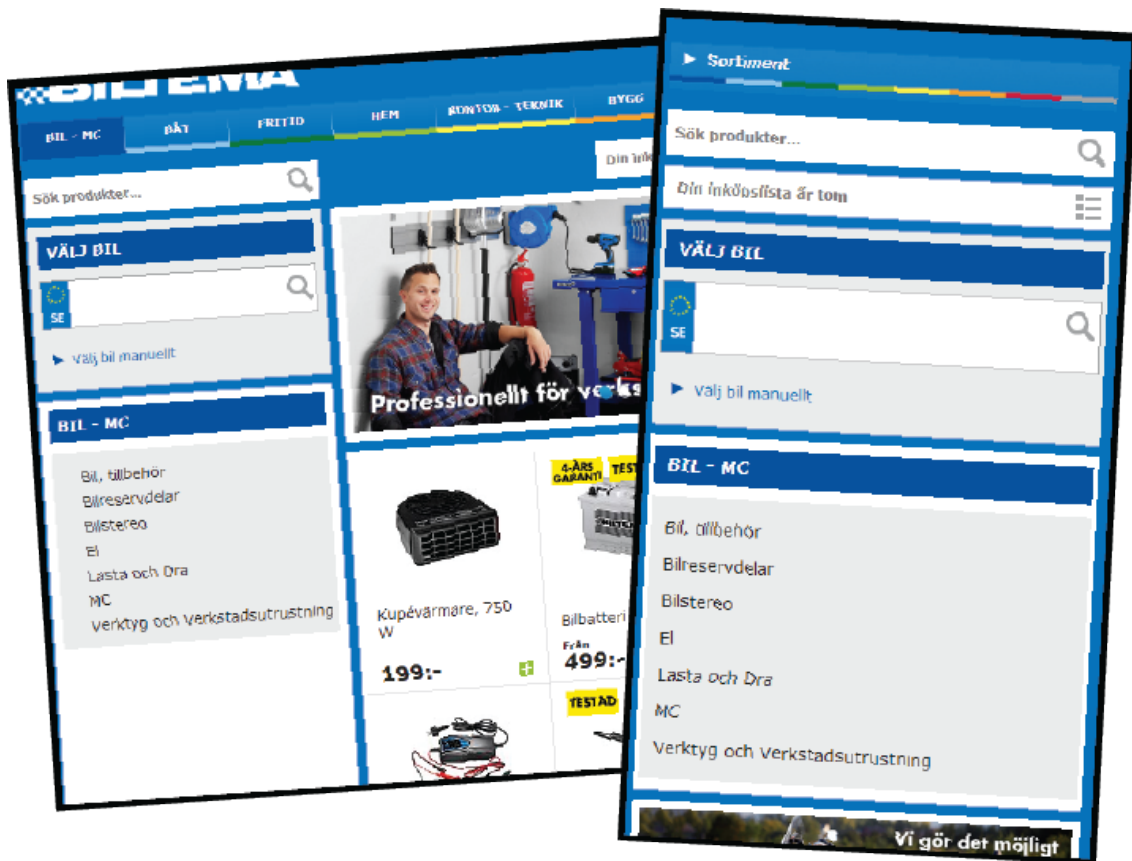


Figure 2.3a: Displays how a submenu displays in the page for wider screens. **2.3b:** Displays the same as in 2.3a but for a smaller screen.

biltema.se does not really use mega menus. For their menu of the different sub categories from the product range they use the way shown in figure 2.3a to show it on a wider screen and on a smaller screen they show it like in figure 2.3b. For wider screens the menu is on the left hand side and for smaller devices the menu displays under the shopping list.

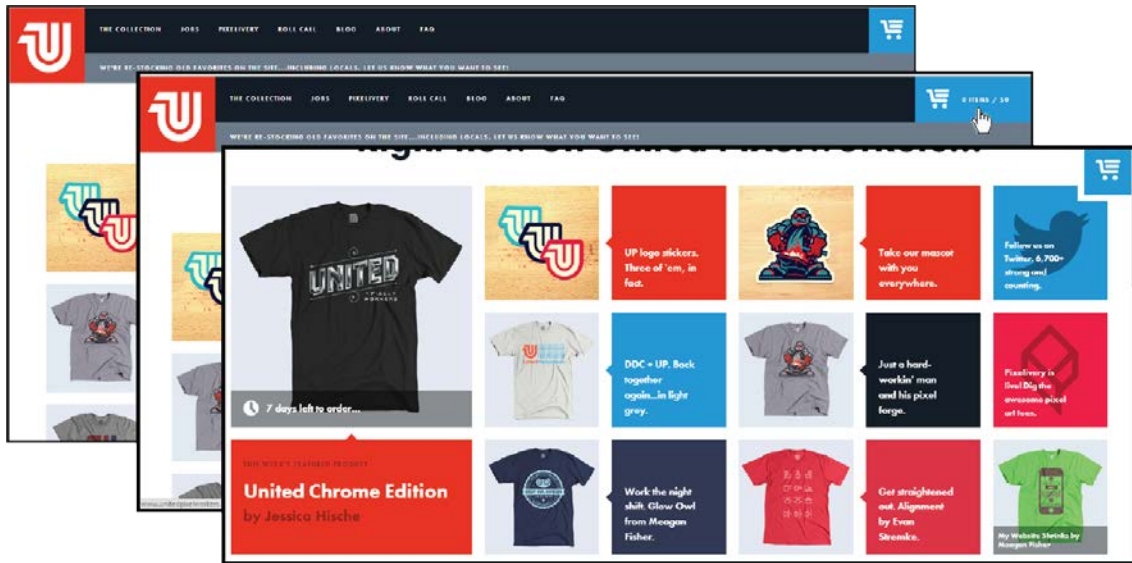


Figure 2.4a: The front page for this site for wider screens. **2.4b:** Same as 2.4a but shows information about items in the shopping cart. **2.4c:** Displays how the shopping cart follows when scrolling.

When visiting this e-commerce site from a device with a wider screen it has a navigation menu at the top and a shopping cart to the left. In figure 2.4 you can see three different views of the front page. The print screen at the rear back (figure 2.4a) is the page presented to the user when first visiting the website. To get some basic info about the shopping cart the user has to put the cursor over it (figure 2.4b), information about how many items that the user has stored and the total cost for all of them is then displayed. When the page is scrolled down the shopping cart follows and is shown in the corner (as shown in the screen capture in figure 2.4c).

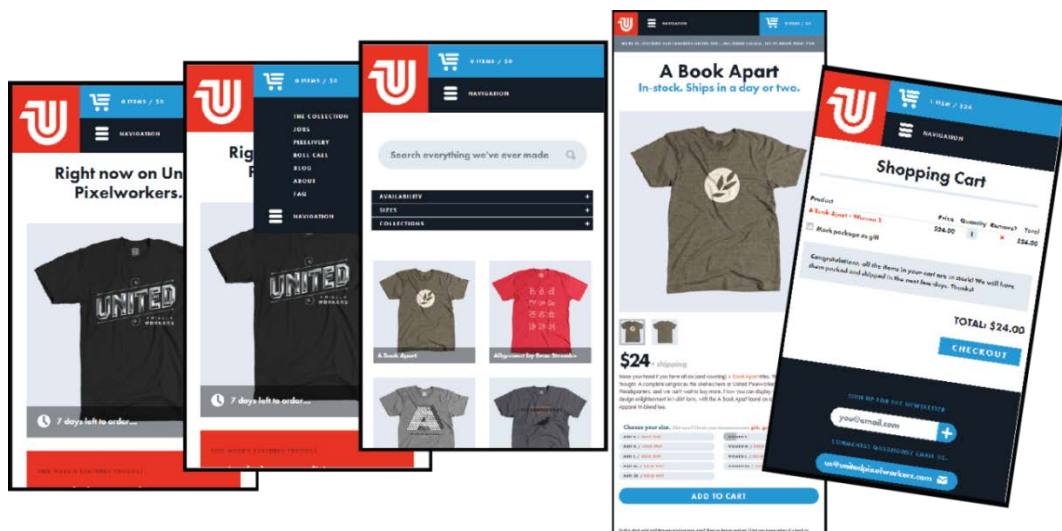


Figure 2.5a: Front page of the site for smaller screens **2.5b:** Navigation menu displayed. **2.5c:** Product listing. **2.5d:** Product page. **2.5e:** The shopping cart.

Figure 2.5 shows how *unitedpixelworkers.com* looks like on a smaller device. As shown in figure 2.5a the navigation menu and shopping cart has moved and the cart always gives the user information about the quantity of items that is stored and the total cost of these items. To show the navigation menu the site uses a drop down menu (figure 2.5b).

When listing the products it looks as in figure 2.5c. The user can filter the products by using the black drop down menus above them. In this smaller screen variant nothing follows when scrolling down compared to the wider page when the cart followed.

To put an item in the shopping cart the user first has to press the item from the product list and then make a choice about size and then scroll down to press the “Add to cart” button (figure 2.5d).

To get more information on how many items that is stored and the total cost the user presses the cart and a new page opens where he/she can change the quantity and remove items (figure 2.5e).

indochino.com

Another e-commerce site that uses responsive web design is *indochino.com*.

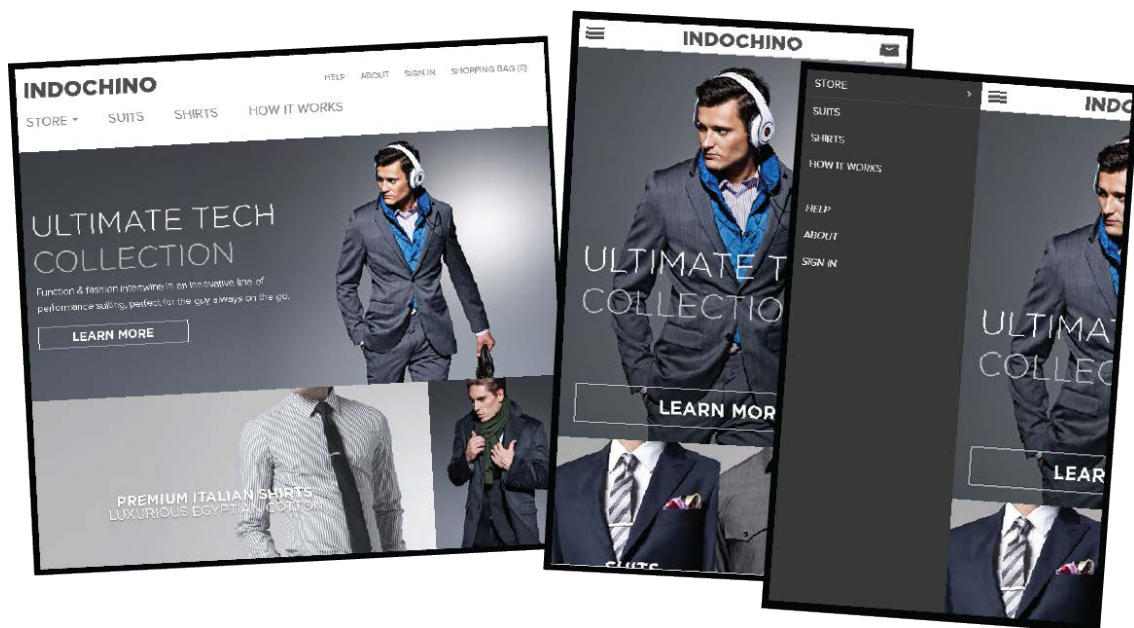


Figure 2.6a: First page for this site viewed with a wider screen **2.6b:** Same as 2.6a but viewed with a smaller screen. **2.6c:** How navigation menu is displayed for smaller screens.

Figure 2.6 shows the start page of *indochino.com*. Figure 2.6a shows how the website looks like in wide devices and figure 2.6b and 2.6c shows it for smaller ones. The navigation menu in figure 2.6a has moved to the top left corner in figure 2.6b. To see the navigation

menu the user presses this icon and then gets the view in figure 2.6c.

The shopping cart changes from the text “shopping bag” to an icon of a bag. When items are stored in the “bag” a number appears in front of the icon.

The header is not following when scrolling down and when pressing “shopping bag” or the shopping bag icon the user will be linked to a page were he/she can see all the items stored, remove or customized them.

The “Add to cart” button works the same way as in *unitedpixelworkers.com*.

skinnyties.com

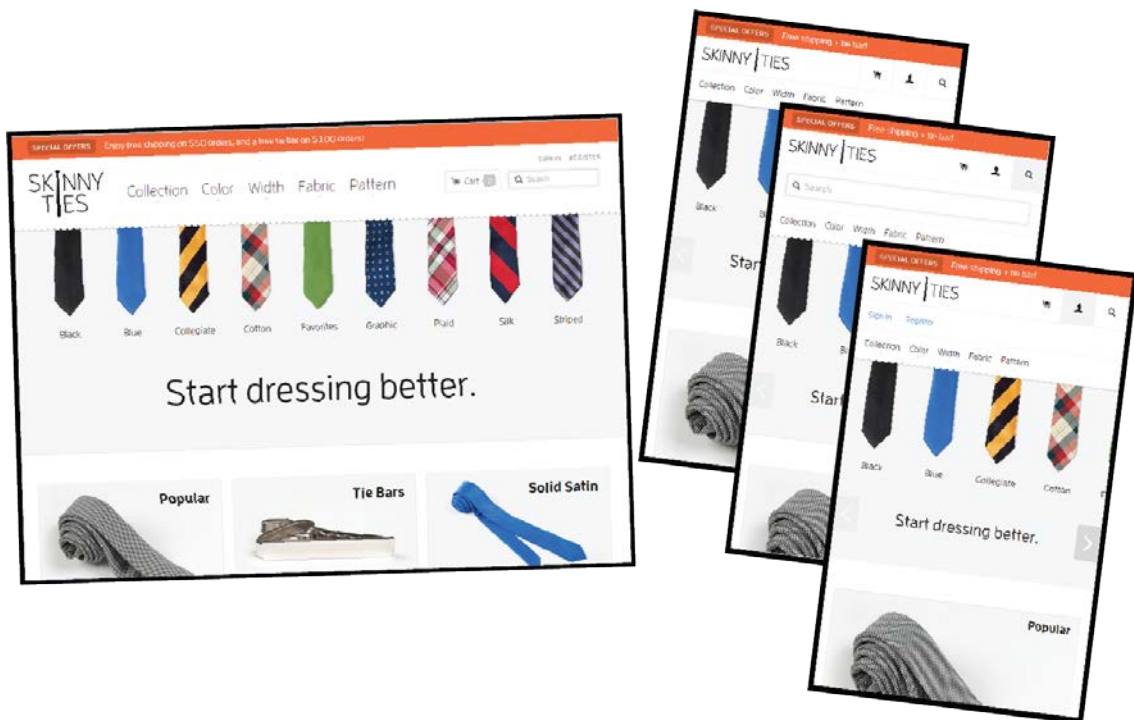


Figure 2.7a: Front page for this site for wider screens. **2.7b:** Same as 2.7a but for smaller screens. **2.7c:** Search function revealed. **2.7d:** User related functions revealed.

The front page for *skinnyties.com* is shown in figure 2.7. The big difference between the page for wider (figure 2.7a) and smaller screens (figure 2.7b, 2.7c and 2.7d) is that the search, login and shopping cart functions are hidden behind icons in the header. When pressing one of these icons the connecting function is revealed underneath (figure 2.7c and 2.7d).

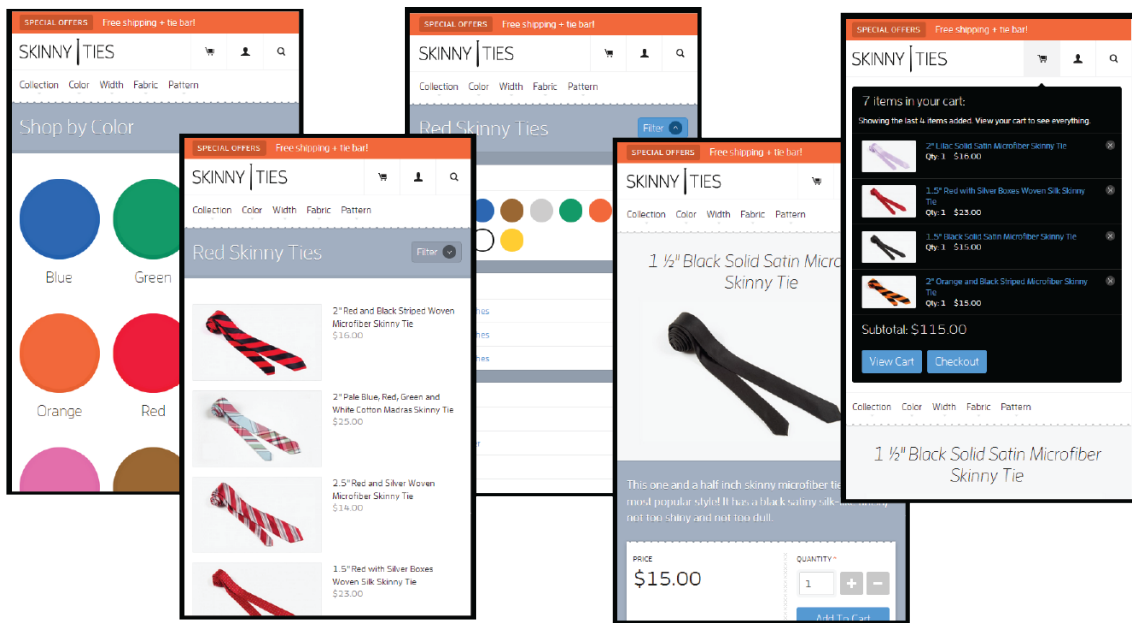


Figure 2.8a: Categories to choose from **2.8b:** Product list. **2.8c:** Filter options. **2.8d:** Product page. **2.8e:** Four last items added into the shopping cart.

To list products on *skinnyties.com* the user first has to choose a category (figure 2.8a) and then the user can view all items in this category (figure 2.8b). If the user wants to filter the items in the category the user presses the filter button and a drop down menu with filter options appears (figure 2.8c). When pressing a filter option the drop down menu disappears and the items with these options are listed.

To add a specific item to the cart the user has to press the item and a new page (figure 2.8d) loads. On this page the user can read more information about the item and add how many you want to buy before you add it to your cart.

To see the items in the shopping cart the user can press the cart icon. Before pressing the icon the user gets no information of how many items that is stored. When pressing it a drop down menu appears and shows the four last items that are added into it (figure 2.8e). Here the user can remove an item if the user wants. To see the rest of the items in the cart it is possible to press “View Cart” and all the stored items are listed, it is then possible to remove them or change the quantity. To go to the checkout there is a button already when listing the last four stored items in the cart and the user does not have to go through the “View Cart” step.



Figure 2.9a: The front page for this site for smaller screens. 2.9b: Same as 2.9a but scrolled down.

byggmax.com also have a responsive e-commerce site and have one different feature to smaller devices that no one of the ones explained above have. This different feature is that the shopping cart is placed in the bottom of the screen (figure 2.9a) and follows while scrolling down (figure 2.9b).

2.4 Usability study 1 – Responsive vs. unresponsive

The test plan together with the background form, orientation script, task scenarios and debriefing questions for this usability test can be found in appendix A.

2.4.1 Goal

The goal of this test was to analyze how people use e-commerce sites on their smartphone. We wanted to see the differences in usability and users attitude when using a responsive site versus an unresponsive site.

2.4.2 Research questions

The bulleted list below shows the questions we were interested in knowing before the test.

- Are there any differences when shopping on a responsive and an unresponsive site?
- Does the user notice the difference between the two sites?
- Which site does the user prefer to shop on?
- Would the user like to shop on a smartphone at all?
If no: Why?
- Is there any function missing?

2.4.3 Participant characteristics

In this test we used 19 participants with different backgrounds which are potential online shoppers. There were ten women and nine men, in the ages 19 to 54.

2.4.4 Method

Before the test, the participants were presented with a questionnaire (found in appendix A), to let us know of their background and past experience with smartphones, tablets and the websites used for this test. The participants tested two e-commerce sites each; *biltema.se* which is a responsive website and *kjell.com* which are not. We made sure that different users started with different websites.

During the test we gathered information and statistics of errors and successful designs. We also gathered information about the participants experience when shopping on the different websites when using a smartphone.

After the test session an interview took place between the test moderator and the participant, where the participants had the opportunity to discuss and express their feelings by answering predetermined questions.

2.4.5 Task list

The test started with that the participant was presented with a smartphone with a start page for an e-commerce site on the screen. The user then went through the steps listed underneath two times on the different sites.

1. Find specific items without using the search function and put it in the shopping cart
2. Look at the stored items and change the quantity of one specific item
3. Find specific items using the search function.
4. Delete one specific item.

2.4.6 Results

All of the participants were owners to a smartphone, four of them had a tablet of their own, twelve had used a tablet and four had never used a tablet.

When we asked about their online shopping habits, all of them had been shopping online at some occasion. One participant shop online every week, six participants shop online at least once every month, ten of the participants shops at least once every sixth month, two participants shop at least once a year and one participant shop online less than once a year. Three participants have been shopping using a smartphone before and only one participant has been shopping using a tablet.

Table 2.1: *The participants (P1-P19) user experience surfing with a smartphone and surfing on biltema.se and kjell.com rated from 1-5 where 1 means no experience and 5 means very much experience. Also the total time in minutes, for surfing on these sited surfing the test.*

	Experience of surfing with smartphone	Experience of biltema.se	Experience of kjell.com	Total time biltema.se	Total time kjell.com
P1	4	1	3	7.13	11.20
P2	5	2	3	7.33	10.35
P3	5	1	1	12.03	14.04
P4	3	1	1	19.46	13.04
P5	5	2	2	8.30	13.22
P6	5	1	1	14.00	14.23
P7	5	4	2	6.39	7.52
P8	5	1	4	9.28	8.49
P9	5	2	3	8.02	11.48
P10	3	1	1	13.51	25.06
P11	4	1	2	6.10	8.09
P12	5	2	1	9.54	11.02
P13	5	3	3	15.08	13.14
P14	4	1	1	12.04	10.15
P15	4	1	1	5.30	8.44
P16	5	2	3	8.37	10.47
P17	5	2	3	4.35	5.40
P18	4	1	2	7.37	9.20
P19	4	2	2	11.39	7.08

Table 2.1 shows that 14/19 participants were faster when shopping on Biltema's site and only 5/19 were faster when shopping on Kjell & Co. The table also shows that the majority of the participants have good or very good experience of surfing with their smartphone. 8/19 participants had greater experience with Kjell & Co's site than with Biltema's, whilst only 2/19 had greater experience with Biltema than with Kjell & Co. 9/19 participants considered themselves have the same or no experience of the two websites. What's interesting is that of those who considered themselves has greater experience with Kjell & Co's site, only one completed the scenarios for this site faster than on Biltema's site.

Test on biltema.se

In the first scenario many participants had some problem finding the toilet item. 16/19 participants looked under "hem" (eng. home) and then "badrum" (eng. bathroom) first. In the listed subcategories under bathroom there is no category where the user can find the toilet. There is a category called "toalett tillbehör" (eng. toilet accessories) and even if many participants finds it strange that it should be underneath this category they looked in it anyway (and did not find it). To find the toilet item in this category the user has to scroll down and find more categories than the ones listed above.

The user can find the toilet under "bygg" (eng. build) but then has to know what "VVS" (eng. HVS - heating, ventilation and sanitation) means and some participants seem to not have this knowledge.

The second scenario often passes without any problems. The things that should be put in the shopping list are categorized logical.

In the third scenario some participants adds the length of the spirit-level in their search and can then not find the correct one. Also there is no information about the lengths of the spirit-levels in the specification shown in product list and the participants had to go in and look into the item to see this information.

The first time the participants have to change the shopping list is during the fourth scenario. Most of the participants, 15/19, solved the assignment through clicking the article number and then add another item through the product page. 10/19 tried to change in the "first" shopping list and only four participants finds the "second" shopping list where the user can change the amount directly.

The last scenario, scenario five, shows the biggest failure with this site. As said before the shopping list has two steps, and to be able to change the amount the user has to go in to the "second" list and to get there they have to press a button that says "Se hela din inköpslista" (eng. see your whole shopping list). If the participants find the "second" list they will not see the delete button if they use the smartphone in portrait. Some participants still tried to change the amount in the "first" list. Eight participants entered

the product page to see if they could delete from there since they cannot delete in the “first” shopping list. Three participants did not find the “second” shopping list at all and solved the assignment through writing “-1” on the product page, eight solved it by putting a “0” in the second list and seven used the actual delete button. Out of these seven participants, who found the delete button, two of them used the smartphone in portrait. Other noticeable things from this test were that some participants were unsure about what “+” meant, and were therefore not sure if it was the correct way to add a product into the users shopping list. 6/19 participants used the backwards button on the site and not the physical one, this is a little bit misleading because the backward button on the page goes back in the menu system and the physical one goes back to the page the user last visited.

9/19 of the participants used landscape during some part of the test. 8/19 showed frustration during the test, this mostly happened when they had problem finding the toilet item in scenario 1, when they tried to find delete in scenario 5 or when they had problems with precision. The frustration was shown through sighs and irritation.

Table 2.2: *The time in minutes for each participant (P1-P19) to complete a specific scenario (S1-S5). Also the total time for all scenarios on Biltema is displayed. The times marked in red are considered not fulfilled for some reason that can be read about in the footnotes.*

Biltema	S1	S2	S3	S4	S5	Total
P1	1.37	1.15	0.59	0.44	2.38	7.13
P2	1.38	2.04	1.30	1.20	1.01	7.33
P3	4.22	2.05	2.10	1.18	2.08	12.03
P4	4.29	3.10	5.51 ²	0.46	5.30 [□]	19.46
P5	2.07	1.56	1.45	1.15	1.27	8.30
P6	2.40	4.32 ^{**}	5.02 ^{2***}	1.14	0.32	14.00
P7	1.17	1.13	2.28	0.55	0.46	6.39
P8	4.33	1.38	1.32	0.54	0.51	9.28
P9	2.19	1.41	1.49	1.29	0.44	8.02
P10	2.21	3.52	1.51	1.19	4.28 [□]	13.51
P11	1.59	1.39	1.11	0.37	0.44	6.10
P12	2.28	2.36	2.41	1.24	0.45	9.54
P13	7.10 [*]	1.49	4.36 ³	1.11	0.22	15.08
P14	3.33	3.01 ^{**}	2.24	1.00	2.06	12.04
P15	1.09	1.23	1.25	0.44	0.49	5.30

P16	2.16 ¹	1.33	1.59	1.04	1.45	8.37
P17	1.59	0.57	0.53	0.33	0.13	4.35
P18	4.09	1.02	1.04	0.51	0.31	7.37
P19	4.54	2.10	1.57	1.22	1.16 ⁴	11.39

▫ Gets help from the test moderator

*The participant has very much problems with the categories. The participant looked in the subcategories under “Home” and “Bathroom” and the toilet could not be found in a subcategory here. The participant did not understand the Swedish abbreviation “VVS” (eng. HVS - heating, ventilation and sanitation) and therefore could not find it under “Build” either.

