

the  
**Predictable Experience of News**

How User Interface, Context and Content Interplay  
to form the User Experience

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**Master's Thesis in Industrial Design Engineering**

DEPARTMENT OF INDUSTRIAL AND MATERIALS SCIENCE  
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CHALMERS UNIVERSITY OF TECHNOLOGY  
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Master of Science Thesis (IMX30)

**The Predictable Experience of News**

How User Interface, Context and Content Interplay  
to Form the User Experience

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# **Predictable Experience of News**

How User Interface, Context and Content Interplay  
to form the User Experience

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# Glossary

**UX** User experience

**UX aspects** Certain attributes of the user experience

UTD Up to date

INT Interesting/interest

REL Relaxation

POS/NEG Positive/negative

REST Restlessness

#ART Number of articles read

**UI** User interface

**UI elements** Certain parts of the user interface

view If only one or more articles are visible in the UI

image If the UI contains images or not

**O** UI with the elements overview without image

**OI** – overview with image

**S** – single view without image

**SI** – single view with image

**Context**

Situation of a person, place or object

A<sub>0</sub>

Context named 'Public transport'

B<sub>0</sub>

– 'Simultaneous task - cooking'

C<sub>0</sub>

– 'Morning in bed'

B

– 'Simultaneous task - cooking'

C

– 'Morning in bed'

B<sub>2</sub>

Context with short episodes and short total time

C<sub>2</sub>

Context with long episode and long total time

**Context characteristics**

Certain attributes of the context

**Content**

In this thesis: news articles

X<sub>0</sub>, Y<sub>0</sub>, Z<sub>0</sub>

Constructed news feeds, first iteration

X, Y

– second iteration

**Content factors**

Certain attributes of the content

**Other****Breaking point**

The point at which a responsive UI shifts

**Noise**

Additional meaningless data in a data sample

# Abstract

This thesis investigates how the components content, context and user interface interplay to form the user experience of news consumption on a smartphone. Further, it explores the possibility of inducing contexts to participants in user studies by introducing relevant context characteristics. The thesis is conducted in cooperation with the company Humblebee, that has extensive knowledge of how to apply user experience design in practice.

The thesis consists of three studies (Study I, Study II and Study III).

Study I consists of a diary study, an online survey and research of existing literature on the topics of both user experience and news consumption.

In Study II, two news feeds and four different versions of the user interface are created based on the findings in Study I. Additionally, two contexts are found to be common situations in which news is consumed. Lastly, several relevant UX aspects are determined. User tests are conducted where participants read a specific news feed, using a specific user interface while conducting different tasks that aim to induce contexts to the participants. After the test, the participants rate their experience in a self-assessment questionnaire which is elaborated on in a follow up interview.

Study III consists of additional user tests aimed to validate the results from Study II and to further investigate the relationship between the content, the context and the user interface.

The results show that a specific user experience can be predicted if different parts of content, context and user interface are known. They also show that it is possible to induce contexts in user studies by introducing relevant context characteristics.

**Keywords:** user experience, UX design, news consumption, user research

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**KALLE EKDAHL**

# Table of contents

|                         |           |
|-------------------------|-----------|
| <b>A. Introduction</b>  | <b>12</b> |
| A.1. Background         | 12        |
| A.2. Aim                | 13        |
| A.3. Research questions | 13        |
| A.4. Process            | 14        |
| A.5. Delimitations      | 15        |
| <b>B. Framework</b>     | <b>16</b> |
| B.1. UX                 | 16        |
| B.2. UI                 | 18        |
| B.3. Context            | 19        |
| B.4. Content            | 20        |

## STUDY I

|                                     |           |
|-------------------------------------|-----------|
| <b>Summary</b>                      | <b>23</b> |
| <b>A. Objectives</b>                | <b>23</b> |
| <b>B. Study Design</b>              | <b>23</b> |
| B.1. Defining target group          | 23        |
| B.2. Diary study                    | 24        |
| B.3. Online survey                  | 25        |
| <b>C. Results</b>                   | <b>27</b> |
| c.1. Diary study                    | 27        |
| c.2. Online survey                  | 30        |
| <b>D. Discussion and Conclusion</b> | <b>32</b> |
| <b>E. Implications</b>              | <b>34</b> |

## STUDY II

|                        |           |
|------------------------|-----------|
| <b>Summary</b>         | <b>36</b> |
| <b>A. Objectives</b>   | <b>36</b> |
| <b>B. Study Design</b> | <b>36</b> |

## STUDY II

|           |  |           |
|-----------|--|-----------|
| B.1.      | First iteration                                    | 36        |
| B.2.      | Pilot test (on site)                               | 48        |
| B.3.      | Second iteration                                   | 49        |
| B.4.      | Pilot test (remote)                                | 53        |
| B.5.      | Main test  | 54        |
| B.6.      | Analysis   | 54        |
| <b>C.</b> | <b>Results</b>                                     | <b>56</b> |
| C.1.      | UX profiles  | 56        |
| C.2.      | Findings   | 65        |
| C.3.      | Breaking down contexts into characteristics        | 70        |
| C.4.      | Comparing UI elements with context characteristics | 70        |
| <b>D.</b> | <b>Discussion and conclusion</b>                   | <b>71</b> |
| D.1.      | General  | 71        |
| D.2.      | Content  | 73        |
| D.3.      | Context  | 73        |
| D.4.      | UI   | 74        |
| D.5.      | Conclusions  | 74        |
| <b>E.</b> | <b>Implications</b>                                | <b>74</b> |
|           | <b>Summary</b>                                     | <b>77</b> |
| <b>A.</b> | <b>Objectives</b>                                  | <b>77</b> |
| <b>B.</b> | <b>Study Design</b>                                | <b>77</b> |
| B.1.      | Participants                                       | 77        |
| B.2.      | UI   | 77        |
| B.3.      | Prototype  | 78        |
| B.4.      | Context  | 79        |
| B.5.      | Procedure  | 79        |
| B.6.      | Setting  | 80        |
| B.7.      | Validation test                                    | 81        |
| B.8.      | Analysis   | 81        |

## STUDY III

**C. Results 82**

|                                |    |
|--------------