**There was a bug in the site at the moment and the bags did not add to the cart even if the participant made the correct action.

***The participant noticed that the dog bed that was added in the scenario before was not in cart anymore. This was because it was deleted when the participant used the backwards button on the phone.

¹ The participant chose the wrong item.

² The participant could not find the item.

³ The participant cheated and used the menus instead of just searching to find the item.

⁴ The item was not in the list and the test moderator did not know if the participant succeeded to delete or if it never were in the list.

Test on kjell.com

During the first scenario on Kjell & Co’s site 11/19 of the participants thought that a dust bag should be found under the “tillbehör till” (eng. accessories for) category. When they noticed that they could not find it under this category most of the participants found the dust bag without bigger problems. Seven participants checked that the item really was added in the cart.

In the second scenario 8/19 participants looked in “tillbehör till” (eng. accessories for) to find the mouse. Many participants commented on that they thought that a mouse is a computer accessory. By using the submenus and reading the information in the product list they often found the correct mouse, but 8/17 of the participants that found the mouse, did forget to change the color to white. After adding the mouse to the cart a pop-up with suggestions for items that would work together with the mouse appeared and 7/17 commented or showed in some other way that this was irritating.

For adding one more dust bag in scenario three most of the participants found where to change the amount without bigger problems. However 6/19 was not sure if their change was saved.

The most participants solved scenario four without any problems. They got what they searched for and the information displayed in the product list gave them the information that they needed.

There were no problems finding the delete button in the last scenario.

Other noticeable things during this test was that some participants thought the button for adding to cart “köp” (eng. buy) confusing since they associate this with check out. Some even tried to use the shopping list that was provided on the site. Many happened to press something while they tried to scroll or zoom on the site and some even commented that the site was not made for a smartphone. Some participants sometimes had been zooming too much and therefore could not find what they are looking for. 18/19 used the submenus though not all of these people found them directly. 9/19 used the smartphone in landscape sometime during the test and eleven participants commented on that the text was too small.

6/19 showed frustration such as irritation or sighs while using this site. This happened when the whole site was reloaded after clicking something, because they had to zoom to see, they could not find the category they were looking for or because of problems with precision.

Table 2.3: *The time in minutes for each participant (P1-P19) to complete a specific scenario (S1-S5). Also the total time for all scenarios on Kjell & Co is displayed. The times marked in red are considered not fulfilled for some reason that can be read about in the footnotes.*

Kjell & Co	S1	S2	S3	S4	S5	Total
P1	2.20	5.24 ^α	1.14	1.42	0.40	11.20
P2	3.00	2.52	1.49	2.09	0.45	10.35
P3	5.28 ^α	3.26 ²	1.55	2.15	1.00	14.04
P4	2.44	6.26 ^α	0.57	2.07	0.50	13.04
P5	1.33	6.55	1.26	2.51	0.37	13.22
P6	3.33	5.10 ³	1.35	3.27	0.38	14.23
P7	2.07	2.19	0.56	1.43	0.47	7.52
P8	1.53	2.39	1.21	2.11	0.45	8.49
P9	3.20 ¹	3.26 ²	1.17	3.04	0.41	11.48
P10	9.10 ^{*α}	5.03 ^{4α}	1.57	8.10 ^{5α**}	0.46	25.06
P11	1.30	2.31 ²	1.17	1.50	1.01	8.09
P12	2.32	3.34	1.17	2.55	0.44	11.02
P13	4.11	2.37 ²	1.48	4.02	0.36	13.14
P14	2.00	2.27	1.07	4.18	0.23	10.15
P15	2.05	2.18	0.55	2.46	0.40	8.44
P16	2.42	2.39 ²	2.27	2.15	0.44	10.47

P17	1.25	2.01 ²	0.39	1.05	0.30	5.40
P18	3.19	3.08	0.42	1.48	0.23	9.20
P19	1.31	2.28	1.14	1.32	0.23	7.08

□ Gets help from the test moderator.

*The participant had zoomed to much and could therefore not see all the categories under “sortiment”.

**The word the participant wanted to search for is misspelled.

¹ The participant first pressed “köp” (eng. buy) and then changed to “lägg till i inköpslista” (eng. add to shopping list). The participant thought that the click on “lägg till i inköpslista” was the correct action but in fact it was the first click on “köp” that went through.

² The participant did not change the color from black to white.

³ The participant had big problems with zooming, did not get good perspective and could not find the submenus. The participant therefore gave up.

⁴ The participant added the wrong item.

⁵ Because of the time had passed too much the test moderator told the participant to choose any battery charger, the participant chose wrong charger.

Answers from debriefing questions

1. Which site was most difficult to shop at? Why?

In this question six participants answered that they could not decide which site that was more difficult than the other.

Five thought biltema.se was the most difficult and the main reason was because of difficulties to change amount of items and to delete them in the shopping list. Some participants also thought it was because bad categories and lack of information of the products in the product list.

Eight participants answered that kjell.com was more difficult than biltema.se, many thought this because of the “tillbehör till” (eng. accessories for) category. Other comments were that the site had too much information, that it was hard with precision, that the page was slow and that it is not made for smartphone.

2. What differences between the two sites did you notice?

Seven participants answered that biltema.se has a custom made site for smartphones and this was the answer that was most common. Other comments were that the two sites displays different amount of items at ones, that biltema.se has a better menu system and that kjell.com reloads all the time.

3. What was good with Biltema's site?

The most popular answer to this question was that Biltema had a better menu system. The participants also liked the amount of information presented in the site, the font size and that the site is custom made. One participant even commented that she liked that there

was difference between the interfaces for having the smartphone in landscape and portrait.

Three participants could not come up with anything positive about the site.

4. What was less good with Biltema's site?

13 participants answered that the shopping list was really bad and confusing. Nine said that the categorization of the products was not intuitive. There were some comments about the search field and the shopping list together took up too much space when holding the smartphone in landscape mode. There is also comments on lack of feedback for adding to cart and that the search algorithm is not good. One participant said that the site still has some teething left, meaning that the site is still in need of improvements.

5. What was good with Kjell & Co's site?

The most common answer to this question was that the products in the categories are logical if looking under "sortiment" (eng. product range). The second most common answer was "nothing". Some said that the shopping cart was good, they liked the placement of it and was able to delete and change the amount of items in it. They also made comments about that the site is cognitive and had a good search algorithm.

6. What was less good with Kjell & Co's site?

The most common thing the participants said was that they did not like the category "tillbehör till" (eng. accessories for). The second most common thing was that too much information was displayed at the same time. It was also common that they commented on that they did not like the menu system, they had to zoom a lot, that the site was not custom made, there was lack of feedback when adding to cart, "köp" (eng. buy) was misleading and that everything was displayed tiny.

7. Which site of these two would you prefer to shop at?

Kjell & Co's site: 7

Biltema's site: 9

Do not know: 3

8. Did you notice any function that was missing on any of these sites?

We did not get many relevant answers to this question. Many answered that they wanted a better shopping list at Biltema's site, for example they would like to be able to delete and change the amount of items in it.

One person said that he would like a filter function after searching, another participant wanted more feedback and one a backwards button.

9. Would you be willing to shop from a smartphone? Why/why not?

To this question 13/19 answered yes. When they got the question why, many of them answered that they would if there was a situation without a computer and if they were traveling. Some comment that they would buy from a smartphone if the site was custom made for this device.

The remaining six participants who said that they would not shop on a smartphone said that this is because the screen is too small, it is clumsy and tricky, it is faster to shop via a computer and that it is unsafe. One participant said that he cannot come up with a situation for when he would need to do it.

10. What information would you like to be presented if you should shop from a smartphone?

Eight participants said that the most important thing is good categories and good perspicuous. They also comment that it should not be too much information at once and that there should be good pictures of the items. Some said that the price information should be displayed so that prices can be compared easily. Other things the users would like are good information about the product in the product list and feedback for adding into cart. One participant said that she would like the products to be displayed like a list with one item per row and a little picture of the item.

11. Would you be willing to shop from a tablet? Why/why not?

For this question, 17 participants said yes and that they would prefer shopping from a tablet over a smartphone because the screen is bigger.

Two participants would not shop on a tablet and the reasons were because they thought it is unsafe and one of these participants also said that he never used a tablet.

12. Do you know what responsive design is?

No one answered yes to this question.

13. Can you remember if any of these two sites was responsive? Which?

After we explained what responsive design was, 12 of the participants answered Biltema and seven answered that they cannot remember if any of the sites was responsive.

14. Why did you use the phone in landscape/portrait?

The main reason why the participants used landscape or changed to landscape was that they thought that they then would get a better overview. Another reason why some participant used it in landscape was because they used to have the phone like that when they surf online.

The main reason for using portrait was because they always used the phone like that. One answered that he changed to portrait when he was on Biltema's site because the search field and shopping list took too much space when having the smartphone in landscape.

2.4.7 Analysis

Are there any differences when shopping on a responsive and an unresponsive site?

One difference that is noticeable is that it is faster to shop on a responsive site. The responsive site that we used for this test turned out to have rather bad categories, which made it hard for the participants to find what they were looking for. For example many participant had problems when looking for the toilet item since it could be found under both the categories "hem" (eng. home) and "bygg" (eng. build). But it was quite hidden under the category "hem" which was the category that most participants wanted to look in to find it. But while looking for the things for the dog there was no problem at all, since there was no doubt about which category they belonged to. In addition to the categories it was difficult for the participants to change and delete items from the shopping list, since this functions were hidden in a second shopping list named "se hela din inköpslista" (eng. see your whole shopping list), which many of the participants did not see. Another problem with Biltema's site was that the search function gave strange search results, making it difficult to find what they were looking for. If the categories and the shopping cart would have been better designed and the search function would have worked better, the total time to complete the scenarios for Biltema would have been even faster.

A reason for that it took so long for the participants on Kjell & Co's site was that they were so zoomed in that they loosed track of where on the site they were and they did not get any good overview of the site. This problem does not exist on a responsive web site.

Does the user notice the difference between the two sites?

When we asked what differences the participants felt while using both sites, 7/19 noticed that Biltema's site was custom made for smartphones. When we later explained what a responsive website were twelve of the participants could point out Biltema as a responsive website. The remaining seven could not remember if any of the two sites were responsive, this could have been because they did not understand what a responsive website was, but did not want to say so.

Other differences the participants noticed was that Kjell & Co displayed more items and information than Biltema, that Biltema was more consequent with their menu system whilst Kjell & Co gave the impression of having many different types of menus.

Which site does the user prefer to shop on?

When we asked the participants which site they would prefer to buy from after they tried them both, nine out of 19 preferred to shop on Biltema's site, while seven preferred Kjell & Co's site, the remaining three participants did not know which site they preferred.

When we asked which site the participant thought was the most difficult to shop on 8/19 thought Kjell & Co's site was the most difficult while 5/19 thought that Biltema's site was the most difficult. 6/19 thought that both Biltema and Kjell & Co's sites were difficult but in different ways.

When asking why they thought Biltema was difficult their answers were about the shopping cart or the categories. For Kjell & Co the users mostly said it was difficult because the "tillbehör till" category. Some also made comments about that the site had too much information, they needed to zoom a lot and that they did not get a good perspective. But still there are more participants who thought that Kjell & Co was the most difficult site which also, in a way, indicates that they preferred to shop on Biltema's site.

Would the user like to shop on a smartphone at all? If no: Why?

Out of all the participants, 13 were willing to shop from their smartphone if they came in a situation where they needed to and did not have any access to a computer, such as if they were on traveling foot. Some participants commented on that they would be willing to shop from their smartphone if the site they where to shop on was custom made for a mobile.

The remaining six participants who could not consider to shop via their smartphone said that they did not think it would be secure enough, that the screen was too small, making them afraid that they would miss something. They also said that it would be too hard and clumsy, and that it would go faster on the computer. One participant could not think of any situation where he would have to use a smartphone to shop online.

17 out of the 19 participants were willing to shop on a tablet. This means that four of the participants who were not willing to shop from their smartphone were willing to do it on a tablet. Their comments were that it had a larger screen, making it more perspective.

Is there any function missing?

Many of the participant felt that a change and delete function were missing on Biltema's site, since these functions were so hidden. Some participants also wished to filter their search on both Biltema's and Kjell & Co's sites. Beyond this the participants did not think there were any functions missing.

2.4.8 Conclusions

A well designed responsive website is much faster to shop from than a website that is not responsive. Even a responsive website with problems such as the ones on biltema.se is faster to shop on, since the user, on a non-responsive website such as Kjell & Co, constantly has to zoom in and out to perform the wanted tasks.

Even though not all of the participants could say that Biltema's site was responsive, most of the participants notice that there is a difference between the two sites. For example they could say that they had to zoom on Kjell & Co's site or that Biltema did not present as many items as Kjell & Co.

Of the two websites, most participants preferred to shop on Biltema, but there were some participants that did not know which site they preferred or did not prefer any of the two sites.

Most of the participants were willing to shop via their smartphone and even more were willing to shop on a tablet. The participant who could not consider shopping from their smartphone or tablet thought it was not secure enough or where afraid that they would miss something because of the small screen. Other reasons where that it would be too difficult and that it would go faster on the computer.

In general the participants did not thought there were any functions missing, although many participants felt that they were missing a change and delete function on Biltema's site. Some participants also wished to be able to filter their search on both Biltema and Kjell & Co's sites.

Recommendation for improvement

One recommendation would be to use two real e-commerce sites. Since responsive web design has not come so far in e-commerce and since the fact that we wanted to use two Swedish websites, we had no choice but to use Biltema as the responsive website, although you only can make a shopping list on it. But if there was a possibility to use a real e-commerce site we would recommend this.

Another recommendation would be to, before the test, figure out how to empty the cash and do so between every participant, so that no one were to be influenced by what someone else had done earlier.

Limitations

One limitation was that the Wi-Fi in the test room was a bit slow. This caused impatience for many of the participants, who thought their click was not valid and tried again while the page was loading, making it take even longer.

Another factor that may have contributed to the ease with which different users performed the different tasks is their experience with the smartphone we were testing on. For example participants with experience of Sony Ericsson/ Sony mobiles might have found it easier than participants with experience of for example iPhone or HTC. There were also some limitations with Biltema's site. The biggest one was that the delete function was as hidden as it was. This should not happen in a responsive website. The participants would probably have liked Biltema's site more if they were able to see the delete function, since this was one of the main reasons to why they did not like their site. Another limitation with Biltema's site was that it saved search alternatives from previous participants and we were not able to clear the cache. This caused that some participants searched for "vattenpass 120" when they saw this alternative (and then got strange search results) although they intended to search for "vattenpass" in the first place and maybe would have found what they were looking for earlier. The fact that Biltema was not a real e-commerce site and that you only made a shopping list instead of actually adding items to a shopping cart, could have contributed to the difference in experience when shopping on the different sites. A last limitation could have been that the participants were various good at think aloud. This could have caused us to lose some data or thoughts of some participants.

2.5 Implementation techniques

The programming languages that are usable for implementing the prototypes is HTML5, CSS3 and Javascript. For implementing stylesheets an extension of CSS3 called Sass will make it easier to structure the code (Sass, 2013). For the behavior on the site a JavaScript library called jQuery will be used (jQuery, 2013).

3 Prototype tests

3.3 Usability study 2 - Prototypes of different design solutions

The test plan together with the background form, orientation script, task list and debriefing questions for this usability test can be found in appendix B.

3.3.1 Goal

The goal was to test the prototypes that had been constructed after the analysis of the usability study 1 that was conducted in the feasibility study, to figure out which prototype the users preferred and also to provide user feedback for further improvements.

3.3.2 Research questions

The bulleted list below shows the questions that we were interested in finding out from the test.

- Which prototype do the participants prefer?
- Would a certain prototype be better if we combined or changed a part of it with a solution of another prototype?
- Is there anything else that needs to be changed with the prototype (for example: too big or small buttons/text)?
- Is there a better solution than thought of so far?
- Is there any function or information missing?

3.3.3 Participant characteristics

We used 20 participants, ten women and ten men, between the ages of 21-60 with different backgrounds that are potential online shoppers.

3.3.4 Method

Before the test, the participants were presented with a background form (found in appendix B), to let us know of their background and past experience with smartphones and online shopping.

First the participants tested three different portrait solutions for the placement of the cart, menu and search functions. Two of these solutions had two versions, one with a fixed header that “follows” when scrolling and another with a header that stays at the top of the site.

Then they also tried two landscape solutions with the placement of the cart, menu and search functions in different ways. One of these also had two versions, one with a fixed header that “follows” and one where the header that stays at the top.

There were two different solutions for the product page for both the portrait and landscape prototypes that also was tested.

While the participants were testing the prototypes, we gathered information on how well the designs worked. After the test, we had a debriefing where the participants were given the opportunity to discuss and express their feelings about the different prototypes by answering predetermined questions (found in appendix B). While we discussed the prototypes the participants were able to look at the prototypes again on a widescreen monitor to more easily compare them and to freshen up their memory in case they forgot any of the prototypes.

3.3.5 Prototypes

Figure 3.1 to 3.9 show the five different prototypes in portrait and figure 3.10 to 3.14 show the three different prototypes in landscape. Figure 3.15 to 3.17 display the design changes from portrait to landscape for our different prototypes. These figures help the reader to get a better understanding of the analysis and conclusion in the end of this chapter.

Portrait

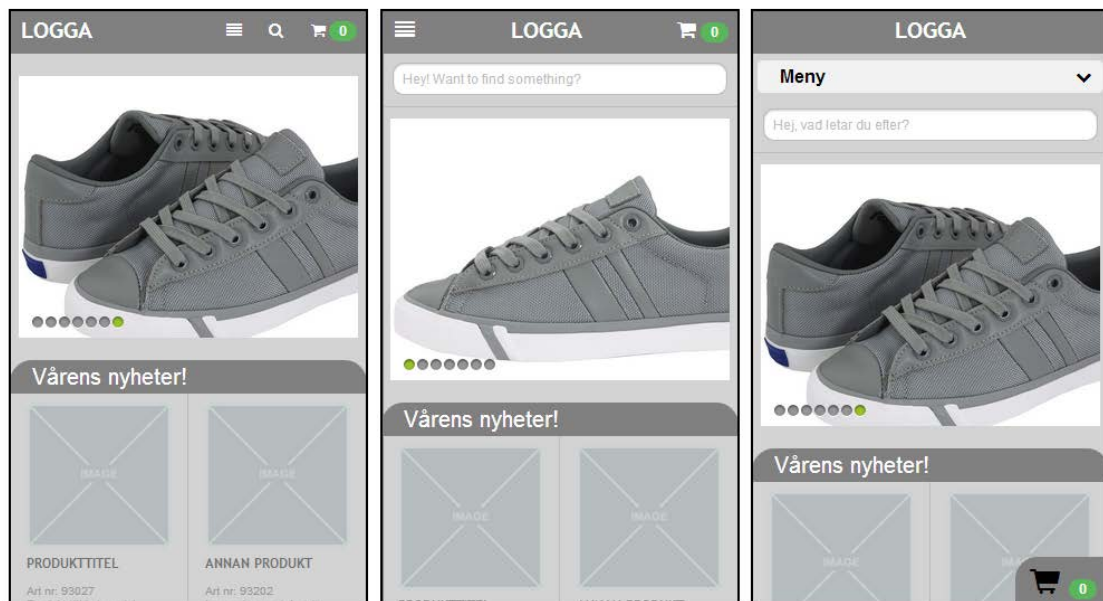


Figure 3.1: Overview of the different prototypes. Left: Prototype 1 and 2. Middle: Prototype 3 and 4. Right: Prototype 5.

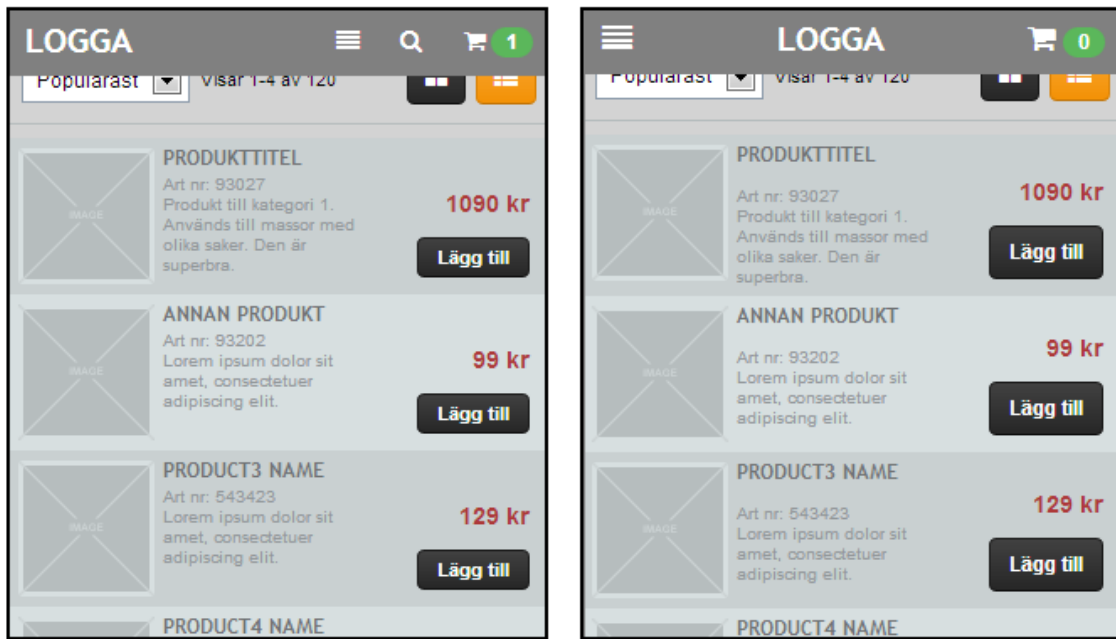


Figure 3.2: Left: Prototype 2. Right: Prototype 4. These prototypes have a fixed header that follows when scrolling.

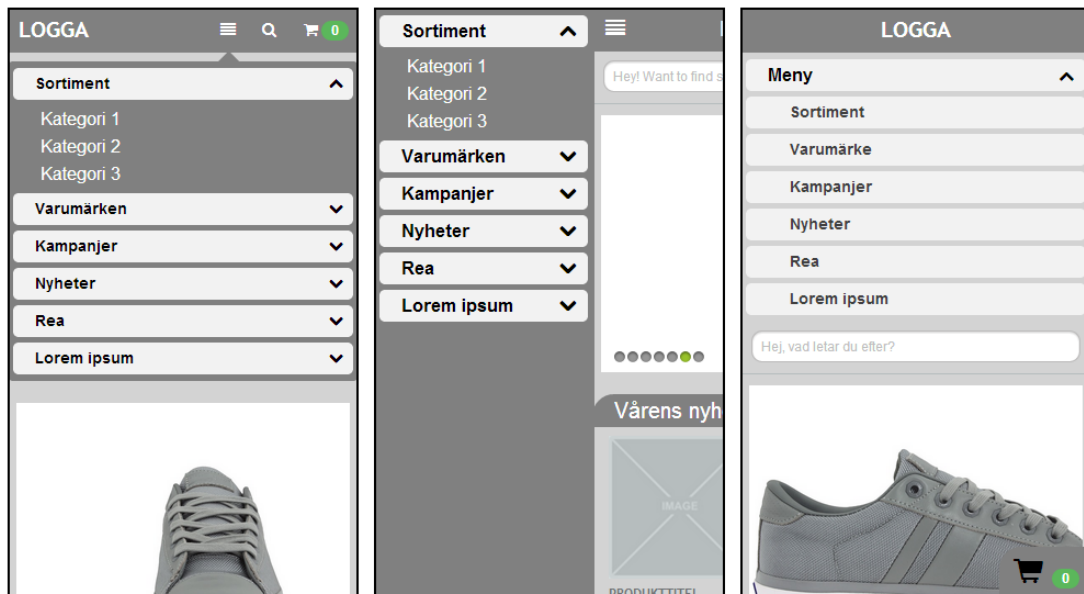


Figure 3.3: This figure shows the menus for the different prototypes. From the left: Prototype 1 and 2, prototype 3 and 4, prototype 5.

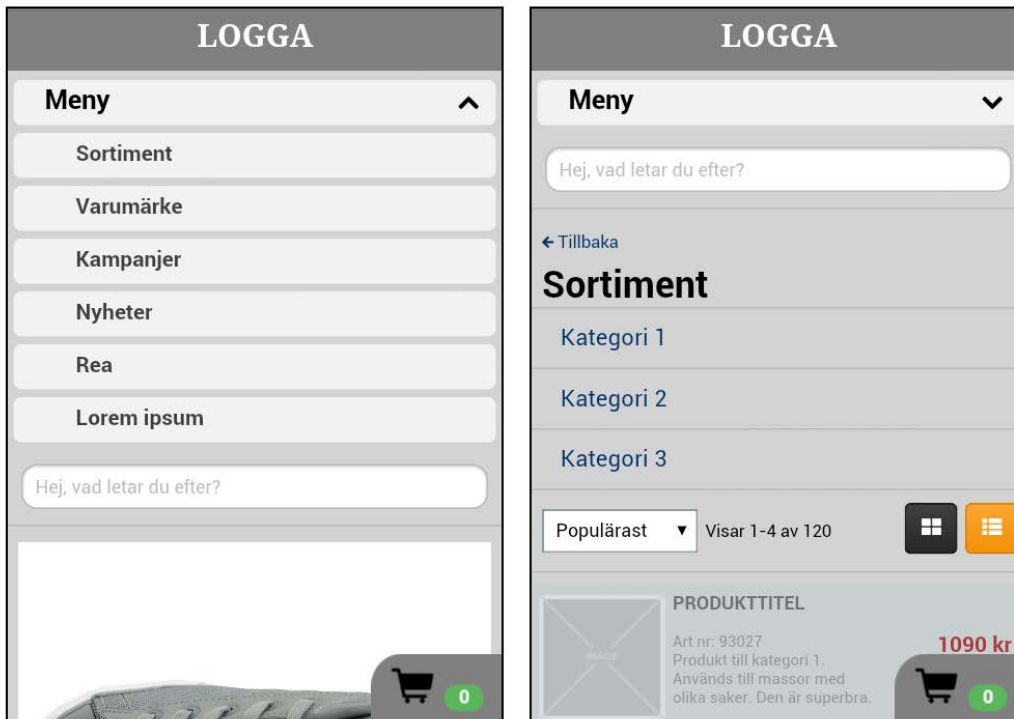


Figure 3.4: In prototype 5 there is a category page before one can reach the subcategories.

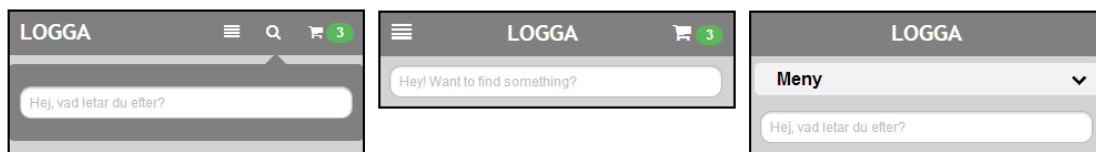


Figure 3.5: This figure shows the search function for the different prototypes. From the left: Prototype 1 and 2, prototype 3 and 4, prototype 5. Prototype 2 is the only prototype in which one can access the search function from anywhere on the website since the header is fixed.

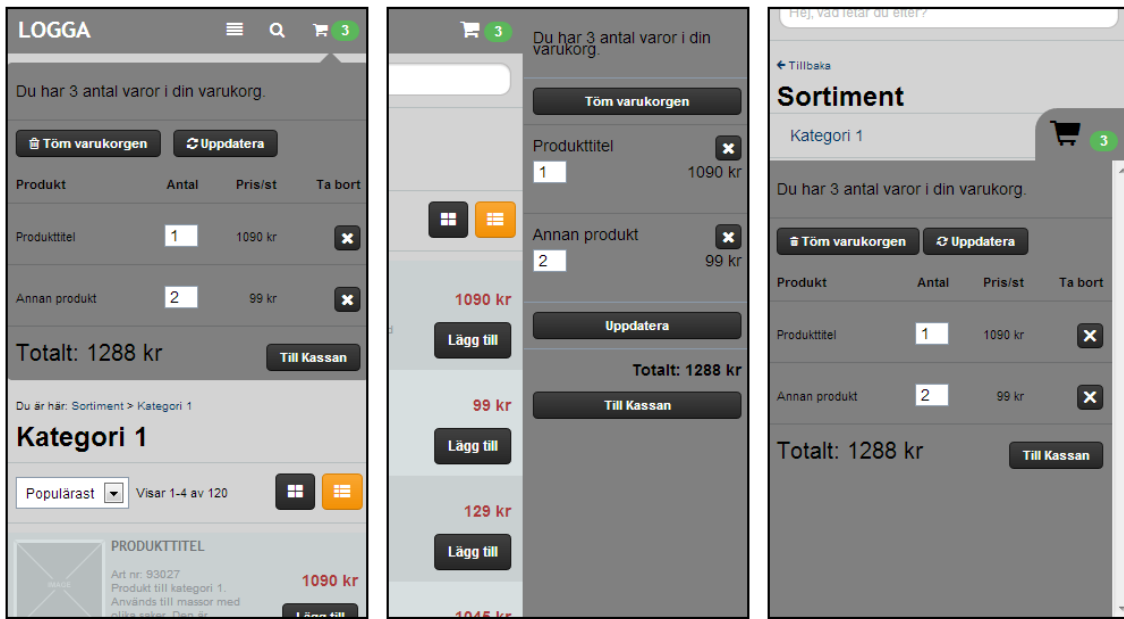


Figure 3.6: This figure shows the shopping cart for the different prototypes. From the left: Prototype 1 and 2 prototype 3 and 4, prototype 5.

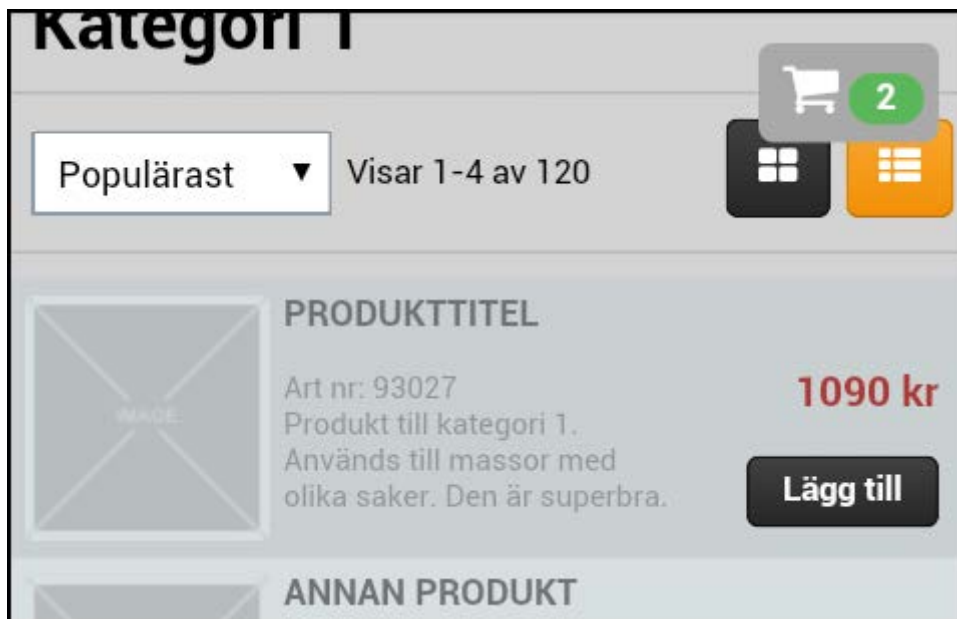


Figure 3.7: The figure shows the feedback for when adding a product to the cart for the prototypes in which the header is not fixed. The feedback disappears after a few seconds. Also the user can click on the feedback box to open the cart.

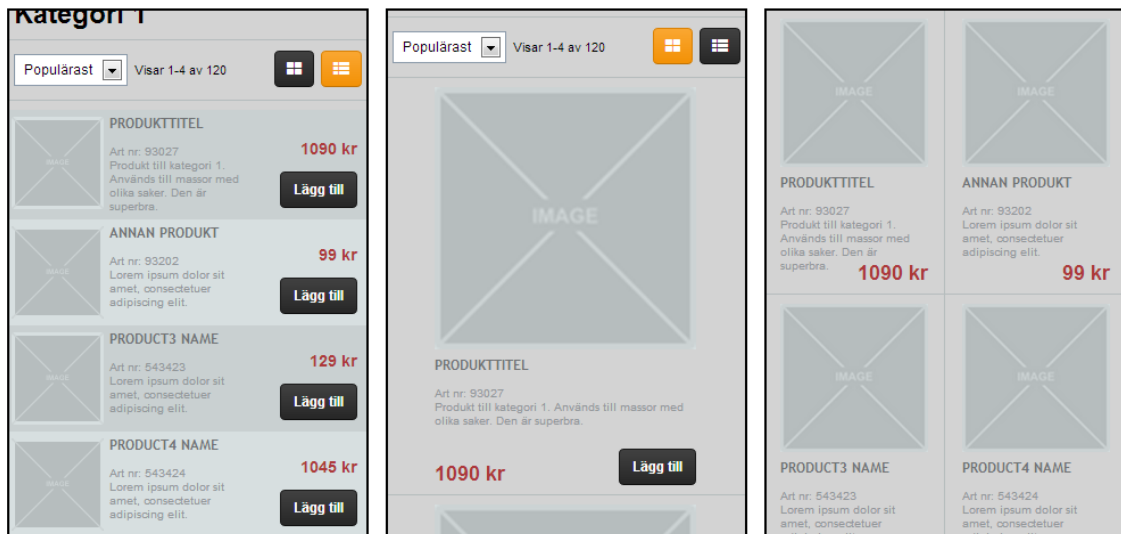


Figure 3.8: List versus grid. From the left: Products in a list, products in a grid showing one product in a row, products in a grid with two products in a row.

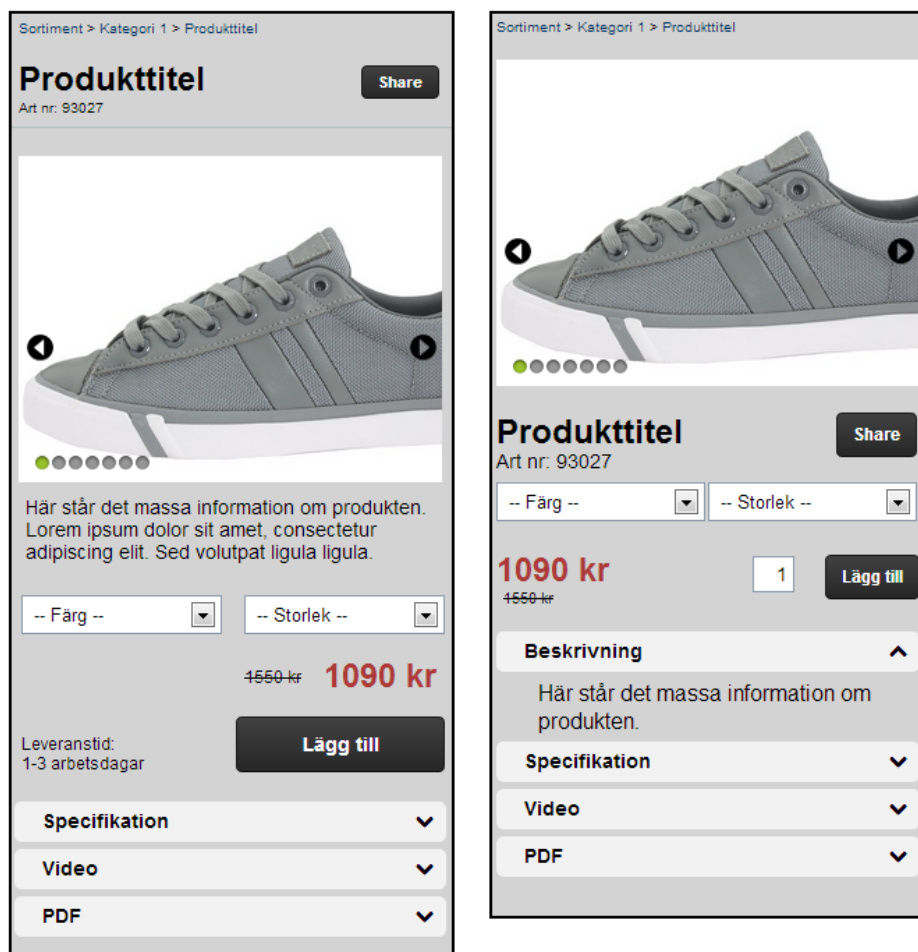


Figure 3.9: This figure shows the different designs of the product page. To the left is product page 1 and to the right is product page 2

Landscape

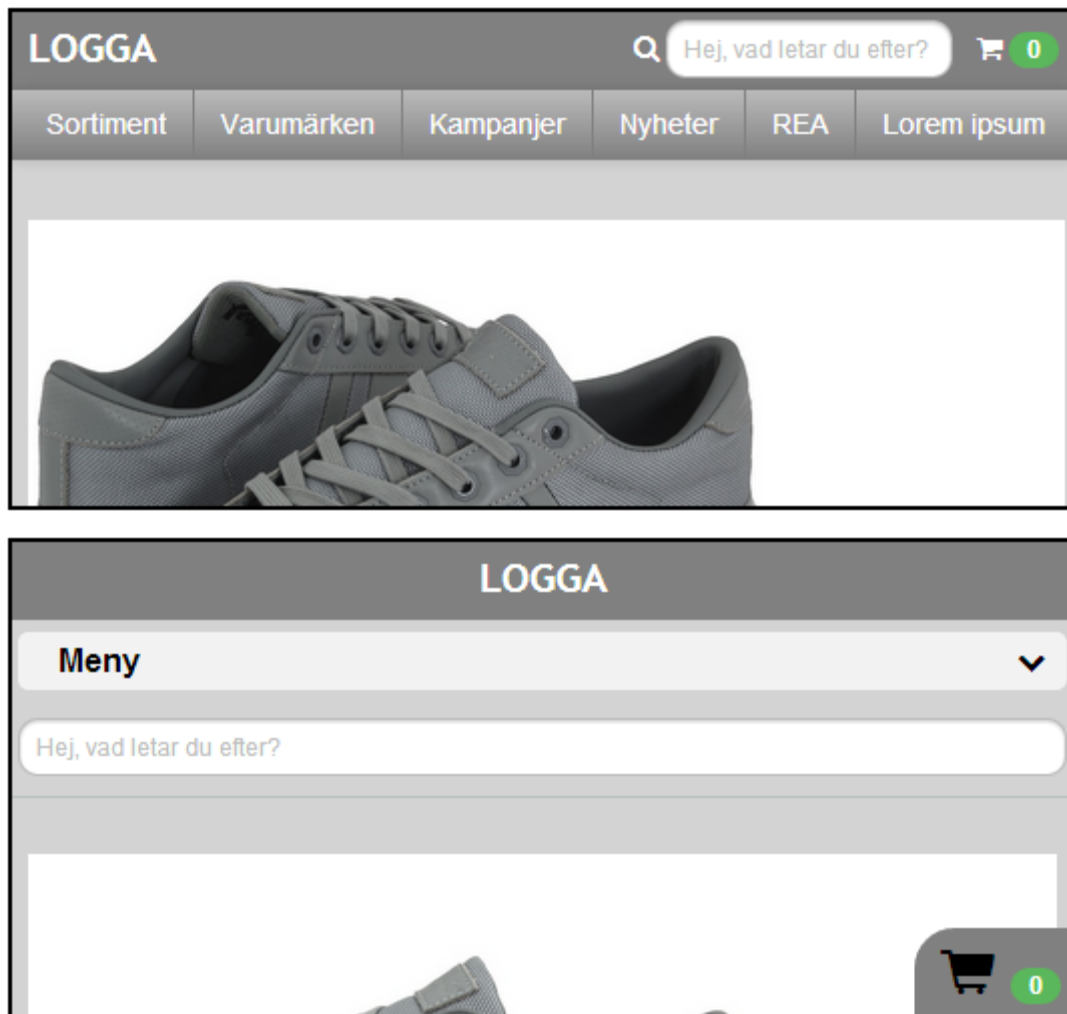


Figure 3.10: Overview of the different prototypes. Top: Prototype 6 and 7. Bottom: Prototype 8.

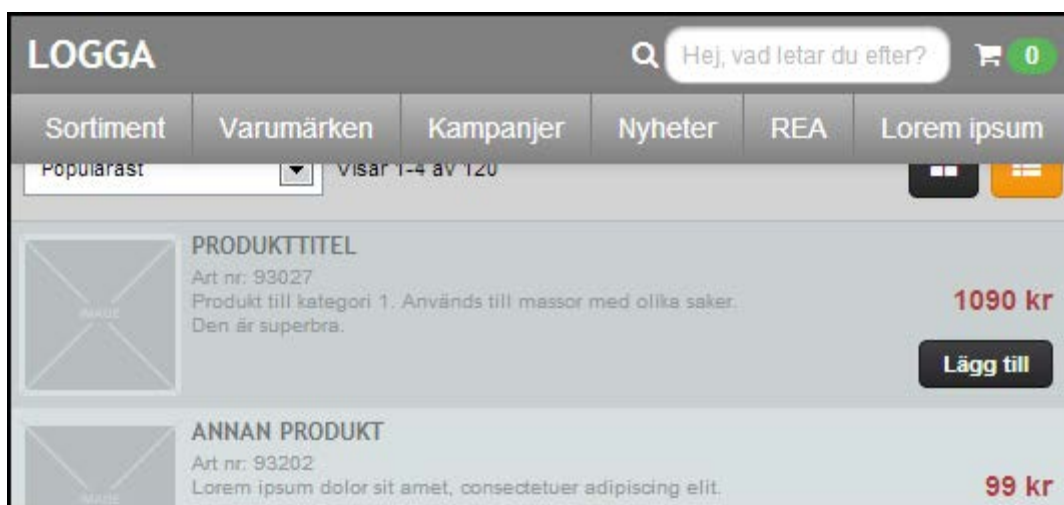


Figure 3.11: Prototype 7 has a fixed header that follows when scrolling.

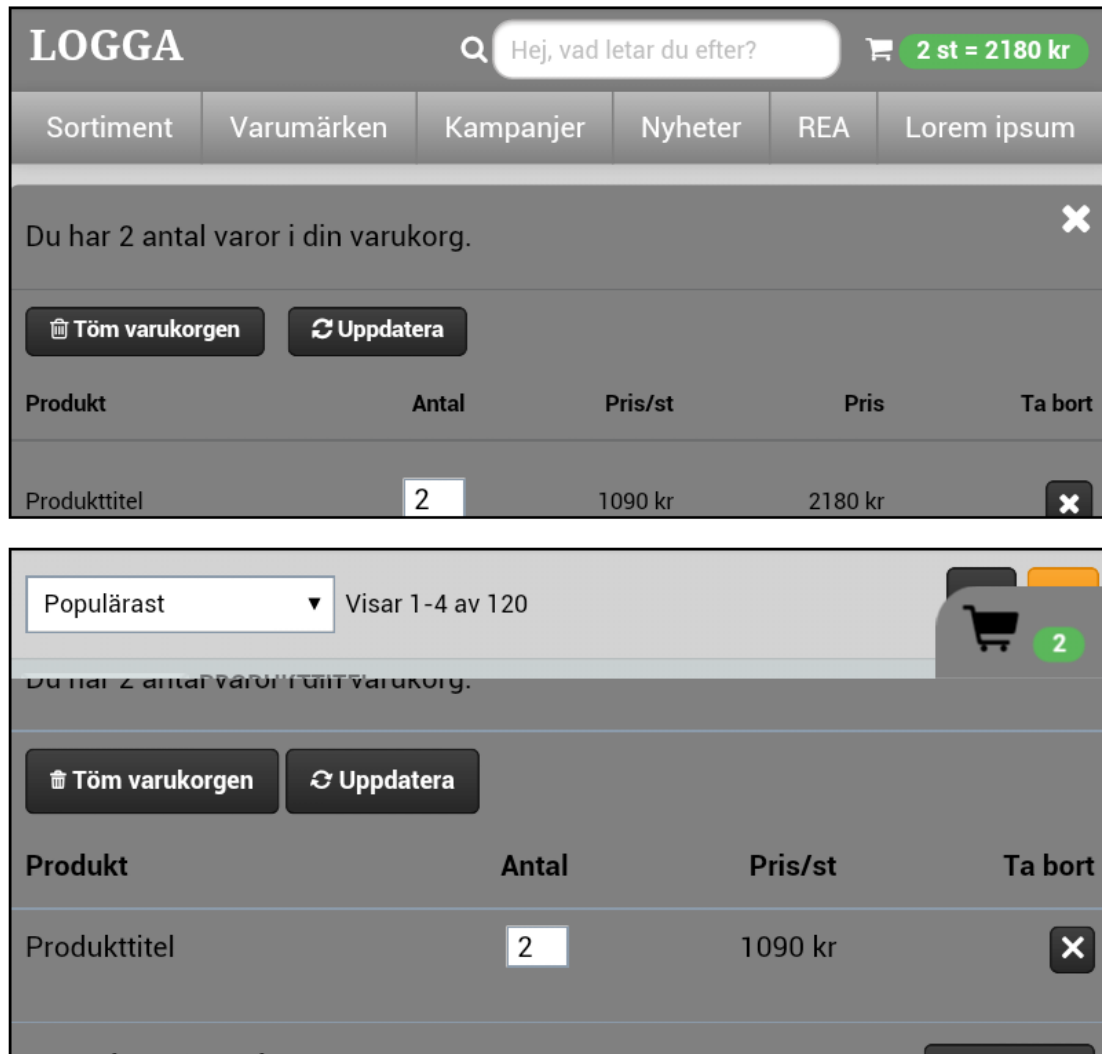


Figure 3.12: This figure shows the shopping cart for the different prototypes. Top: Prototype 6 and 7. Bottom: prototype 8.

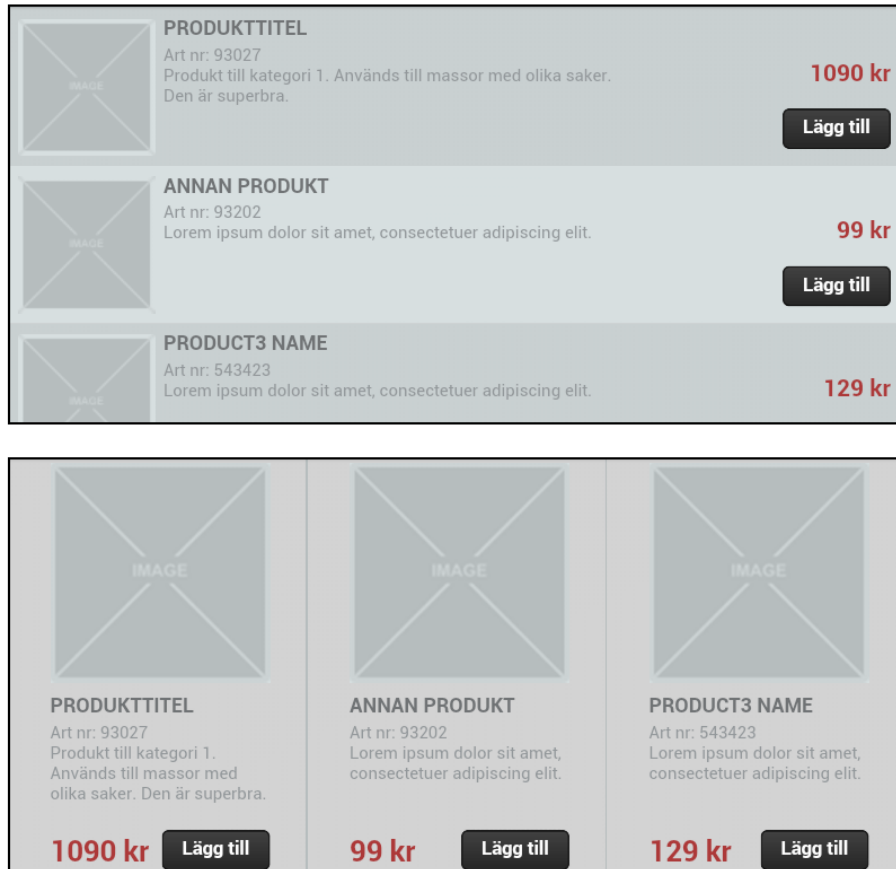


Figure 3.13: List versus grid. Top: Products shown in a list. Bottom: Products shown in a grid.

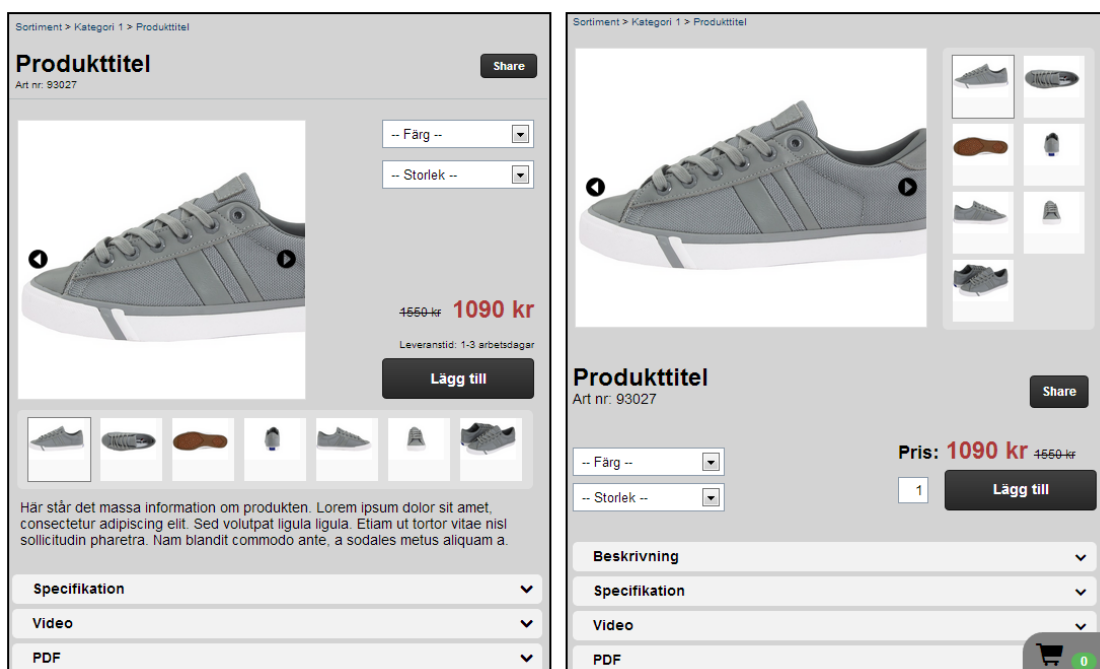


Figure 3.14: This figure shows the different designs of the product page. To the left is product page 3 and to the right is product page 4.

From portrait to landscape



Figure 3.15: *Prototype 1 and 2 becomes prototype 6 and 7 when switching from portrait to landscape mode.*

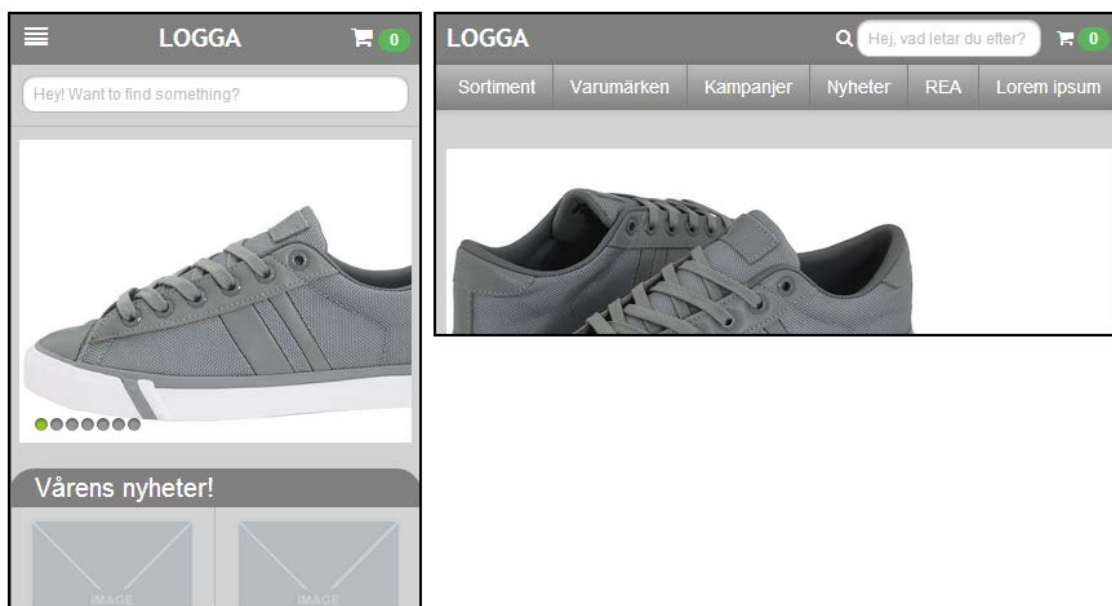


Figure 3.16: *Prototype 3 and 4 becomes prototype 6 and 7 when switching from portrait to landscape mode.*

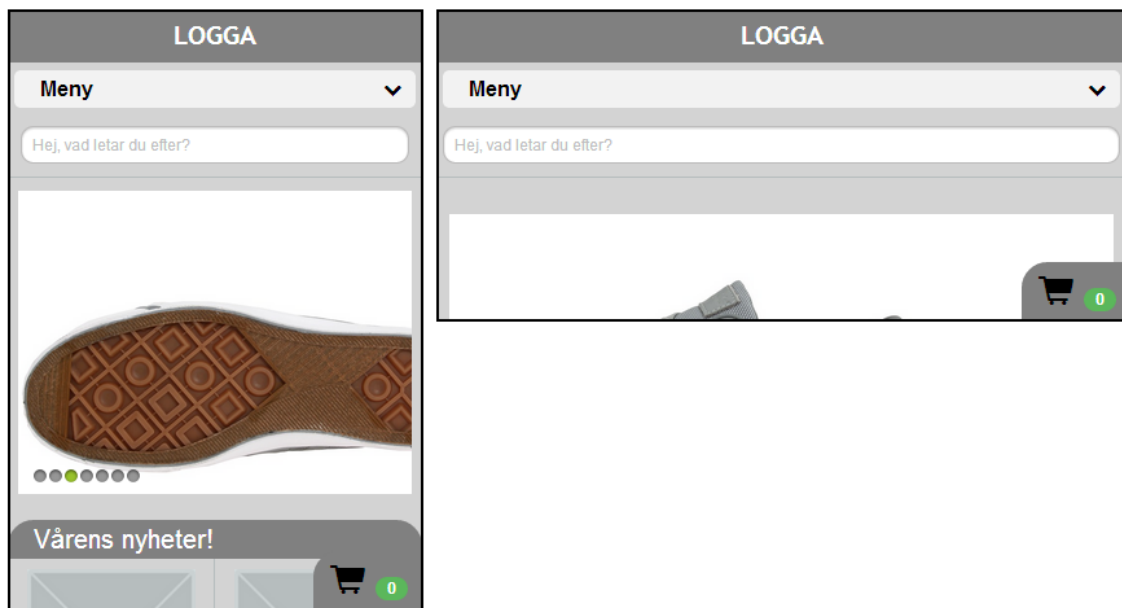


Figure 3.17: *Prototype 5 becomes prototype 8 when switching from portrait to landscape mode.*

3.3.6 Results of usability study 2

Background form

In this test the average participant was 26.5 years old and the rating for the participants experience with surfing on a smartphone, on a scale from 1-5, the average score was 4.25. 19/20 of the participants were smartphone owners and the one participant that was not a smartphone owner had been using one. 19/20 of the participants have been shopping online. The one that had not been shopping said that this was because of the safety and that he did not want to give away his credit card number. All the other 19 participants had used a computer for online shopping and only one of them had also been using a tablet for this purpose. No one of the participants had been using a smartphone to buy things online. 15/19 of the online shoppers have bought technology gadgets, 13/19 bought clothes and/or shoes. Other stuff that has been bought was furnishings, books, tickets and vitamins/supplements.

Five of the online shoppers buy things at least one time every month and 14 participants buy things at least once every half year.

Observations

There were two main things we noticed during the tests. The first thing was that many participants did not understand when the listing of the product reached the end, and they kept on scrolling for a while before they realized that they were at the end. The other thing

we noticed was that there were many of the participants who did not use the update button after they had changed the amount of products in the cart.

Debriefing questions

Portrait

1. *Did you notice that any button or text was too small?*

The answers we got on this question were that the icons on prototype 1 and 2 are too small. Some commented on that they would like more space between the subcategories in the menu. And one participant said that everything always feels a little bit small on a smartphone.

2. *Which prototype did you prefer in general? (see figure 3.1 and 3.2)*

Prototype 1: 0

Prototype 2: 9

Prototype 3: 1

Prototype 4: 10

Prototype 5: 0

3. *Which shopping cart did you prefer? (see figure 3.6)*

Prototype 1 & 2: 7

Prototype 3 & 4: 11

Prototype 5: 2

Many participants noticed the feedback when adding to cart and liked it. Some said that they noticed it but would like a little bit more blinking. One participant would like more and bigger feedback and another would like more feedback plus a notice close to the add-button that the product is added to the cart.

4. *Where in the shopping cart would you like to place the buttons for "Update" and "Empty Cart"? (see figure 3.6)*

Underneath the products: 9

Above the products: 5

One above and one underneath: 5

One participant thought that one above and one underneath would prevent the shopper for making mistakes by pressing the wrong button. Some participants said

that the buttons should be above (especially the empty bottom) because they did not want to scroll through the whole cart if they for example wanted to empty it.

5. *Which search did you prefer? (see figure 3.5)*

Prototype 1 & 2: 15

Prototype 3,4 and 5: 5

Some participants liked the search from prototype 1 and 2 the most but wants it to be displayed from the beginning as in the other three prototypes.

6. *Which menu did you prefer? (see figure 3.3 and 3.4)*

Prototype 1 & 2: 9

Prototype 3 & 4: 11

Prototype 5: 0

One participant commented on that he would prefer that the menu would slide in a little bit more on prototype 3 and 4.

7. *Do you have any ideas about how to make search, menu and shopping cart better?*

One participant wonders if all shoppers understand that the menu icon means menu, and thinks this should be improved in some way to make it clearer.

Another participant would prefer an update button on every item in cart instead of one for all the products because of the loading time.

A third participant commented that it would be good to have clickable plus and minus signs next to the quantity box in the cart.

We got another tip from one of the participants that the "Sale" category should be more highlighted in the menu since he thought many shoppers would look in this category first.

8. *What information would you like to be presented on the front page?*

Many participants answered that they would like to see campaigns, news and a banner that shows some inspiring pictures including the products the store provides to get some inspiration.

Some said that they wanted a search function to be displayed at once and others wanted to see the most popular products. One participant would like to see products recommended according to what the shopper have been looking at the

other times he/she visited the store. Another said that the menu should be displayed at once, and not hidden under an icon. We got the comment that it should be very clean not to display so much information from some participants.

9. *Did you prefer the products to be displayed as list or grid? (see figure 3.8)*

List: 18

Grid: 2

10. *When displaying the products as grid, would you prefer that each row displayed two products or one? (see figure 3.8)*

Two: 16

One: 4

One participant commented that the shopper had to scroll too much if it is just one product in a row.

11. *Do you want to see the subcategories directly or do you want to go through a category before the subcategories are displayed? (see figure 3.4)*

Only category first: 0

Subcategories at ones: 20

12. *Which product page did you prefer in general? (see figure 3.9)*

Product page 1: 14

Product page 2: 6

On this question we got two, very conflicting comments, one participant likes that the add-button is big on product page 1 and the other commented that the same button is too big.

13. *Which placement of the product title did you prefer? (see figure 3.9)*

Product page 1: 10

Product page 2: 10

14. *Which placement of the description did you prefer? (see figure 3.9)*

Product page 1: 11

15. *Do you want a box to change the quantity of products before adding to cart? (see figure 3.9)*

Yes: 17

No: 3

To this question most people thought that this box is needed if they buy products that a shopper use to buy more than one of. When buying shoes most people just want to buy one pair but if it is movie tickets the box should really be provided. Some said that they would like to have clickable plus and minus signs on the sides of the box for increasing or decreasing the amount of products before adding to cart.

16. *Do you want to see the delivery time and stock status? If yes, where would you like to find it? (see figure 3.9 for an example of how delivery time could be displayed)*

Yes: 20

Hidden under accordion menu: 8

Displayed directly on the page: 12

No: 0

One participant said that it is not super important to have information about delivery time and stock status, but it would be nice. Another participant thinks that an alternative would be to just tell the customer when a product is, or soon is, out of stock and a third participant would like to be able to get this information in the shopping cart so he can decide if he wants the whole order to be sent to him at once or if he would prefer to split it, if some of the products is out of stock he would not have to wait for the others.

17. *Do you prefer that specification, video, pdf and similar information is hidden underneath an accordion menu or do you prefer that they are displayed directly? (see figure 3.9)*

Accordion: 19

Displayed directly: 1

18. *Do you have any other ideas about how to make the product page better? (see figure 3.9)*

One participant wanted the share button to be replaced by individual button for each social media type (i.e. one button for Facebook another for Twitter).

Some participants felt that it would be nice to see pictures of what others who bought a certain product more have bought, similar product and products that fits well together with that product.

Landscape

1. *Did you feel that any button or text was too small?*

One participant wanted smaller pictures because she thought that she did not get an overview of the whole site when the pictures took up so much space.

One participant felt that the “bubbles” showing the subcategories in prototype 6 and 7 should be bigger.

2. *Which prototype did you prefer in general? (see figure 3.10 and 3.11)*

Prototype 6: 10

Prototype 7: 9 (7/9 would like it better if the header would take less space)

Prototype 8: 1

Many participants commented on that they thought that prototype 7 was bad because they felt the fixed header took up too much space on the screen. Some of those who thought this, thought that it would be acceptable to have a fixed header if the smaller or if they menu disappears when scrolling down.

One participant came up with the idea to have a “hide menu” button for prototype 7, which makes the usage of the page optimal and the menu easy accessible.

3. *Which shopping cart did you prefer? (see figure 3.12)*

Prototype 6 & 7: 17

Prototype 8: 3

Some participants felt that they wanted more feedback, close to the “add to cart”-button, when adding products to the cart.

4. *Which search did you prefer? (see figure 3.10)*

Prototype 6 & 7: 20

Prototype 8: 0

5. *Which menu did you prefer? (see figure 3.10 and 3.11)*
Prototype 6 & 7: 18
Prototype 8: 2

6. *Do you have any ideas about how to make search, menu and shopping cart better?*
Some participants wanted a landscape version that looked more like prototype 3 and 4.
Many participants would have liked to have a menu icon in the header of prototype 6 and 7, that if pressed shows/hides the menu bar.

7. *Did you prefer the products to be displayed as list or grid? (See figure 3.13)*
List: 3
Grid: 17

8. *When displaying the products as grid, was the amount of products in a row enough, too many or too less? (See figure 3.13)*
Enough: 20
To less: 0
To many: 0

9. *Which product page did you prefer in general? (See figure 3.14)*
Product page 3: 9
Product page 4: 11
Of the participants that preferred product page 4, some commented on that they did so because they liked that everything that had to do with adding to cart was displayed together.

10. *Which placement of the product title did you prefer? (See figure 3.14)*
Product page 3: 11
Product page 4: 9

11. *Which placement of the description did you prefer? (See figure 3.14)*
Product page 3: 13
Product page 4: 7

12. *Do you want a box to change the quantity of products before adding to cart? (See figure 3.14)*

Yes: 19

No: 1

13. *Do you have any ideas about how to make the product page better? (See figure 3.14)*

On product page 3, some participants felt it was too much space between the selection menus and the price.

One participant felt that the feedback on what picture the shopper currently was viewing was not enough. That participant also wanted to be able to see how many pictures there were in total (for example 3/7).

Another participant did not like that the shopper would have the opportunity to share the product through social media, and thought the product page would be better if we deleted this function.

14. *Did you think it would be natural to go from portrait to landscape in these cases?*

Prototype 1, 2 ---> Prototype 6, 7 (see figure 3.15)

Yes: 17

No: 3

The participants that answered no to this question thought that they menu should be exactly the same in landscape as it was in portrait.

Prototype 3, 4 ---> Prototype 6, 7 (see figure 3.16)

Yes: 14

No: 6

Many of the participants who answered yes to this question would have liked to add a search icon, as the one in prototype 2, in prototype 3 and 4. The ones who answered no thought that the landscape version should look more like or exactly like the portrait version.

Prototype 5 ---> Prototype 8 (see figure 3.17)

Yes: 20

No: 0

All of the participants answered yes to this question, but many of them felt like this change did not use the given space in a good way, when switched from portrait to landscape. Some participants even felt the change was boring.

3.3.7 Analysis of usability study 2

Which prototype do the participants prefer?

In portrait it was very clear that the participants did not prefer prototype 5, 1 or 3. Everyone except one participant did prefer to have a fixed menu at the top of the screen (see figure 3.18). To have easy access to all the functions when shopping on a smartphone is probably a very good idea since the user will spend money and therefore think it is important to have a good overview.

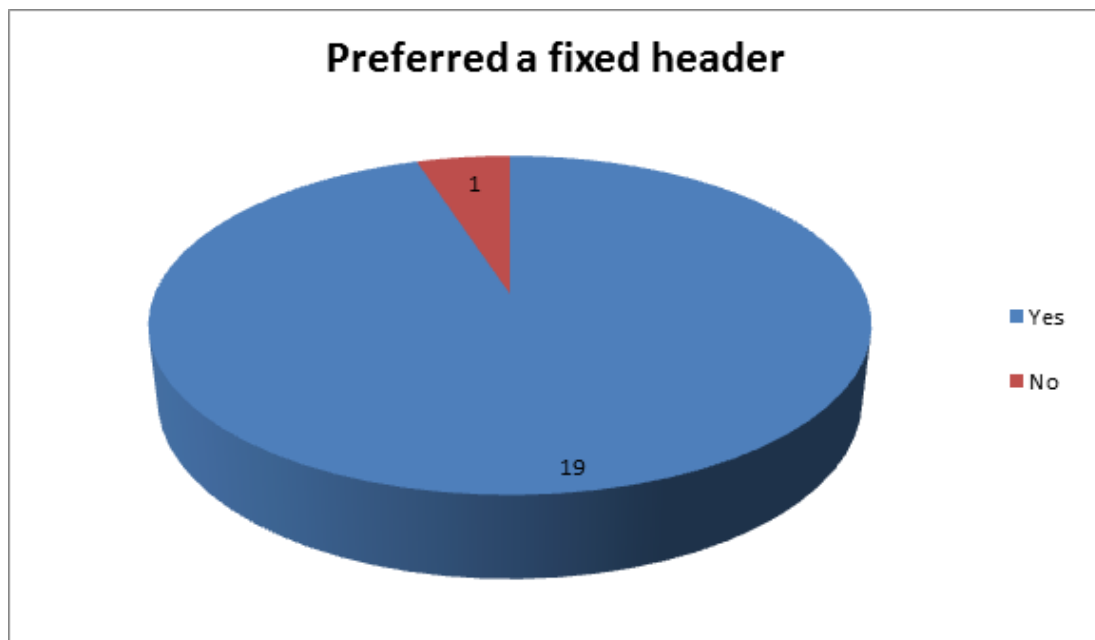


Figure 3.18: The diagram shows the distribution on how many that preferred a fixed header in portrait mode.

The scores for prototype 2 and 4 were very even. If we combine prototype 3 and 4, since they look the same, the scores add up to nine participants that preferred prototype 2 and eleven that preferred prototype 4 (see the prototypes discussed in figure 3.1 and the result from the tests in figure 3.19). If we look further more into the answers for the main functions in the prototypes we can see that it is eleven participants who said that they preferred the shopping cart of prototype 4 and only seven that preferred the shopping cart from prototype 2 (see figure 3.6). The scores does still not differ much but we have a

small lead for the prototype with a fixed menu with functions that slides in from the sides (see figure 3.3).

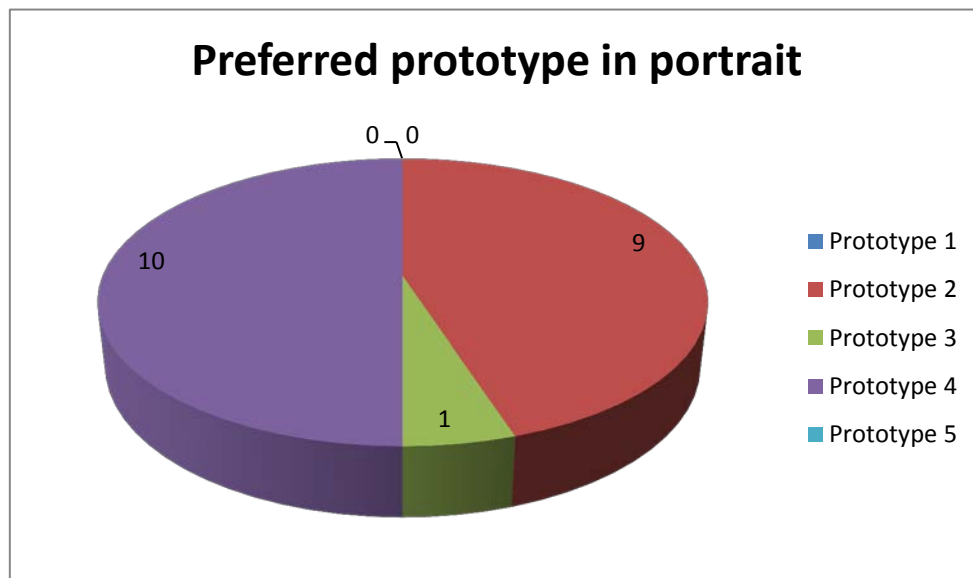


Figure 3.19: Shows the prototypes the participants preferred in portrait.

For listing the products on the page while using a smartphone in portrait (see figure 3.8), 18/20 participants preferred that the products were listed as in the list view. For displaying the products in grid, 16/20 participants would prefer to show two products on each row instead of one.

For the product page in portrait mode (see figure 3.9), 14/20 participants preferred product page 1. The comments we got was that they liked that the price and add-button was close to each other in this page.

The landscape version (see figure 3.10 and 3.11) that the participants liked the most stood between prototype 6 and 7. Only one participant preferred prototype 8 (see figure 3.20). The dilemma many participants had with prototype 7 was that the fixed menu used too much screen space. Many still liked to have the header fixed but with a solution that takes up less screen space.

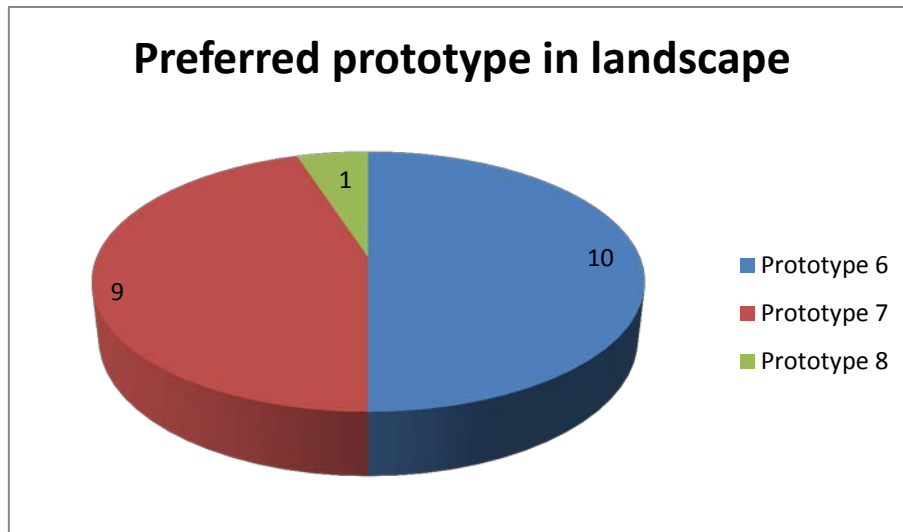


Figure 3.20: Shows the prototypes the participants preferred in landscape.

For displaying the products in landscape (see figure 3.13), 17/20 participants preferred the grid view more than the list view. In landscape there can be some space that feels unused while displaying the products in list and grid uses the horizontal space better.

As with a lot of things in this test the score was almost fifty-fifty for which product page in landscape mode (see figure 3.14) the participants preferred the most. Product page 4 got eleven votes and product page 3 got nine. Some commented that it was good to display everything that has to do with pictures at once and everything that has to do with adding to cart at once as in product page 4.

Would a certain prototype be better if we combined or changed a part of it with a solution of another prototype?

15/20 of the participants preferred when they could access the search function anywhere from the website, as in prototype 2 (see figure 3.5). But since many also preferred prototype 4 overall, they thought that it would be even better if we added a search icon in the header to the left of the cart in this prototype.

The placement of the product title on the product page (see figure 3.9) got the votes ten against ten for placing the title underneath or above the picture. Many did not see that the pages was different at all while testing the prototypes and did not notice it until we showed them the prototypes together on the widescreen monitor. We noticed that many participants did not see the title when using product page 1 because they just scrolled

down to the picture. Therefore we think it is better to have the title displayed underneath the picture close to the information and selections before adding to cart.

The participants would also like to add a quantity box at the page to make the page optimal.

For the product page when using the smartphone in landscape the placement of the title still got almost as many participants that preferred to have it underneath the picture as preferred it above. One said that he preferred it underneath in portrait and above in landscape. We think that it is too early to make this change in the layout. The title will be moved above the picture in some version of the page, maybe in the layout for tablets. But for the landscape version on a smartphone we still think that it is best to have the product title underneath the picture so the shopper does not miss it.

The biggest change the participants wanted to make in product page 4 was to move the description for the product, so it is visible direct at the page.

Is there anything else that needs to be changed with the prototype? (For example: Too big or small buttons/text)

The participants did not complain much about the size of buttons or text. Some participants thought that the icons in prototype 1 and 2 (see figure 3.1) were a little bit small and some that there could be a little bit more space between the subcategories in the menus (see figure 3.3). Some said that they pressed the wrong category and that this was their own fault. This was a very important comment since we never want the shopper to have the feeling that he/she has too big fingers or is clumsy. If there is a problem with size or lack of space, it can be fixed. It is never the user's fault since a good design prevents the users from making mistakes.

Is there a solution that is better that we have not thought about?

7/9 of the participants that preferred prototype 7 said that it would be better if there was a way to make the header smaller. Some of the examples were to have a menu icon to the left of the search field that if pressed would have displayed the menu bar. Another example was to have a "Hide/Show header" button somewhere at the top, which hides and shows the whole header. This solution could make the usage of the page optimal and the menu easy accessible. A drawback with this suggestion is that the user would not be able to see the feedback from the cart directly. But this can be fixed by using the feedback box shown in figure 3.7.

Maybe some of the participants that preferred prototype 6 would have liked prototype 7 more if we made any of these changes, since they clearly preferred to have a fixed header in portrait, where it did not use too much space.

Some participants would prefer to have a landscape version of prototype 3 and 4, but more participants preferred prototype 6 and 7. The participants who preferred prototype 3 and 4 in portrait and did not want a version that looked the same in landscape said that the space will not be used in an optimal way then. 14/20 thought that this change from portrait to landscape felt natural and logical. However there were six participants who thought it was unnatural and this we need to consider when we make our final design decisions.

Is there any function or information missing?

In the pilot test we did before we started with the real test, we noticed that we forgot to put information about stock status on the page, so we made a question about this in our debriefing questions and all the participants were in favor to have this information plus the information about delivery time. Eight participants thought that this information could be hidden under the accordion menu at the bottom of the page and twelve thought it would be better to have it displayed directly on the page.

In the tests conducted during our feasibility study we noticed that a filtering function was wanted by the users. This function had not been implemented for the prototypes we made but we think it is a nice function that is very good when looking for a product with, for example, a specific function or color. One reason for that no one of the participants mentioned this as a missing function in this test could have been that they never really were in a situation where such a function could have been of help for them.

We noticed during the tests that many of the participants did not understand when the listing of the products was at the end, therefore when the user reaches the end it needs to be indicated in some way.

3.3.8 Conclusions of usability study 2

Our results of which prototype in portrait that was the best one is very fifty-fifty between prototype 2 and 4, so our conclusion is that both of the layouts will work. The most important things are that there is a fixed header at the top of the page and that the main functions (menu, search and cart) are provided in this menu. Then if the functions are sliding in from the sides or drops down from the icons is just a matter of taste. A sketch of how one solution for the portrait mode might look like is shown in figure 3.21.

For the landscape version we need to make some bigger improvements and discuss different solutions before we make the final decision on how to make the final prototype better. Many participants said that they would like to be able to hide the menu under an icon in the header (see figure 3.23) and one user talked about a “Hide/Show header”

function (see figure 3.24). Maybe this idea that this one user thought about is the best way to do it, but other did not think about it because it is a bit “out of the box”. Before settling on a layout for the landscape version we need to look further into how the different browser works on different mobile devices. Since the one we used (Google Chrome on Samsung Galaxy II) had a fixed address field, we need to take this in consideration if it appears that more web browsers do the same.

During the tests we noticed that many participants did not use the update button after changing the amount of a product. One solution to this might be to have the update button inside the keyboard that appears when the user is to change the amount. We will have to look at if it is possible to make such a keyboard before deciding on a way to solve this problem. If this is not possible, we have to look more into how to give to shopper the best flow while interacting with the cart.

Where to place the different elements in the product pages is also mostly a matter of taste. Of course the placement has to provide a good flow and be placed logical. One comment that we did get more than once though, was that the price should be near the “add to cart” button. If we combined the participant’s favorite solution from our test results and make some compromises, the product pages will look like the pictures in figure 3.22. Though it is not sure that this will be the final layouts, we have to look more into the scores and consider what the companies that will buy the solution think is important.



Figure 3.21: Sketch of how the prototype in portrait will look like if we combine the results from the tests.



Figure 3.22: Sketch of how the product page would go from portrait to landscape if we combine the results from the tests.

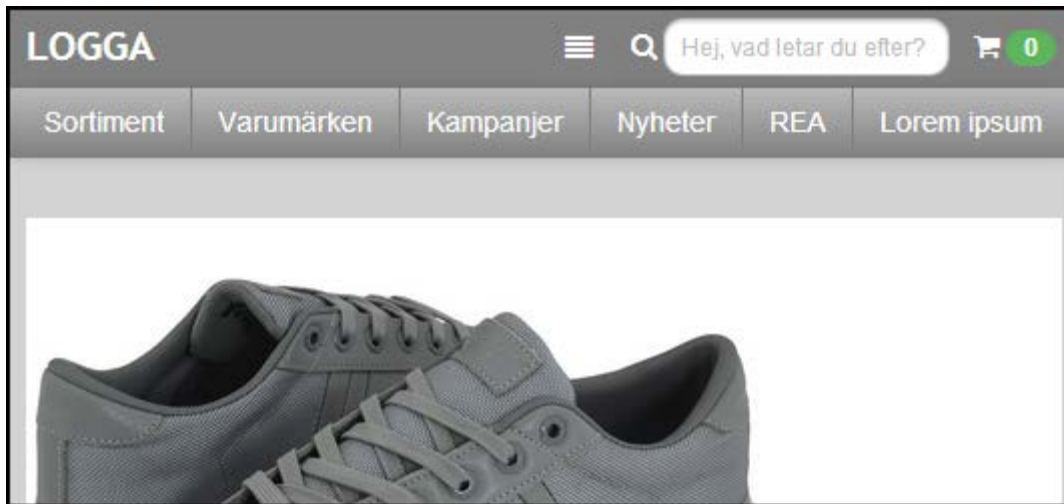


Figure 3.23: Sketch of how the landscape version might look like if we added a menu icon that shows/hides the menu bar, which in the figure is currently shown.



Figure 3.24: A sketch of how the landscape version might look like if we added a “Hide/Show header” function.

Recommendation for improvement

One improvement for this test would have been to merge the different layouts for portrait and landscape mode. Then the participant, in real time, could have got the feel of how it would be to switch from portrait to landscape and we could also have noticed if the participant would have any difficulties to find the different functions since the layout had changed.

While discussing the prototypes in the debriefing, it would have been good if we had at least three mobiles that the participant could have looked at for comparing the prototypes, instead of the widescreen monitor, or at least as a compliment to it. We noticed that it can

be hard for the participants to understand and remember what the prototypes actually looked like on the smartphone. Sometimes it felt like they liked a certain prototype because of its layout when shown on the computer but did not remember that they could not see as much of it in the mobile.

It would have been a good idea to make a landscape version of prototype 3 and 4, with the sliding menu and cart. This would have helped the participants to get a better understanding of what such a prototype would feel and look like and help them make up their mind when we asked if they thought that they would have preferred such a solution instead of the one presented in prototype 6 and 7

Limitations

To start with, one limitation of this test was that the prototypes were designed to work for every possible online shop. This is in practice impossible, since a website should be adapted to what product or service the site is selling to get the best possible layout. It matters a great deal if the online shop is selling clothes, technical gadgets or books, since the user wants different information when shopping different things. So to establish a layout that would work for all possible online shops is quite a hard task. It would be easier for us to know that kind of online shop we were testing on to get the most information out of the test.

Another limitation we faced during this test was that the mobile version of Google Chrome uses a fixed address field (see figure 3.25), which one could not get rid of. While designing the prototypes this was something that we had not thought about. The address field took up a lot of space, especially in landscape mode when the header was fixed (prototype 7). This caused many of the participants to dislike prototype 7.

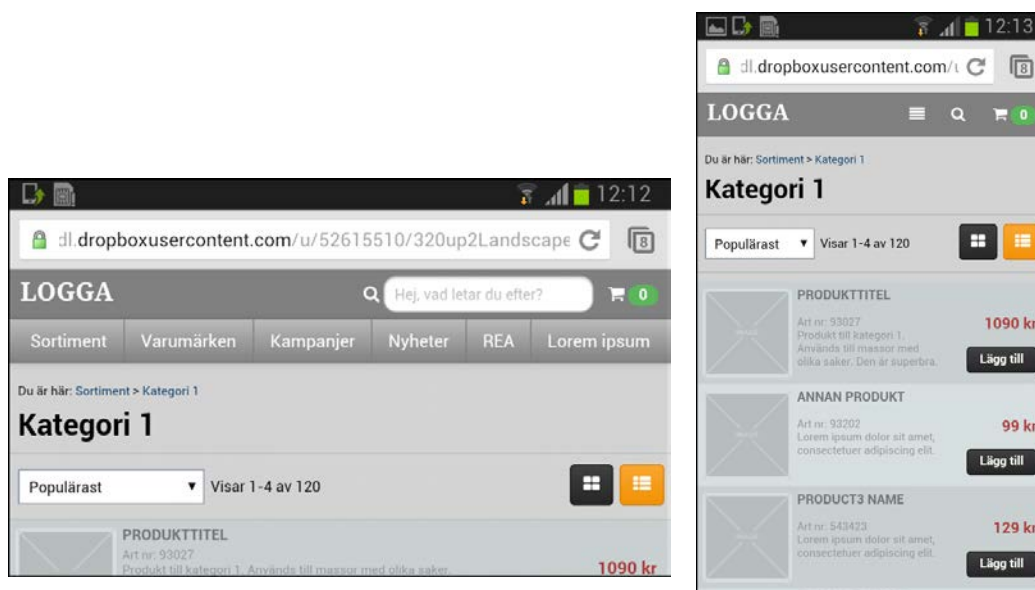


Figure 3.25: The mobile version of Google Chrome uses a fixed address field

3.4 Usability study 3 - The final prototype

The test plan together with the background form, orientation script, task scenarios and debriefing questions for this usability test can be found in appendix C.

3.4.1 Goal

The goal of this test was to test the final prototype we had constructed to get feedback on things that needs to be improved. We also wanted to see if the users understand the final design and if the changes made when changing from using a smartphone in portrait to landscape is okay and intuitive.

3.4.2 Research questions

The bulleted list below shows the questions that we were interested in finding out from the test.

- Does the layout feel intuitive?
- Where should the breakpoint be, 480px or 600px?
- What errors are made?
- What information is expected by the buyers when shopping via their smartphone/tablet?

3.4.3 Participant characteristics

For this test we will use five participants, two women and three men, with different ages and different backgrounds, who are potential online shoppers.

3.4.4 Method

Before the test, the participants are presented with a questionnaire, to let us know of their background and past experience with smartphones and online shopping.

The participants will test the following setups in different order:

- Smartphone: layout 1 in both portrait and landscape. (Setup A)
- Smartphone: layout 1 in portrait and layout 2 in landscape. (Setup B)
- Tablet: landscape layout 2 in both portrait and landscape. (Setup C)

For each setup the participant will be given a number of task scenarios to perform.

Table 3.1: Shows in which order the participants will test the different devices with the different layouts.

Participant	Setup order
P1	C B A
P2	B A C

P3	C B A
P4	B A C
P5	B A C

While the participants were testing information and statistics of errors and successful designs was gathered.

After the test session an interview took place between the test moderator and the participant where the participant had the opportunity to discuss and express their feelings by answering predetermined questions.

The test, from that the participant arrived until the subject answered our debriefing questions, took approximately 30 minutes.

3.4.5 Prototype

Below follows some pictures of the prototype in portrait and landscape mode so that the reader will get a better understanding of the analysis and conclusion in the end of this chapter.

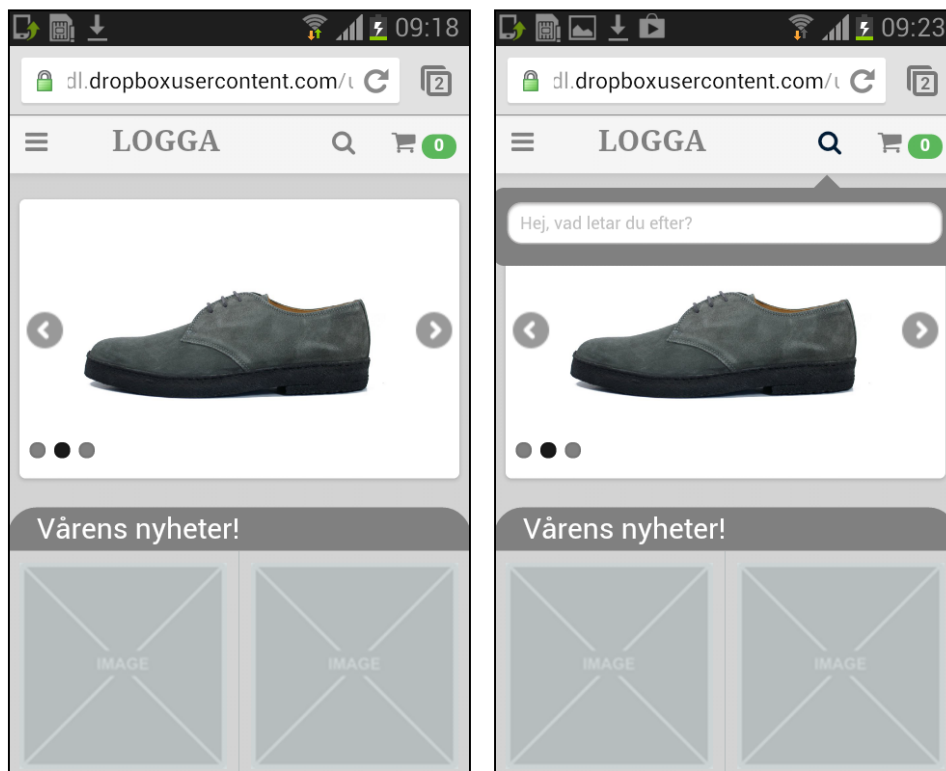


Figure 3.26: The front page viewed in portrait. To the right the search-function is displayed.

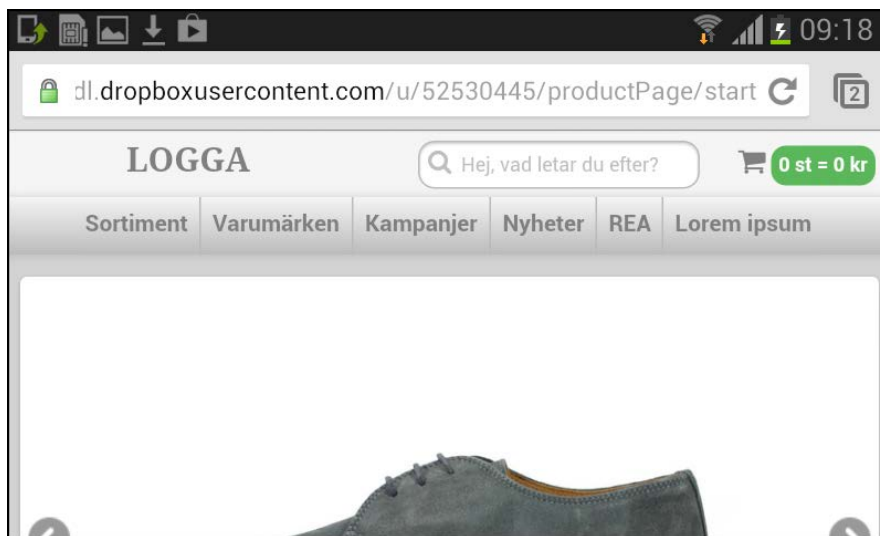


Figure 3.27: The front page viewed while using the smartphone in landscape.

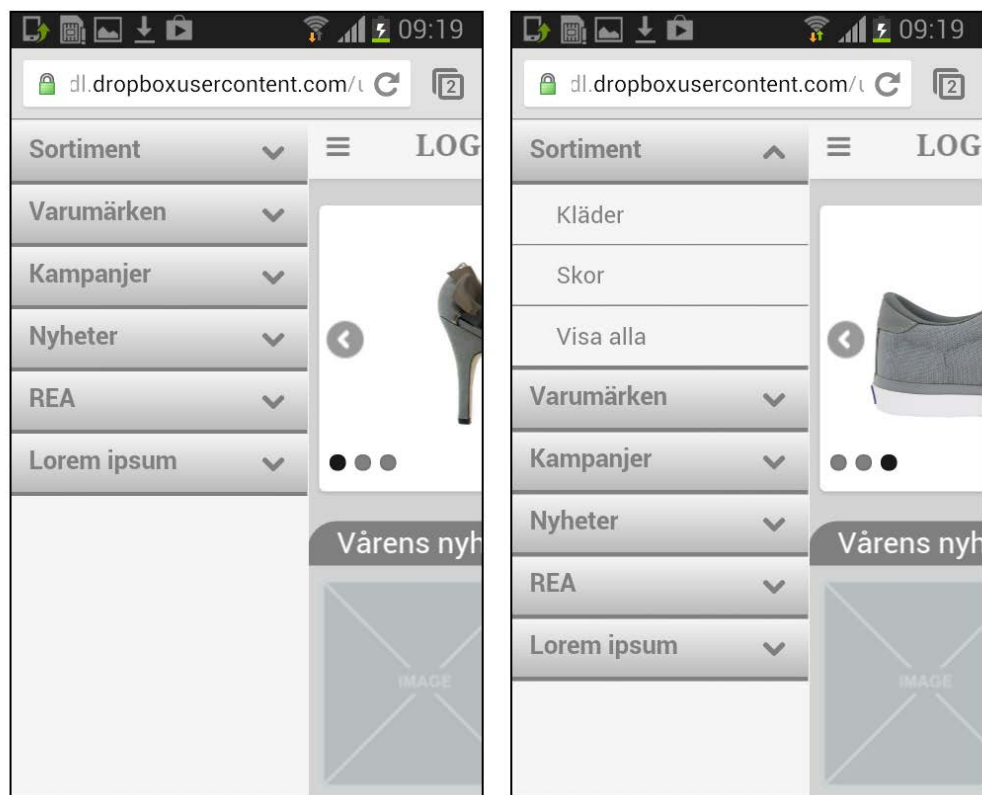


Figure 3.28: The menu while using the phone in portrait. To the right is the subcategories displayed.

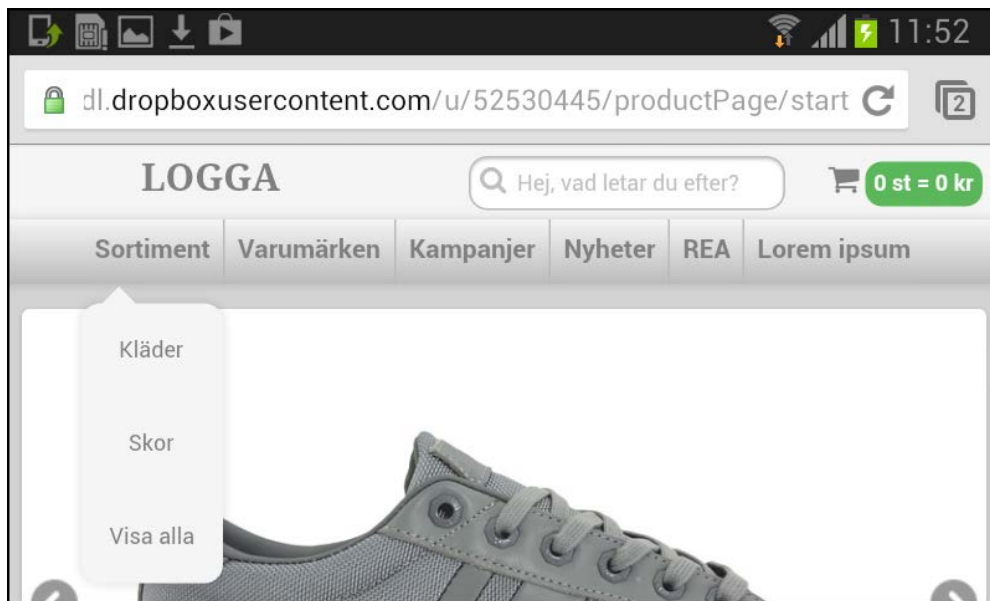


Figure 3.29: The subcategories displayed in landscape.

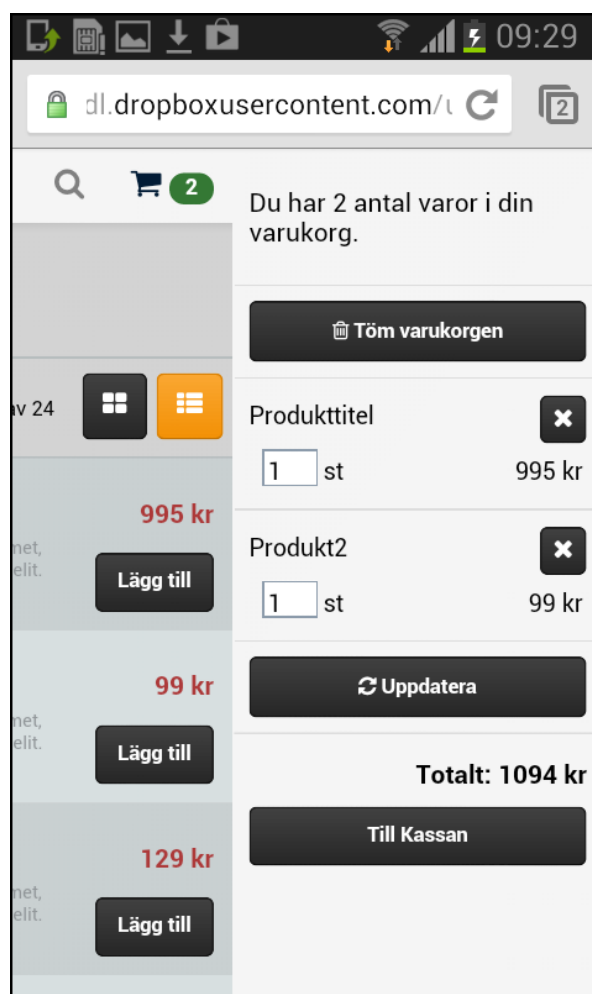


Figure 3.30: The shopping cart in portrait with two products in it.

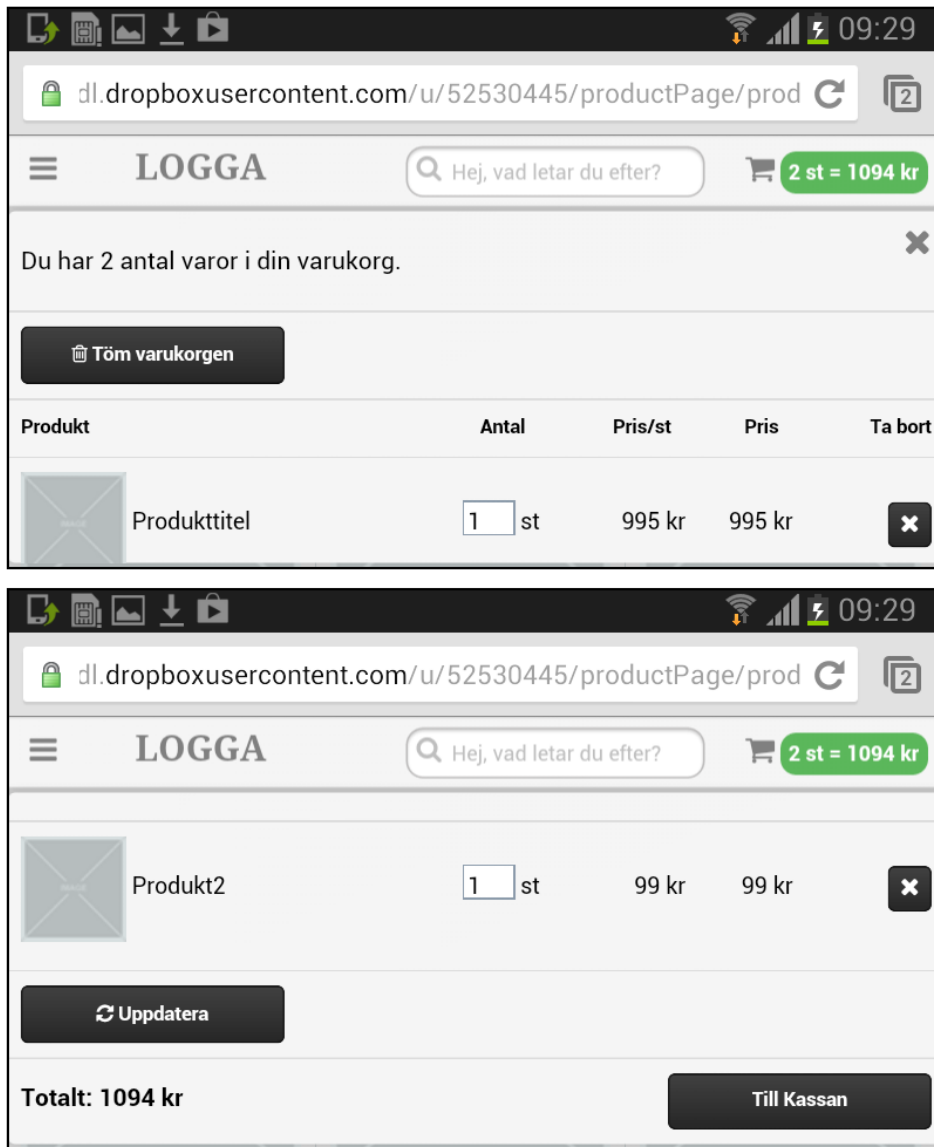


Figure 3.31: *The shopping cart in landscape with two products in it.*

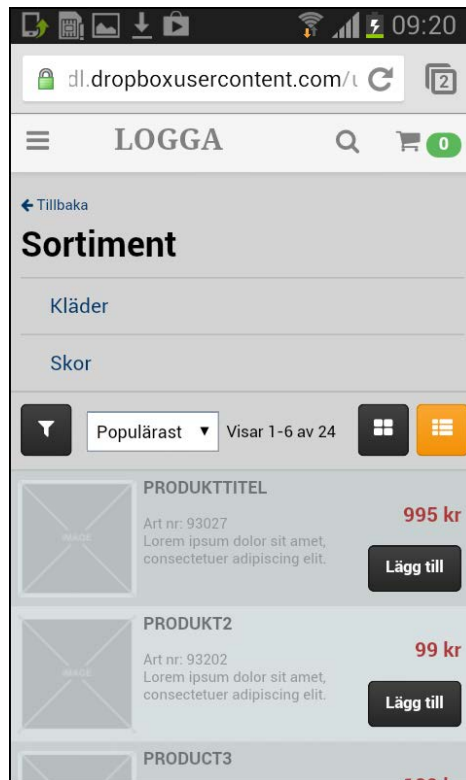


Figure 3.32: A category after a user pressed the “display all” subcategory.

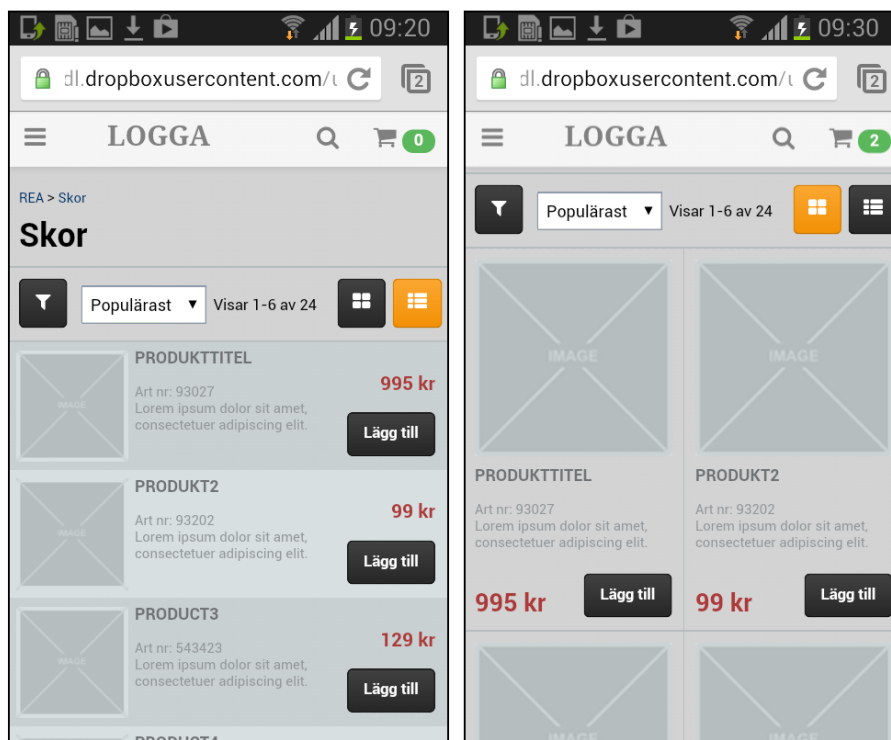


Figure 3.33: To the left is the standard product-listing in portrait. To the right is the grid view the user can choose to see the products listed in.

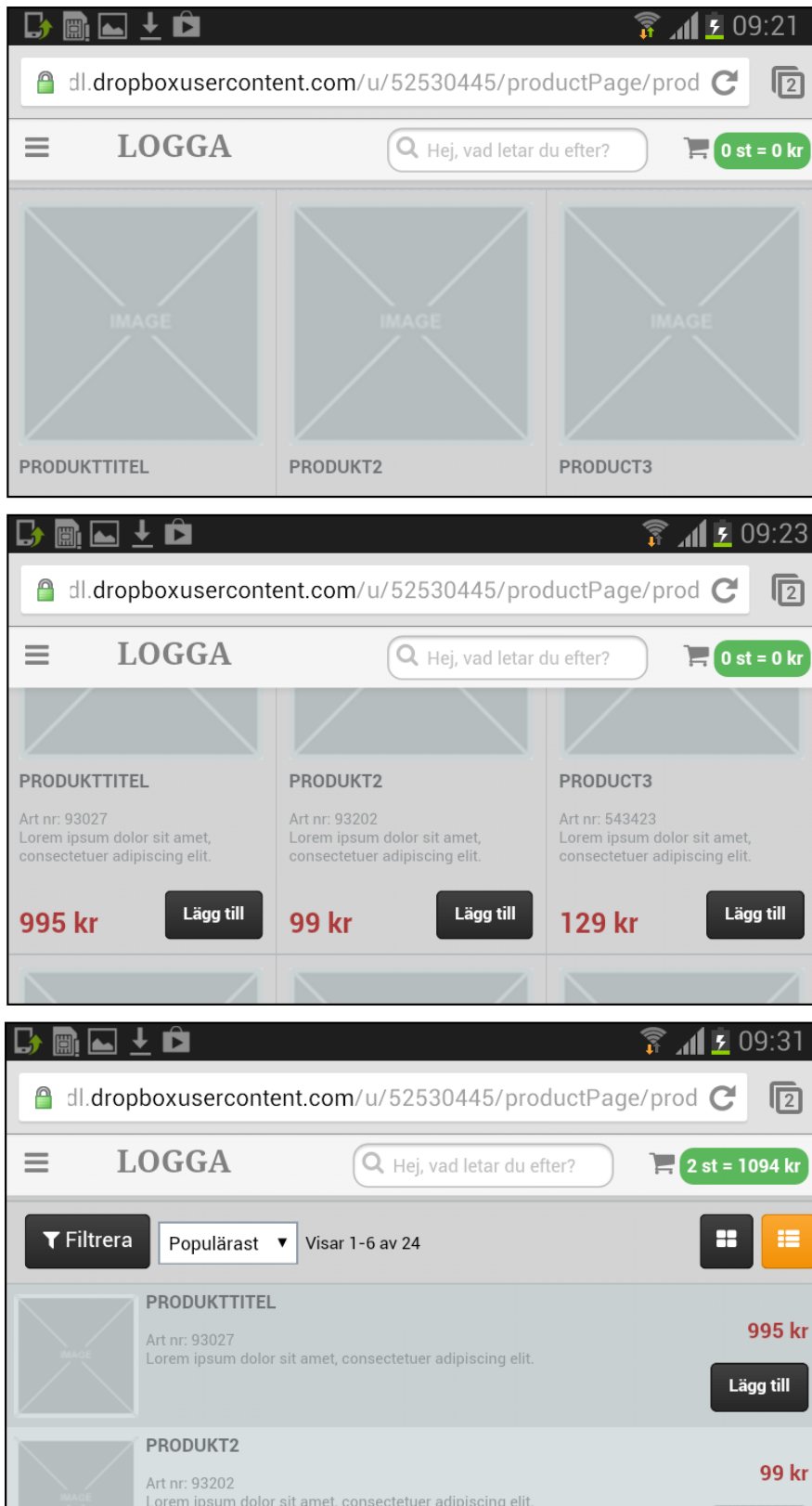


Figure 3.34: The two figures in the top displays the standard product listing for landscape. The one underneath displays how it looks like to view the products in a listed way.

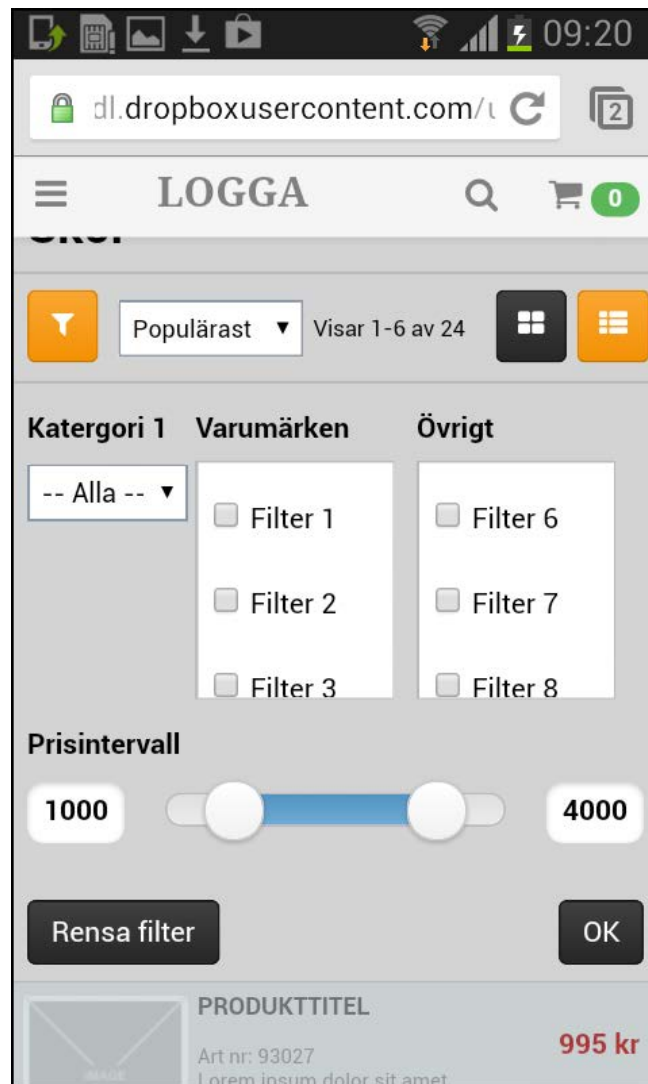


Figure 3.35: *If the user presses the filter button, this figure displays how it looks like in portrait.*

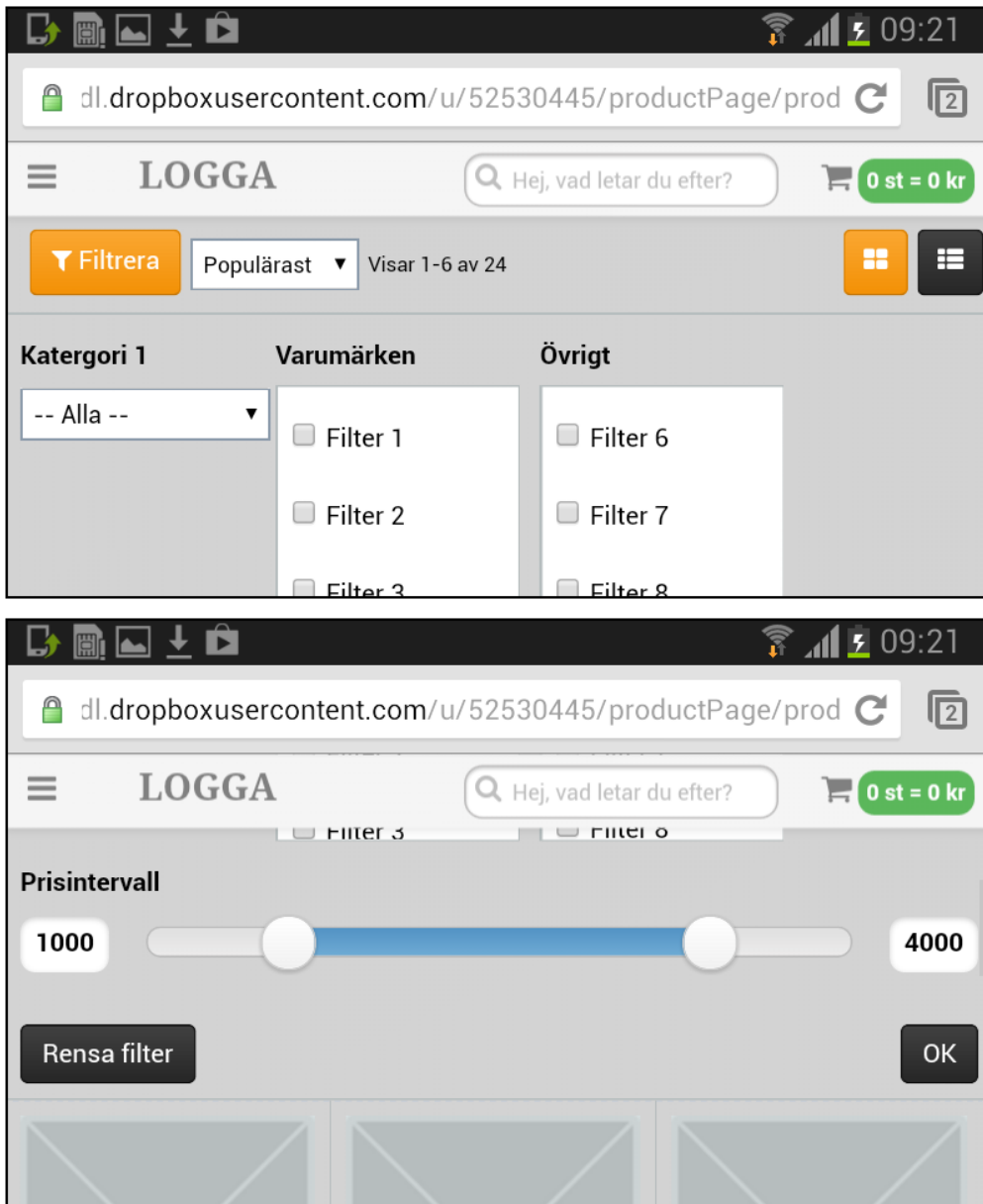


Figure 3.36: *If the user presses the filter button, this figure displays how it looks like in landscape.*

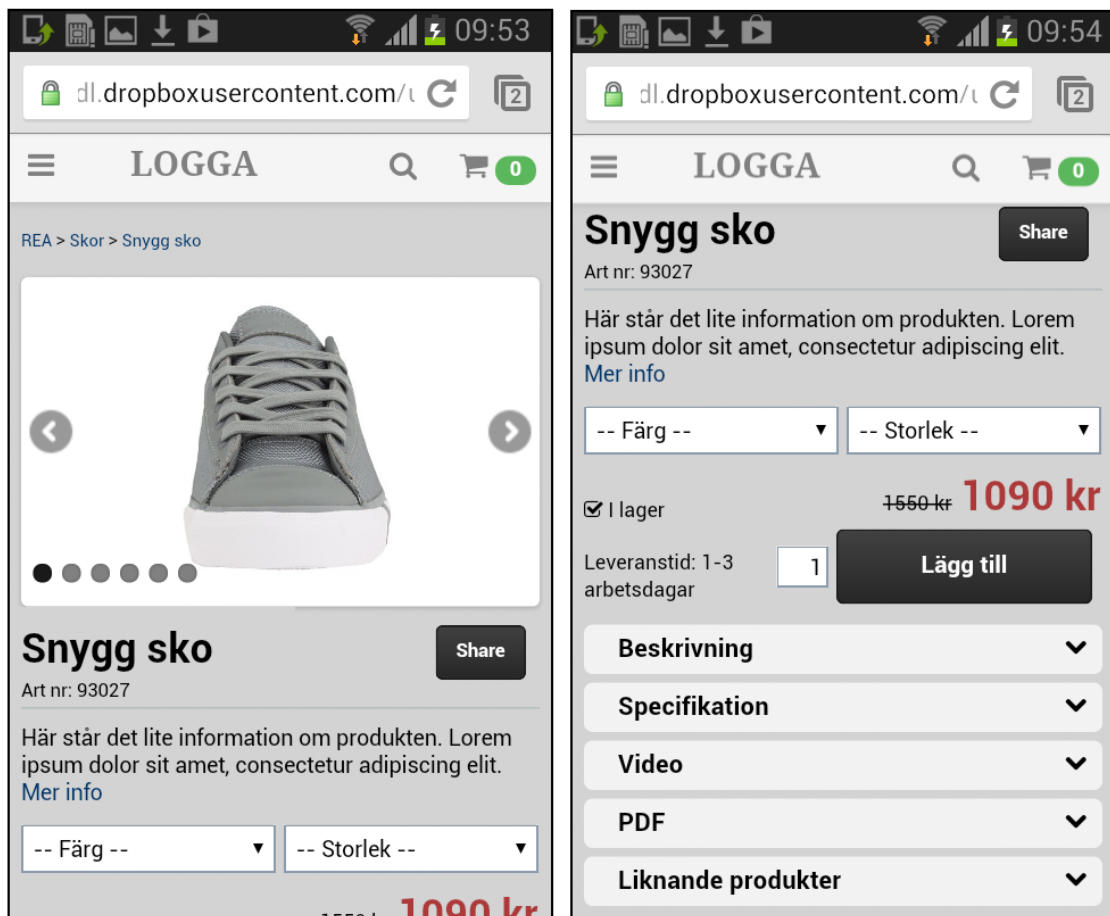


Figure 3.37: The product page in portrait.

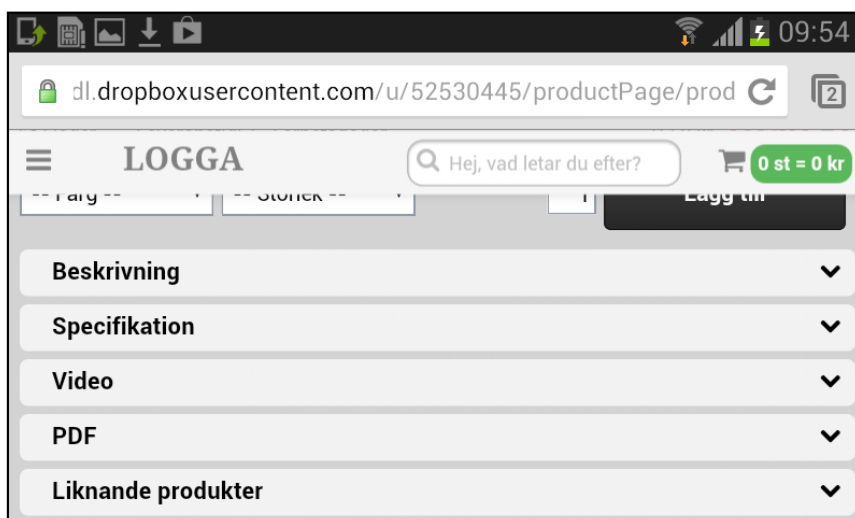
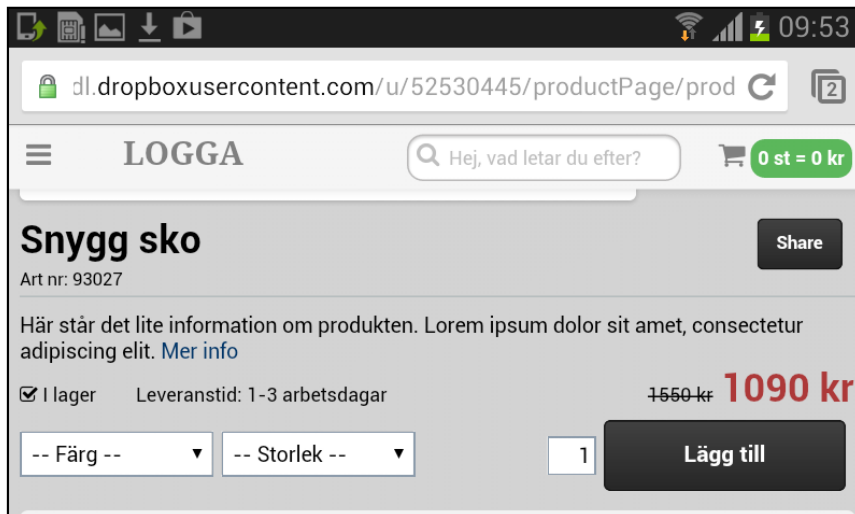
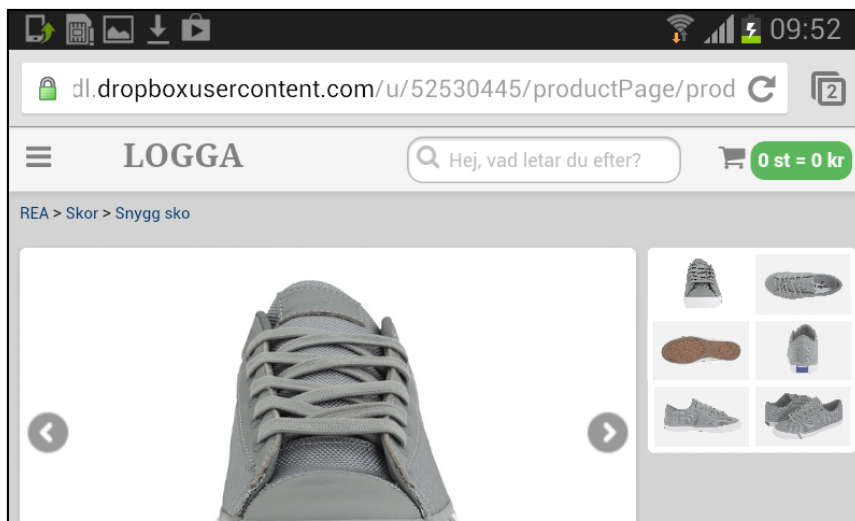


Figure 3.38: The product page in landscape.

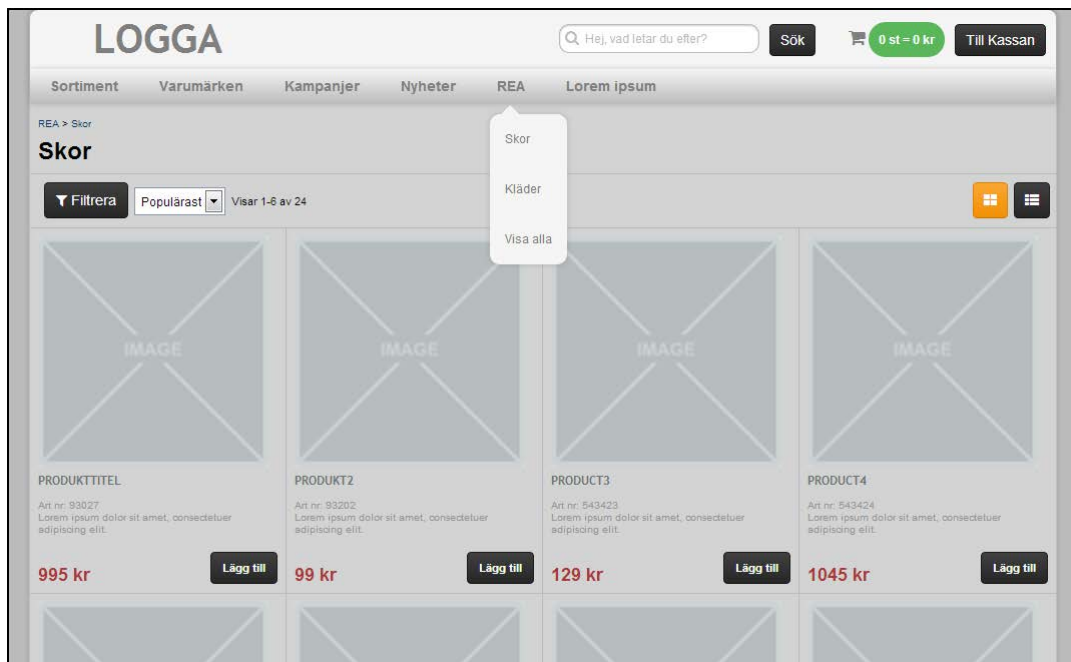


Figure 3.39: The prototype showed in full size.

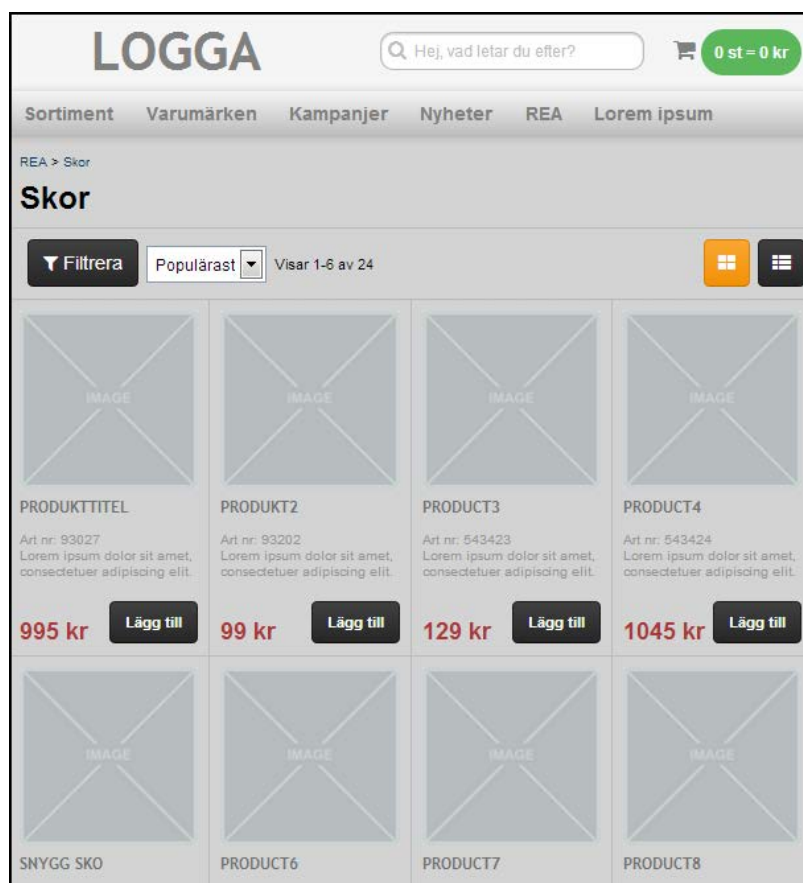


Figure 3.40: The prototype when hit the breakpoint of 600px (This view was never visible for the participants since it is too big for landscape on smartphone and too small for portrait on tablet).

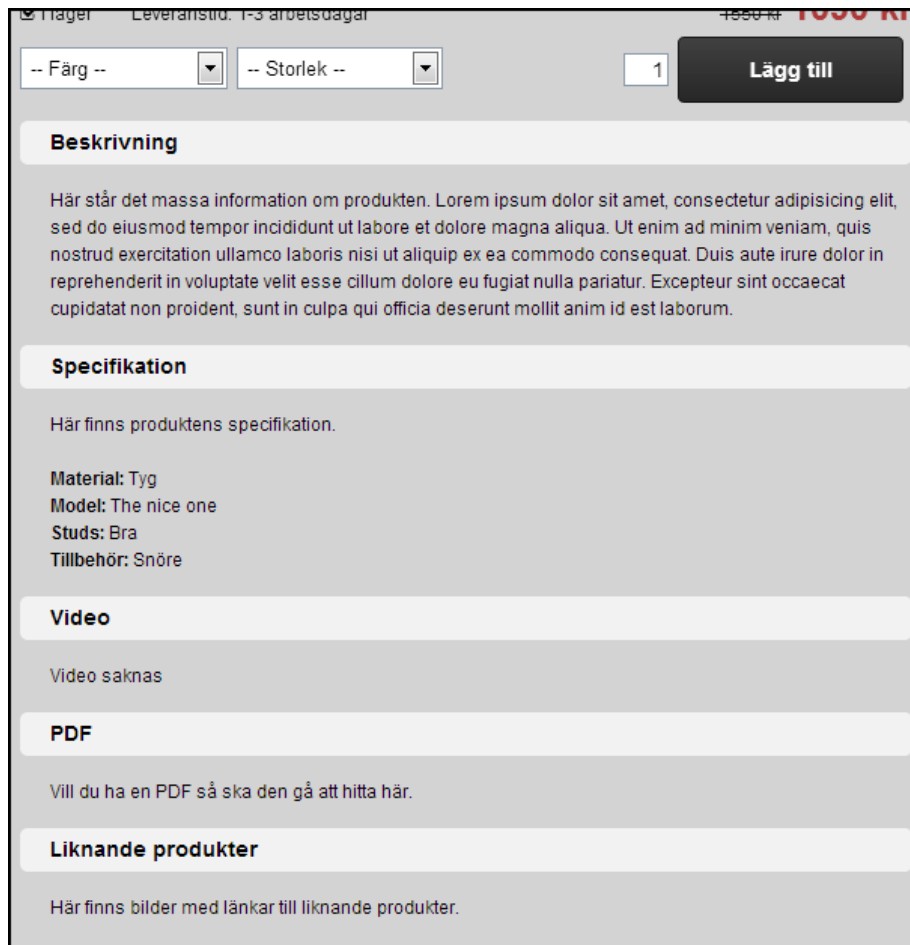


Figure 3.41: Shows that the tabs on the product page are open when a breakpoint of 600px is reached.

3.4.6 Results of usability study 3

Background form

Table 3.2: This table shows some background information about the participants.

Participant	Gender / Age	Smartphone experience	Tablet experience	Experience of surfing with smartphone	Experience of surfing with tablet
P1	M / 24	own one	own one	2	5
P2	M / 48	own one	has used one	2	2
P3	F / 54	own one	has never used one	2	1
P4	F / 22	own one	has used one	4	1
P5	M / 26	own one	has used one	4	2

All participants have been online shopping at some time. 4/5 shop online at least once every six months. One participant shop online once every month. When online shopping they all used a computer. Table 3.3 shows what devices the participants were willing to shop from. The participants that was not willing to shop from their smartphone, said it was because it felt too impulsive or that the screen was too small. The one participant what was not willing to shop from a tablet said this was because he did not own one.

Table 3.3: X marks what devices the participants were willing to shop from.

Participant	Computer	Tablet	Smartphone
P1	X	X	
P2	X		
P3	X	X	
P4	X	X	X
P5	X	X	X

When we asked what information and/or functions that are most important to have available when visiting an e-commerce site the answers were that the site should be intuitive, easy to navigate and to search on. It should also be easy to see what the site has to offer and possible for the user to sort and filter on products.

Table 3.4: The table shows individual and total scores for different elements on a product page rated by the participants. 1 is the most important and 9 is least important.

Rating	Element
8 + 5 + 1 + 2 + 1 = 17	Product picture
3 + 4 + 6 + 6 + 6 = 25	Stock status
4 + 3 + 4 + 7 + 7 = 25	Delivery
6 + 7 + 8 + 5 + 5 = 31	“Add to cart”-button
1 + 6 + 3 + 3 + 2 = 15	Price
5 + 2 + 2 + 8 + 3 = 20	Product description
2 + 1 + 7 + 1 + 4 = 15	Product name
9 + 9 + 9 + 9 + 9 = 45	“Share”-button
7 + 8 + 5 + 4 + 8 = 32	Options, such as color and size

Observations

Smartphone

Scenario 1

The participants had no bigger issues solving this scenario.

Scenario 2

One participant found it hard to find the menu. She had never seen the icon before and did not understand it. One participant complained about that he thought that “display all” should have been at the top of the categories.

Scenario 3

In this scenario many participants looked under the sorting function for the filter. They did not recognize the icon for the filter, but found it easier to understand when they held the smartphone in landscape mode. One participant clicked everywhere but the filter icon. Another participant clicked the filter icon almost at once since she felt that the filter usually can be found in that position, and by eliminating her choices she felt that there were no other options. We also got comments on that the input fields in the filter should be bigger.

Scenario 4

The participants had no bigger issues solving this scenario.

Scenario 5

One participant found it hard to understand how to close the cart when the smartphone was held in portrait mode and the cart was empty. She tried to click on everything but the cart icon.

Scenario 6

The participants had no bigger issues solving this scenario.

Scenario 7

Two participants commented that the total price should be close to the checkout button in landscape mode. They said it felt like they had to look for the total price.

Some said that they felt that it was annoying that the cart disappears when they switched from portrait to landscape and vice versa.

Tablet

Scenario 1

The participants had no bigger issues solving this scenario.

Scenario 2

We got comments that the text and buttons felt unnecessarily small and that everything that was clickable should indicate in some way that it is a button.

Here we also got the same comment as on the smartphone; that the “display all” should have been at the top of the categories.

Scenario 3

Some observations were the same as on smartphone; not as many as on smartphone but still some participants pressed the sort function when they looked for filter. We also got comments on that the input fields in the filter should be bigger. When checked the right filter options, one participant pressed the filter button (shows/hides filter) instead of the OK button in the filter. There was no feedback when adding a product to the cart if the user was scrolled down so that the header was not visible.

Scenario 4

The participants had no bigger issues solving this scenario.

Scenario 5

The participants had no bigger issues solving this scenario.

Scenario 6

One participant comments on that he would like to have “+” and “-” buttons to change the quantity of a product in the cart. One participant does not press the update button after changing the quantity. One participant commented on that the empty cart and update button should be right aligned since every other buttons is this.

Scenario 7

Two participants commented on that the total price should be close to the checkout button. They said it felt like they had to look for the total price.

Debriefing questions

1. *Did you notice that any button or text was too small?*

Two participants could not think of anything that was too small. Another participant said that some buttons should have colors to make them more visible.

This participant also said that all buttons always is too small on a smartphone and that a mouse and physical keyboard is always to prefer. Of the two participants that is left one thought that the menu categories and subcategories in the tablet was too small, the other one thought that everything was a bit too small on the tablet.

2. *Was there anything in the prototype that was complicated or hard to understand?*

Three of the participants said that the filter icon was hard to understand and wondered what it was on the icon and if it is common. Two of these three participants said that they preferred to move the drop down for the sort function into the filter and expand the “filter”-button so the text “Filter” fits into it. The other participant said that the design should stay the way it is now because the sort drop down is more useful on a smartphone and more advanced filtering would be done at the computer.

One participant said that nothing was hard to understand and the last participant had some problems to close the cart in portrait after she had emptied the cart.

3. *What is your opinion about that the menu changed when switching to landscape/portrait?*

Four of our participants liked this change. Though one said that it would be preferable to have the menu-icon visible all the time in landscape-mode. He said that the icon can look like it is not clickable but still be visible. One participant commented that the site is more usable because of the changes when switching between the two views.

The last participant did not like that the menu was hidden while in portrait and would prefer the landscape-look but with the buttons displayed underneath each other.

4. *What is your opinion about that the cart changed when switching to landscape/portrait?*

All the participants liked this change. One said that that she liked that it was more information in the landscape cart than in the other one where it is less space.

5. *What is your opinion about that search moved when switching to landscape/portrait?*

Four participants liked the change. They commented that the icon is well known.

One said that it was smart to hide the function under the icon and that it made the design cleaner. One participant would like the search field to be displayed as in the landscape mode even in portrait, since older people can have problems to understand the icon.

6. *What is your opinion about that the products were listed differently when switching to landscape/portrait?*

All the participants liked this change.

7. *What is your opinion about that the product page changed when switching to landscape/portrait?*

All the participants liked this change and only one commented that the picture should be smaller.

8. *Do you still agree on the order you ranked before about what is most important on the product side.*

One participant said that he only buys things for his work and for this kind of product he would like to have the product name and description over the picture. The other participants liked the product page as it was in the prototype. Even the participants who in the background form ranked “product picture” to an 8 said that he liked the prototype and would not like to change anything.

9. *If there were any device you before the test thought that you did not want to do online shopping from, have you changed your mind?*

One participant who in the background form said that he would not do any shopping from his smartphone said that he still thinks it feels more serious to shop on a tablet or a computer, but he also said that he could consider buying cheap things like movie tickets. But he also said that this is because his smartphone is not that good and would maybe change his mind if he had a better phone that he used more.

Another participant said that he would never buy from a tablet or smartphone himself because he wants to use a mouse and physical keyboard to interact on a website. But he also commented that his children often do his online shopping and he would let them shop for him from a tablet or smartphone.

A participant who in the background form answered that she would not shop online from smartphone before changed her mind after the test though she

discovered that she had no problem to see what is happening on the screen. The other two participants could already before the test consider doing online shopping from all the devices (computer, tablet and smartphone) and therefore they did not get this question.

3.4.7 Analysis of usability study 3

Does the layout feel intuitive?

Overall the participants understood the layout. There were only a few things that needed smaller improvements. The icon for filter was most complicated for the participants. The icon is not established yet and many thought it was hard to relate to it. Since the sort drop down also is a kind of filter this can be moved to under the filter button. This move will make more room for the filter button and therefore we could make it bigger and write "Filter" next to the icon. We think that the icon should still be there to help it get established.

Another way to solve this problem is to make two rows before the product listing. One with the information of how many products that are displayed together with the buttons for grid and list and another with the filter button, with both icon and text, and the sort drop down menu. Solving the problem in this way would not lose the fast access to the sort function. But on the other hand it can be confusing for the user to be displayed to many options at the same time on such a small screen.

One participant had a lot of problem when trying to close the cart after she emptied it, even if she had no problems to open it at first. Maybe it does not feel natural to everyone to close it via the cart button when it is empty. Maybe the cart should close itself after it is emptied and not be able to open if it is empty. An alternative way to close the cart would be to have a cancel cross in the upper right corner as in the landscape version, maybe this would seem more natural to people that is not that used to a smartphone.

Where should the breakpoint be, 480px or 600px?

From the comments at the debriefing questions we can make the conclusion that the breakpoint should be at 480px. The participants thought it was good and smart to use the space available in the best possible way. Only one had some problems to find the menu when it was hidden under an icon and therefore got a little confused when looking for the menu. No one else got confused while navigating in the menu system. But there were some comments that the menu icon should be visible even when in the top of the page in landscape. We thought that we could make the icon look unclickable in this state and

therefore always have it visible.

What errors are made?

From the observations we could only find two errors. The biggest error was the one with the filter, described above. Many participants pressed the sort drop down instead of the filter button. The other error was that one participant pressed the filter button (show/hide the filter) instead of the “OK”-button inside the filter, when done choosing filter options. A way to solve this problem would be to not have an “OK”-button, but rather let the site automatically update the product list while the filter options are made. Some users might be confused when they would not get the same confirmation on that their filtering choices has happened or not, since the screen is so small, the user probably just sees the filter alternatives and not the listed product underneath and therefore don't notice the feedback of the automate changes. In addition to this we also believe that when users actually make a purchase they will be more cautious of their actions and is less likely to miss the “OK”-button.

What information is expected by the buyers when shopping via their smartphone/tablet?

In the background form we asked what information and/or functions that is most important when the participant enters an online store. In both this test and the two earlier tests (see section 2.4 and 3.3) the search-function has always been a popular answer to this question. The range is also important and that the page is intuitive and easy to navigate.

We focused a little on the product page for this question and if we look at the background from and table 3.4 and then look at the element that got the most ones, the most twos and so on we can see that the order for what element is most important will be:

1. Product name, Product picture
2. Product description
3. Price
4. Delivery
5. Add to cart button
6. Stock status
7. Delivery
8. Options
9. Share

Hence the product name and the picture of the product got the same number of ones, we look at the total score and can then see that the product name got a lower score than the picture and can therefore be considered as more important. If we look further down the list we can see that delivery appears two times. It has got the most fours and the most sevens. As the fifth score for the delivery element is a three we therefore consider delivery to be a four more than a seven. The resulting list will therefore look as following:

1. Product name
2. Product picture
3. Product description
4. Price
5. Delivery
6. Add to cart button
7. Stock status
8. Options
9. Share

We think the list above proves that the design choices we made in the product page were correct. Maybe the product name should be above the picture but we think that would lead to that the user easily misses the name because he/she scrolls down. In our design the user will be reminded of the product name just before he/she decides to put it in the cart. Also one participant who gave a low score for the product picture in the background form said that he changed his mind after the test and preferred the product page as it was in the prototype.

3.4.8 Conclusions of usability study 3

Our conclusion is that the layout is overall intuitive and easy to navigate in. We have to make the filter button display "Filter" on it, otherwise many users will not understand it. The inside of the filter function also has to be improved. The options have to be bigger and we have to consider when we want the filter to update, automatic or after pressing a button. We have to consider if we would like to fix the closing of an empty cart problem, do we think there are users who will have this problem when shopping online or will this not be a problem when launching the site.

The cart needs to be improved in the landscape version since some of the participants thought that they could not find the total price at one but had to look for it. One way to make the total price more visible would be to make it bigger or to move it closer to the checkout button.

Recommendation for improvement

An improvement is always to use more participants. Although we could see some patterns in what the participants had problem with and not, it would be more noticeable with more participants and it would also be a form of confirmation on our conclusions.

Another improvement for this test is to make the prototype look more real by adding real product names and pictures of actual products. Also the filter could be more realistic with real filtering options instead of just “filter 1”, “filter 2” and so on.

Limitations

One limitation, same as in the previous test (see section 3.3), was the address field in the Google Chrome mobile browser, which is fixed on the top of the page at all time. The address field takes up a lot of space making the view on the screen a bit smaller than it really should look like. This could have caused the participants to have got the wrong impression of the prototype. But since we knew that Google Chrome is choosing to remove the fixation of the address field in newer versions (product forums Google, 2013), we chose to ignore this limitation.

Another limitation might have been that the different pages were not connected, for example if one item was added to the cart on one page and the user moves on the next page, the cart is emptied. This might have caused the participant to not be as free in their solving of a task as they might have been otherwise.

4 The final design choices

In this section we will bring up some suggestions for improvement on the prototype tested in section 3.4. In addition to these proposed improvements the final prototype will look as the one showed in section 3.4.5.

Since the users found it confusing that the menu-icon disappeared then they were on top of the page, we decided to make it visible but not clickable (see the upper left corner of figure 4.1)

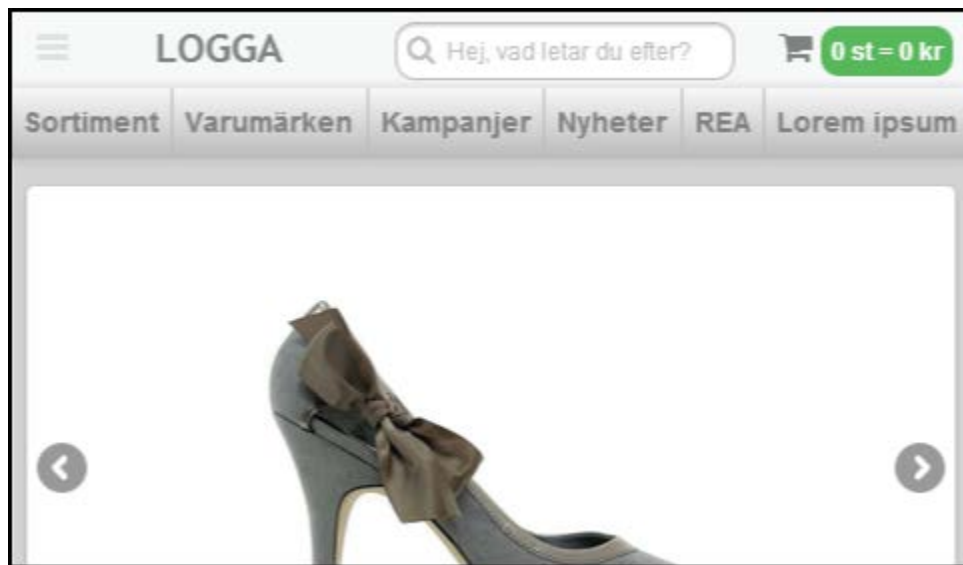


Figure 4.1: Shows the unclickable menu-icon in the upper left corner.

Another suggestion for improvement can be seen in figure 4.2. Since so many of the participants had problems with finding the filter in portrait we choose to add the text "Filter" next to the icon and move the sort function inside the filter. We chose between this way and of moving sort to a new row below. Both solutions would probably have worked but we decided to move the sort function inside the filter to minimize the impressions the user gets when surfing on a small screen such as on smartphones.

When the screen width increase the sort function can be moved out of the filter function since the space is available and it is a well-used function by users.

Inside the filter the different block elements has been moved around to make them larger and easier to understand.



Figure 4.2: Shows the filter function when opened.

When the participants used the prototype with a tablet they commented on that the buttons and especially the menu and submenu felt too small. Therefore the font and the buttons must be bigger when the site reaches the breakpoint of 600px.

Since there was one participant that found it hard to close the cart a “cancel cross” was added in the upper right corner of the cart in portrait mode (see figure 4.3). In addition, since there is a cross in the landscape version of the cart it seems natural to have one in portrait too.

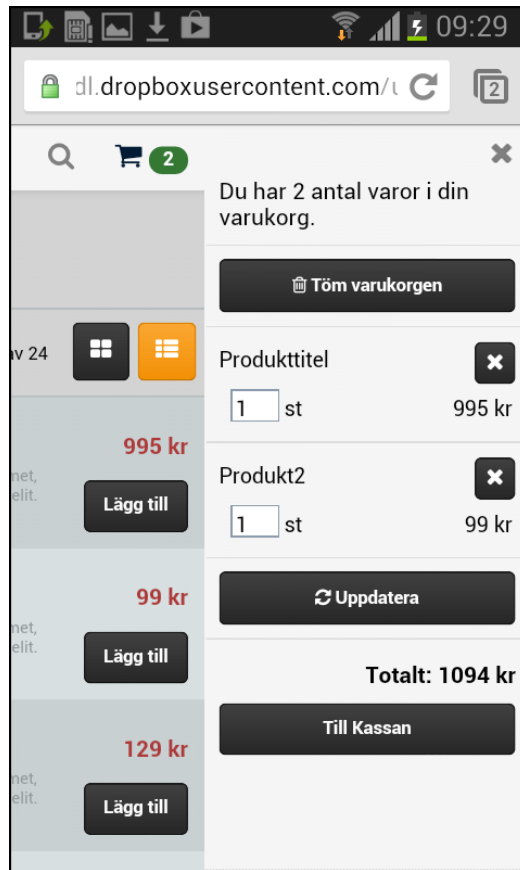


Figure 4.3: Shows the cross added in the upper right corner of the cart.

Since some of the participants in usability study 3 had problems finding the total price, we decided to move the price closer to the checkout button as seen in figure 4.4. Another way to do it would be to have it directly to the left side of the checkout button, but by putting it above the button it follows directly under the price columns in the above product list.

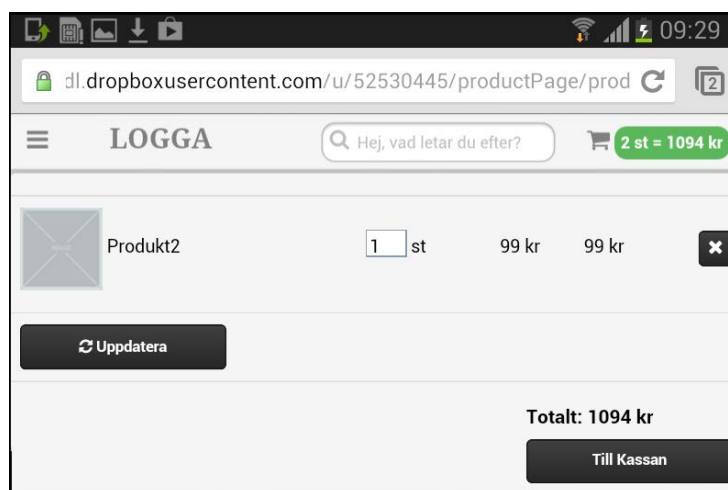
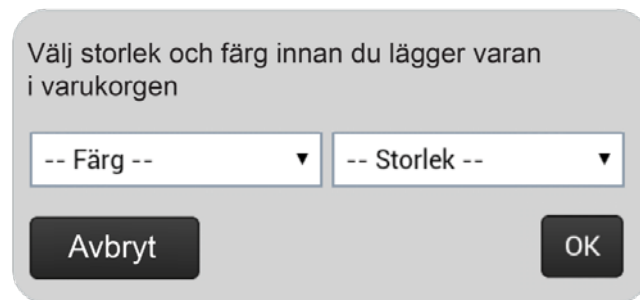


Figure 4.4: Shows the total price closer to the checkout button.

One last suggestion of improvement would be to have a popup like the one shown in figure 4.5, when the user add an item from the product listing that requires the user to specify options before it can be added. The design should be cohesive and not only have a “add to cart” button on the products that don’t need to be specified. This solution allows all products to have an “add to cart” button. Another solution would be to don’t have an “add to cart” button in the product listing at all. This would force the user to enter the product page before one can add a product.



Välj storlek och färg innan du lägger varan i varukorgen

-- Färg -- -- Storlek --

Avbryt OK

Figure 4.5: *Popup when adding a product from the product listing that needs to be specified.*

5 Discussion

What does online shopping behavior look like today, when using a smartphone/tablet?

In the first usability test that was conducted during the feasibility study we looked at shopping behavior at two existing e-commerce sites, one that was responsive and one that was not. Here the site that was not responsive had sorted the products much better and therefore some participants liked it more. Even if the responsive site had some problems in how they have sorted their products 14/19 of the participants was faster using this page. This indicates that a responsive page is easier to use on a smartphone even if the site is not good in other ways.

Is the market ready to shop via their smartphone and/or tablet?

In all three usability tests we have conducted the participants, 44 people in the ages 19-61, only one participant were not a smartphone owner. This tells us that the market at least exists.

All the participants have answered on the question which devices have been used for online shopping and only one participant had never been shopping online at all and all the other participants had been using a computer. Three participants have used a smartphone for online shopping and two have used a tablet. This tells us that it is not very common to shop using a smartphone or a tablet.

In usability test 1 and 3 we asked the participant if they were willing to shop online at a smartphone or a tablet. Altogether 16/24 participants were willing to shop from a smartphone and 21/24 from a tablet. This we think is a promising result for e-commerce on smartphone and tablet. Even if the participants right now have not used these devices for online shopping they could imagine doing it.

What information is expected by the buyer on a smartphone and on a tablet?

This question has been asked to all our participants during our first and third test and the final result is basically: Everything. The buyer wants the same functions that they are used to interact with on an e-commerce site on a computer. We think that the answers we got basically affect sites for both smartphones/tablets and computers.

As said in usability study 3 in section 3.4, the search function is a popular answer when asking for the most important function or information.

In the first usability test the participants said that good categories a good perspicuous is very important. There should be good pictures and relevant information on the items in product listing and also the price should be displayed in a way that the prices could be

compared easily. They also wanted good feedback when adding a product to the shopping cart. The only thing that could differ a little from a computer site is that there should not be too much information displayed at once. This tells us that all the information should be available but it can be hidden.

How does a full width site differ from a smartphone/tablet site?

While doing our feasibility study we wrote that “One thing to have in mind when developing a responsive website is that smartphone users and computer users often have different desires when visiting a website” after reading an article written in *Internetworld* by Torberger. This does not match our results from our tests and as said in the section above the users want the same things while shopping online on smartphones as on computers.

How should different elements be placed on a smartphone and on a tablet?

Main navigating system (shopping cart, menu, search)

When studying the data we got out of usability study 2 in section 3.3, we found out that a fixed header really is a feature that the users prefer since 19/20 out of the participants said that. This makes a quick access to all the navigating features and the user can always see the cart and get feedback on its status.

Another thing we came up with was that the shopping cart should definitely be in the top left corner and search and menu should also be in the header. We almost got a fifty-fifty score between two prototypes that had these functions in top. The only difference between those two was how they display the cart and the menu. This means that the ultimate design does not have to have menus that come in from the sides, this is only one way to do it. When the screen is 480px or wider the menu system will look different. This is because you should always use the space available as much as possible. And the design will look more and more like the desktop version. The menu system has 4 different breakpoints, the start is at 320px and the next change is made at 480px, after that a change is made at 600px and the last one, the full screen design, is at 768px. For pictures of the different breakpoints see figure 3.26 for 320px, figure 3.27 for 480px, figure 3.40 for 600px and figure 3.39 for 768px that can be found in section 3.4. The design for the breakpoint after 600px to 767px has not been tested since we did not have any device supporting this size. We have decided that we will like to keep it anyway and trust our design instincts that the site should use the space available as much as possible. The design for 768px and more has been tested and they look very similar, the only thing that differs is that there is a button for search and checkout in the full screen version. Since our focus

mainly have been to find a working design for smartphones, the design for 600px and up has been looked aside a bit when developing our solutions.

Product listing

This question was answered in usability study 2 in section 3.3 and was then confirmed by the usability study 3, section 3.4. Of the participants in usability study 2, 18/20 preferred to see the products in a list (see figure 3.33 in section 3.4) in portrait and 17/20 wanted the products to be displayed in grid (see figure 3.34 in section 3.4) when using the smartphone in landscape. All the users from usability study 3 confirmed this and liked that the products were listed in different ways in the different modes because it gave a much better overview of the products. The product listing has three breakpoints. The first one at 480px, when the products are arranged as three products in a row as grid instead as one in a row as list. The next breakpoint is at 600px, then it is four in a row instead of three.

Product page

We have done lots of tests to make the product page ultimate. First in usability study 2 we tested different solutions and then combined the best of this to a page. Then in usability study 3 we asked the participants, before they made the test, which functions and information that is most important.

The answers in usability study 3 confirmed that we made the correct priority for the different elements on this page.

The product page has three breakpoints. The first one is up to 479px (see figure 3.37 in section 3.4) then, when reached 480px, the layout changes and uses the space available (see figure 3.38 in section 3.4). When the screen is 600px or more we open up the menu with information about the products and make all information directly available to the buyer (see figure 3.41 in section 3.4).

6 Conclusions

A conclusion is that it is very hard to make one ultimate responsive design for general e-commerce site. Much depends on the products or services that will be sold at the site and the target group. As an example it is at some e-commerce sites pictures are very important, at others the information is more required. What we definitely can say about any e-commerce site, used via smartphones is that it should be easily perspicuous and don't present too much information at once. To get an easily perspicuous a fixed header is definitely to recommend. The placement of the cart should be in the upper right corner since the user has a learned behavior that it should be there.

To avoid a messy impression on a small screen it is a good idea to hide information underneath icons and/or buttons. When the screen becomes larger and the amount of space increases the information can be moved to be visible at all time.

Also the fact that the design should be a full responsive design complicates it a lot, therefore we have focused on the design for smartphones and not that much on the tablet design. We have learned that the users prefer the site to be as similar as possible all the time and want the page to look like the full screen page as soon as possible.

Another conclusion is that the work in this thesis project could be divided into several projects. Just designing a product page or the shopping cart in an ultimate way needs much testing and is a science in itself.

7 References

Joly, K. (Feb 2012). One design to rule them all - Responsive web design in higher education

jQuery. Retrieved 2013-06-05, from
<http://jquery.com/>

Marcotte E. (2009-03-03) *A List Apart, Fluid Grids*. Retrieved 2013-01-28, from:
<http://alistapart.com/article/fluidgrids>

Marcotte E. (2011-06-07) *A List Apart, Fluid Images*. Retrieved 2013-01-28, from:
<http://alistapart.com/article/fluid-images>

Marcotte E. (2010-05-25) *A List Apart, Responsive Web Design*. Retrieved 2013-01-25, from:
<http://alistapart.com/article/responsive-web-design>

Mozilla Developer Network. Retrieved 2013-01-25, from:
https://developer.mozilla.org/en-US/docs/CSS/Media_queries

Nimesh R. (2012-11-29) *1st Webdesigner, How Fluid Grids Work in Responsive Web Design*. Retrieved 2013-01-28, from:
<http://www.1stwebdesigner.com/tutorials/fluid-grids-in-responsive-design/>

Productforums Google (2013-04-11). Retrieved 2013-06-07, from:
http://productforums.google.com/forum/#!msg/chrome/I8h1hcO759o/Wtzu8R_95YYJ

Sass. Retrieved 2013-06-05, from
<http://sass-lang.com/>

Torberger P. (2012-04-20) *Internetworld*. Retrieved 2013-01-24, from:
<http://internetworld.idg.se/2.1006/1.444545/sa-funkar-responsiv-webbdesign>

W3C (2012-11-06) *W3C, CSS Grid Layout*. Retrieved 2013-01-28, from:
<http://www.w3.org/TR/2012/WD-css3-grid-layout-20121106/>

W3C (2012-06-19) *W3C, Media Queries*. Retrieved 2013-01-25, from:
www.w3.org/TR/css3-mediaqueries/

Wroblewski L. Ideation + Design (2010-06-04). Retrieved 2013-01-25, from:
<http://www.lukew.com/ff/entry.asp?1117>

Appendix A

Test plan

Responsive vs. unresponsive

Sanne Bengtsson

Maja Håkansson

2013-02-01

Goal

This test is a part of the Feasibility study for our master thesis. We will analyze how people uses e-commerce sites on their smartphone. We want to see the differences in usability and users attitude when using a responsive site versus an unresponsive site.

Research questions

- Are there any differences when shopping on a responsive and an unresponsive site?
- Does the user notice the difference between the two sites?
- Which site does the user prefer to shop on?
- Would the user like to shop on a smartphone at all?
If no: Why?
- Is there any function missing?

Participant characteristics

We want to use at least 10 participants, with different ages and different backgrounds, who are potential online shoppers.

Method

Before the test, the participants are presented with a questionnaire, to let us know of their background and past experience with smartphones and tablets and the websites used for this test. The participants will test two e-commerce sites each; *biltema.se* which is a responsive website and *kjell.com* which are not. We will make sure that the different users start with different websites.

During the test we will gather information and statistics of errors and successful designs. We will also gather information about the participants experience when shopping on the different websites when using a smartphone.

After the test session an interview will take place between the test moderator and the participant where the participant has the opportunity to discuss and express their feelings by answering predetermined questions.

The test, from that the participant arrive until the subject answered our debriefing questions, will take approximately 30 minutes.

Task list

The test will start with that the participant is presented with a smartphone with a start page for a e-commerce site on the screen. The user will go through the steps listed underneath two times on different sites.

1. Find specific items without using the search function and put it in the shopping cart
2. Look at the stored items and change the quantity of one specific item
3. Find specific items using the search function.
4. Delete one specific item.

Test environment, equipment and logistics

We will use the test lab on IKDC at *Lunds Tekniska Högskola* and its equipment. To carry out the tests, a smartphone with access to Wi-Fi will be used. The smartphone will be a Sony Ericsson Xperia Arc S2.

Test moderator role

In the beginning of the test the test moderator will clearly stress that it is the e-commerce sites we are testing and not the participant. If problems arise during the test it is the website that is the problem and not the participant.

The test moderator will give the participant instructions in form of a list of task scenarios to perform. The moderator will also be silent support during the test and cannot under any circumstances give leading information about how to solve a specific task. To get as

much data as possible about how the participant solves a task, he or she will be encouraged by the moderator to think aloud.

Data to be collected and evaluate measures

Data that will be collected are questions from the background form and debriefing, that then together with the video material will be used to analyze possible problems and approaches. This data will then be the basis for the conclusions we will make in our feasibility study.

Report content and presentation

The result of this test will be presented as a part of the feasibility study of our Master Thesis.

Task scenarios

www.biltema.se

1. Du håller på att renovera ditt badrum och behöver köpa en ny toalettstol. Du vill handla den på Biltema, men innan du kör dit vill du göra en inköpslista. Utan att använda sökfunktionen lägg till en toalettstol i din inköpslista.
2. När du är inne på biltemas sida kommer du osökt att tänka på att du behöver köpa lite prylar till din hund Nisse. Till exempel så har hundpåsarna och hundshampot tagit slut, dessutom behöver Nisse en ny hundbädd. Utan att använda sökfunktionen, lägg till dessa varor till din inköpslista.
3. Till renoveringen av badrummet behöver du även ett nytt vattenpass som är 120 cm. Genom att använda sökfunktionen lägg även till denna vara till din inköpslista.
4. När du shoppat ett tag kommer du att tänka på att du lika gärna kan köpa två hundshampor. Nisse blir ofta skitig och det tar därför ändå slut så snabbt. Ändra i din inköpslista till två hundshampor.
5. Vid närmare eftertanke känns det onödigt att köpa en ny hundbädd, den Nisse redan har duger ett år till. Ta bort den från inköpslistan.

www.kjell.com

1. Du är ute och surfar på Kjell och Co's hemsida för att köpa hem en ny dammsugarpåse. Utan att använda sökfunktionen lägg till i din varukorg, en dammsugarpåse som passar till din electrolux dammsugare.
2. Du har länge velat ha en trådlös vikbar mus och kommer att tänka på att Kjell & Co säljer sådana. Leta upp en sådan i vit, och lägg till den i din varukorg.
3. Vid närmare eftertanke känner du att du lika gärna kan köpa två dammsugarpåsar eftersom de ändå tar slut så snabbt. Ändra i din varukorg till två stycken

dammsugarpåsar.

4. Du kommer på att du behöver batterier till din nya datormus. Du har laddningsbara AA-batterier hemma, men har tappat bort din laddare. Genom att använda sökfunktionen, lägg till en batteriladdare för denna typ av batterier med en laddningstid på 2 h.

5. Under tiden du shoppar ringer din kompis och berättar att han hittat din batteriladdare hemma hos sig. Tur att du inte hunnit checka ut ännu. Ta bort batteriladdare igen.

Orientation script

Hej och tack för att du vill medverka i detta test. Testet går ut på att du kommer att få prova att handla förbestämda varor på två olika e-handelsidor på en smartphone.

Under testet kommer jag att finnas i rummet så om det är något du missuppfattat eller undrar över något så är det viktigt att du frågar. Då det är en undersökning är det tyvärr inte alltid jag kommer kunna svara på dina frågor men jag ska försöka så gott det går.

Testet kommer att filmas i undersökningssyfte och kommer endast att visas för oss som gör detta examensarbete samt inblandade på Avensia. Är detta okej med dig?

För att vi ska få ett hum om vad du har för tidigare erfarenheter av e-handel så kommer du innan testets början att få fyll i en enkät. Efter testet vill vi gärna att du besvarar några frågor om hur du upplevde e-handelsidorna och om det var några svårigheter vid användandet. Testet kommer att pågå i ungefär 30 minuter.

Du kommer att få uppgifter som består av scenarion på små lappar. Läs uppgifterna högt så vi vet att du läst hela uppgiften. Då du anser dig helt färdig med ett scenario ska du vända bort lappen och påbörja nästa.

Under testet gång ser vi gärna att du försöker tänka högt dvs förklara vad du gör och hur du tänker när du utför uppgifterna. Det gör det lättare för oss att förstå svårigheterna som kan uppstå.

Vi vill poängtera att det är e-handelsidorna och inte du som kommer att testas. Och kom ihåg att du när som helst kan välja att avbryta testet.

Har du några frågor innan vi sätter igång?

Bakgrundsformulär

1. Ålder: _____

Kvinna Man

2. Sysselsättning

Jobbar: _____

Studerar: _____

Annat: _____

3. För eventuell kontakt med fler frågor (ej obligatorisk)

E-mail: _____

4. Vad har du för erfarenhet av en smartphone?

Äger en Har använt en Har aldrig använt en

5. Vad har du för erfarenhet av en tablet?

Äger en Har använt en Har aldrig använt en

Ringa in den siffra som stämmer bäst överens, 1 är ingen vana alls och 5 är stor vana.

6. Hur stor vana har du av att surfa via en smartphone?

1 2 3 4 5

7. Hur stor vana har du av att surfa via en tablet?

1 2 3 4 5

8. Har du någon gång handlat online?

Ja Nej.

Om nej, varför inte? (Hoppa till fråga 12 på nästa sida efter du svarat på denna frågan)

9. Vilken/vilka enheter använder du för att handla online?

Dator Tablet Smartphone

Var god vänd

10. Ungefär hur ofta handlar du online? (Välj ett av nedanstående alternativ)

- Minst 1 gång varje vecka
- Minst 1 gång varje månad
- Minst 1 gång varje halvår
- Minst 1 gång varje år
- Färre än 1 gång varje år

11. Vad handlar du online? (Välj ett eller flera alternativ)

- Kläder/Skor
- Teknikprylar
- Inredning
- Annat: _____

Ringa in den siffra som stämmer bäst överens, 1 är ingen vana alls och 5 är stor vana.

12. Hur stor vana har du av att surfa på biltema.se (Biltema)

1 2 3 4 5

13. Hur stor vana har du av att surfa på kjell.com (Kjell & Co)

1 2 3 4 5

Tack för dina svar!

Debriefing

1. Vilken sida tyckte du var svårast att handla ifrån? Varför?
2. Vad upplevde du för skillnader på de två sidorna?
3. Vad var bra med biltemas sida?
4. Vad var mindre bra med biltemas sida?
5. Vad var bra med kjell & co?
6. Vad var mindre bra med kjell & co?
7. Vilken av dessa två hade du helst handlat ifrån?
8. Upplevde du att det var någon funktion som saknades på någon av sidorna?
9. Skulle du kunna tänka dig att handla från en smartphone? Varför/varför inte?
10. Vad skulle du vilja ha tillgång till för information om du skulle handla på en smartphone?
11. På en tablet? Varför/ varför inte?
12. Vet du vad responsive design är? (Om nej, förklara)
13. Kan du komma ihåg om någon av sidorna var responsive? Vilken/vilka?

Appendix B

Test plan

Prototypes of different design solutions

Sanne Bengtsson

Maja Håkansson

2013-04-05

Goal

This test is a very important part of our Master Thesis since we will test prototypes we have conducted and figure out which prototype users prefer and if they have any ideas how we can make it even better.

Research questions

- Which prototype dose the participants prefer?
- Would this prototype be better if we combined it or changed a part of it with a solution of another prototype?
- Is there anything else that needs to be changed with the prototype? (For example: Too big or small buttons)
- Is there a solution that is better that we have not thought about?
- Is there any function or information missing?

Participant characteristics

We want to use 20 participants, with different ages and different backgrounds, who are potential online shoppers.

Method

Before the test, the participants are presented with a questionnaire, to let us know of their background and past experience with smartphones and online shopping.

The participants will test three different portrait solutions for the placement of the “cart, menu, search” functions. Two of these solutions has two versions, one with a header that “follows” when scrolling and another with a header that stays at the top of the site.

They will also try two landscape solutions with the placement of the “cart, menu, search” functions in different ways. One of these also has two versions, one with a header that “follows” and one that stays.

There is two different solutions for the product site for both the portrait and landscape prototypes that also will be tested.

While the participants are testing we will gather information and statistics of errors and successful designs. We will also interview the participants frequently during the test. The interview gives the participants the opportunity to discuss and express their feelings by answering predetermined questions.

The test, from that the participant arrive until the subject finish the test will take approximately 40 minutes.

Task list

The test will start with that the participant is presented with a smartphone with prototype of a start page for a e-commerce site on the screen. The user will go through the steps listed underneath for five of the prototypes.

- Find search
- Find the menu
- Find the cart
- Go to Category 1
- Add the first and the last item in the list to the cart
- Change the quantity of some item in your cart
- Remove an item from your cart
- Display the items in another view
- Choose color and size before adding the product to the cart

Test environment, equipment and logistics

The test will be conducted in a room at IKDC at *Lunds Tekniska Högskola* and we will use a dictaphone to record what the participant says during the test. To carry out the tests, a smartphone with access to Wi-Fi will be used. The smartphone will be a Samsung Galaxy SII and we will use Chrome as browser.

Test moderator role

In the beginning of the test the test moderators will clearly stress that it is the prototypes that are tested and not the participant. If problems arise during the test it is the prototype that is the problem and not the participant.

The test moderators will give the participant instructions in form of a list of tasks to perform.

After the prototypes have been tested the moderators will discuss the prototypes with the participant.

Data to be collected and evaluate measures

Data that will be collected are questions from the background form and interviews, which then together with the notes we take during the test will be used to analyze possible problems and approaches. This data will then be the basis for the conclusions we will make in our analysis to make the best interface for shopping on a smartphone.

Report content and presentation

The result of this test will be presented as a part of the result of our Master Thesis.

Task list

	Prototyp	Prototyp	Prototyp	Prototyp	Prototyp	Prototyp
Hitta sök						
Hitta menyn						
Hitta varukorgen						
Gå till kategori 1						
Lägg till första och sista produkterna i listan						
Ändra antal av någon produkt du lagt till						
Ta bort produkt från varukorgen						
Visa produkterna i en annan vy						
Välj färg och storlek på en produkt innan du lägger till den						

Orientation script

Hej och tack för att du vill medverka i detta test. Testet går ut på att du kommer att få prova olika lösningar för hur en e-handelssida skulle kunna fungera på en smartphone.

Under testet kommer vi att finnas i rummet så om det är något du missuppfattat eller undrar över något så är det viktigt att du frågar. Då det är en undersökning är det tyvärr inte alltid jag kommer kunna svara på dina frågor men jag ska försöka så gott det går.

Under testet kommer ljud att spelas in i undersökningssyfte och kommer endast att användas av oss som gör detta examensarbete samt inblandade på Avensia.

För att vi ska få ett hum om vad du har för tidigare erfarenheter av e-handel så kommer du innan testets början att få fyll i en enkät. Efter testet vill vi gärna att du besvarar några frågor om hur du upplevde prototyperna och om det var några svårigheter vid användandet. Testet kommer att pågå i ungefär 40 minuter.

Du kommer att få uppgifter på en lapp som du kryssar alltefter du utför dem. När du gjort alla uppgifterna för en prototyp säg till oss.

Vi vill poängtera att det är prototyperna och inte du som kommer att testas. Och kom ihåg att du när som helst kan välja att avbryta testet.

Har du några frågor innan vi sätter igång?

Om du godkänner allt ovanstående har du möjlighet att vinna en iPad-mini.

Bakgrundsformulär

1. Ålder: _____

Kvinna Man

2. Sysselsättning

Jobbar: _____

Studerar: _____

Annat: _____

3. För eventuell kontakt med fler frågor (ej obligatorisk)

E-mail: _____

4. Vad har du för erfarenhet av en smartphone?

Äger en Har använt en Har aldrig använt en

5. Vad har du för erfarenhet av en tablet?

Äger en Har använt en Har aldrig använt en

Ringa in den siffra som stämmer bäst överens, 1 är ingen vana alls och 5 är stor vana.

6. Hur stor vana har du av att surfa via en smartphone?

1 2 3 4 5

7. Hur stor vana har du av att surfa via en tablet?

1 2 3 4 5

8. Har du någon gång handlat online?

Ja Nej.

Om nej, varför inte? (Hoppa till fråga 12 på nästa sida efter du svarat på denna frågan)

9. Vilken/vilka enheter använder du för att handla online?

Dator Tablet Smartphone

Var god vänd

10. Ungefär hur ofta handlar du online? (Välj ett av nedanstående alternativ)

- Minst 1 gång varje vecka
- Minst 1 gång varje månad
- Minst 1 gång varje halvår
- Minst 1 gång varje år
- Färre än 1 gång varje år

11. Vad handlar du online? (Välj ett eller flera alternativ)

- Kläder/Skor
- Teknikprylar
- Inredning
- Annat: _____

Tack för dina svar!

Debriefing

Portrait

Var någon knapp/text för stor eller för liten?

Vilken prototyp föredrog du i helhet?

1

2

3

4

5

Comments:

Vilken varukorg föredrog du? Var feedbacken tillräcklig när du la till en vara?

1,2

3,4

5

Comments:

Vart vill du placera "Uppdatera" och "Töm hela varukorgen"?

Comments:

Vilken sök föredrog du?

1,2

3,4,5

Comments:

Vilken meny föredrog du?

1,2

3,4

5

Comments:

Har du något annat förslag på hur varukrg-meny-sök skulle kunna se ut?

Vad vill du få för information på startsidan?

Hur föredrog du att produkterna visades?

Lista

Grid

Comments:

Skulle du vilja se två produkter i rad istället för en när i "grid"? Då blir bilderna lite mindre.

JA

NEJ

Vilken sätt att komma till sortimentsidan föredrog du?

1,2,3,4

5

Comments:

Vilken produktsida föredrog du i helhet?

1

3

Comments:

Placering av Produkttitel?

1

3

Comments:

Placering av beskrivning för produkten?

1

3

Comments:

Antalknapp eller ej?

Ja

Nej

Comments:

Leveranstid och lagerstatus?

Comments:

Överig info i flikar, är det bra, annan idé?

Ja

Nej

Annat:

Har du något annat förslag på hur produktsidan skulle kunna se ut?

Landscape

Var någon knapp/text för stor eller för liten?

Vilken prototyp föredrog du i helhet?

6

7

8

Comments:

Vilken varukorg föredrog du? Var feedbacken tillräcklig när du la till en vara?

6,7

8

Comments:

Vilken sök föredrog du?

6,7

8

Comments:

Vilken meny föredrog du?

6,7

8

Comments:

Har du något annat förslag på hur varukrg-meny-sök skulle kunna se ut i landscape, (om sliders gillades innan, skulle de vilja ha sliders i landscape med? Platta?)?

Hur föredrog du att produkterna visades?

Lista

Grid

Comments:

Visades det för få/många produkter i rad vid "grid"?

JA

NEJ

Vilken produktsida föredrog du i helhet?

6,7

8

Comments:

Placering av Produkttitel?

6,7

8

Comments:

Placering av beskrivning för produkten?

6,7

8

Comments:

Antalknapp eller ej?

Ja

Nej

Comments:

Leveranstid och lagerstatus?

Comments:

Överig info i flikar, är det bra, annan idé?

Ja

Nej

Annat:

Har du något annat förslag på hur produktsidan skulle kunna se ut?

Allmänt Portrait & Landscape

Tror du det skulle kännas naturligt att gå från portrait till Landscape

1,2 ---> 6,7

Comments:

3,4 ---> 6,7

Comments:

5 ---> 8

Comments:

Appendix C

Test plan

The Final Prototype

Sanne Bengtsson

Maja Håkansson

2013-05-14

Goal

The goal for this test is to find out if the responsive design solutions we have made is working.

Research questions

- Does the layout feel intuitive?
- Where should the breakpoint be, 480px or 600px?
- What errors are made?
- What information is expected by the buyers when shopping via their smartphone/tablet?
-

Participant characteristics

For this test we will use six participants, three women and three men, with different ages and different backgrounds, who are potential online shoppers.

Method

Before the test, the participants are presented with a questionnaire, to let us know of their background and past experience with smartphones and online shopping.

The participants will test the following setups in different order:

- Smartphone: layout 1 in both portrait and landscape. (Setup A)
- Smartphone: layout 1 in portrait and layout 2 in landscape. (Setup B)

- Tablet: landscape layout 2 in both portrait and landscape. (Setup C)

For each setup the participant will be given a number task scenarios to perform.

Table 1: Shows in which order the participants will test the different devices with the different layouts.

Participant	Setup order
P1	C B A
P2	B A C
P3	C B A
P4	B A C
P5	B A C

While the participants are testing we will gather information and statistics of errors and successful designs.

After the test session an interview will take place between the test moderator and the participant where the participant has the opportunity to discuss and express their feelings by answering predetermined questions.

The test, from that the participant arrive until the subject answered our debriefing questions, will take approximately 30 minutes.

Task list

The test will start with that the participant is presented with a smartphone or tablet with a prototype of a start page for an e-commerce site on the screen. The user will go through the steps listed underneath when using both smartphone and tablet.

- Find specific items without using the search function and put it in the shopping cart
- Look at a product page for a specific product.
- Look at the stored items and change the quantity of one specific item.
- Find the search function.
- Filter on a specific category.
- Delete one specific item.

Test environment, equipment and logistics

We will use the test lab on IKDC at *Lunds Tekniska Högskola* and its equipment. To carry out the tests, a smartphone and a tablet with access to Wi-Fi will be used. The smartphone

will be a Samsung Galaxy S2 and the tablet will be a Samsung Galaxy Tab 8.9. We will use Chrome as web browser.

Test moderator role

In the beginning of the test the test moderator will clearly stress that it is a prototype of an e-commerce sites that are tested and not the participant. If problems arise during the test it is the prototype that is the problem and not the participant.

The test moderator will give the participant instructions in form of a list of task scenarios to perform. The moderator will also be silent support during the test and will try as far as possible not to give leading information about how to solve a specific task. To get as much data as possible about how the participant solves a task, he or she will be encouraged by the moderator to think aloud.

Data to be collected and evaluate measures

Data that will be collected are questions from the background form and debriefing, which then together with the video material will be used to analyze possible problems and approaches. This data will then be the basis for the conclusions we will make in our Master Thesis.

Report content and presentation

The result of this test will be presented as a part of the result of our Master Thesis.

Task scenarios

1. Du sitter på bussen och surfar på en onlinebutik i din smartphone/tablet. Du vill söka efter en produkt som du sett tidigare, hitta sökfunktionen.
2. Du ångrar dig och bestämmer dig istället för att kolla vad sidan har för produkter att erbjuda. Använd menyn för att kolla på alla produkterna i sortimentet.
3. Filtrera på produkter som kostar under 2000 kr och är av varumärket "Filter 3". Lägg sedan till "Product6" i varukorgen.
4. Din kompis som är med dig på bussen berättar att den skon du länge velat ha nu finns på REA. Du vill hellre ha den så ta bort "product6" ur varukorgen.
5. Genom att använda menyn, gå nu in under REA och leta upp skon "Snygg sko". Läs i specifikationen för produkten och välj sedan färg och storlek innan du lägger till den i din varukorg.
6. När du lagt till skon kommer du på att du vill beställa två par. Eftersom du så lätt sliter på dina skor kan det vara bra att ha ett par extra. Gå in i varukorgen och ändra antalet par "Snygg sko" till två.
7. Kontrollera så att priset stämmer och gå sedan till kassan.

Orientation script

Hej och tack för att du vill medverka i detta test. Testet går ut på att du kommer att få prova en prototyp för hur en responsiv e-handelssida skulle kunna fungera. Du kommer att få testa sidan på en smartphone och i en tablet.

Under testet kommer vi att finnas i rummet så om det är något du missuppfattat eller undrar över något så är det viktigt att du frågar. Då det är en undersökning är det tyvärr inte alltid vi kommer kunna svara på dina frågor men vi ska försöka så gott det går.

Testet kommer att filmas i undersökningssyfte och kommer endast att visas för oss som gör detta examensarbete samt inblandade på Avensia.

För att vi ska få ett hum om vad du har för tidigare erfarenheter av e-handel så kommer du innan testets början att få fyll i en enkät. Efter testet vill vi gärna att du besvarar några frågor om hur du upplevde prototypen och om det var några svårigheter vid användandet på smartphone respektive tablet. Testet kommer att pågå i ungefär 30 minuter.

Du kommer att få uppgifter som består av scenarion på små lappar. Läs uppgifterna högt så vi vet att du läst hela uppgiften. För varje scenario du utför på smartphonen är det viktigt att du testat layouten i både portrait och landscape (dvs i stående och liggande format). Då du anser dig helt färdig med ett scenario ska du vända bort lappen och påbörja nästa.

Tänk högt under tiden du utför uppgifterna!

Vi vill poängtera att det är prototypen och inte du som kommer att testas. Och kom ihåg att du när som helst kan välja att avbryta testet.

Har du några frågor innan vi sätter igång?

Om du godkänner allt ovanstående har du möjlighet att vinna en iPad-mini.

Bakgrundsformulär

1. Ålder: ____

Kvinna Man

2. Sysselsättning

Jobbar som: _____

Studerar till: _____

Annat: _____

3. För eventuell kontakt med fler frågor (ej obligatorisk)

E-mail: _____

4. Vad har du för erfarenhet av en smartphone?

Äger en Har använt en Har aldrig använt en

5. Vad har du för erfarenhet av en tablet?

Äger en Har använt en Har aldrig använt en

Ringa in den siffra som stämmer bäst överens, 1 är ingen vana alls och 5 är stor vana.

6. Hur stor vana har du av att surfa via en smartphone?

1 2 3 4 5

7. Hur stor vana har du av att surfa via en tablet?

1 2 3 4 5

8. Har du någon gång handlat online?

Ja Nej.

Om nej, varför inte?

9. Skulle du kunna tänka dig handla online via?

Dator: Ja Nej, varför? _____

Tablet: Ja Nej, varför? _____

Smartphone: Ja Nej, varför? _____

(Om du svarade nej på fråga 8, hoppa till fråga 12 på nästa sida)

Var god vänd

9. Vilken/vilka enheter använder du för att handla online?

- Dator Tablet Smartphone

10. Ungefär hur ofta handlar du online? (Välj ett av nedanstående alternativ)

- Minst 1 gång varje vecka
 Minst 1 gång varje månad
 Minst 1 gång varje halvår
 Minst 1 gång varje år
 Färre än 1 gång varje år

11. Vad handlar du online? (Välj ett eller flera alternativ)

- Kläder/Skor
 Teknikprylar
 Inredning
 Annat: _____

12. Vilken information och/eller funktion är det viktigast för dig att ha tillgänglig när du först besöker en e-handelsida?

13. Vilken information tycker du är viktigast att se på en produktsida? Rangordna följande alternativ från 1-9. Där 1 är viktigast.

- Bild på produkten
 Lagerstatus
 Leveranstid
 "Lägg till"-knapp
 Pris
 Produktbeskrivning
 Produktnamn
 "Share"-knapp (möjlighet att dela på sociala medier tex facebook och twitter)
 Val av tex färg och storlek

Tack för dina svar!

Debriefing

1. Tyckte du någon knapp/text var för liten?
2. Var det något i prototypen som var svårt att förstå?
3. Vad tyckte du om att menyn ändrades när du bytte till portrait/landscape?
4. Vad tyckte du om att varukorgen ändrades när du bytte till portrait/landscape?
5. Vad tycker du om att sökfunktionen ändrades när du bytte till portrait/landscape?
6. Vad tycker du om att produktlistningen ändrade uteseende när du bytte till portrait/landscape?
7. Vad tyckte du om att produktsidan ändrades när du bytte till portrait/landscape?
8. Tycker du fortfarande att rangordningen på vad som är viktigast på produktsidan är samma som innan?
9. Om nej på fråga 9 i bakgrundsformuläret, har du ändrat din åsikt?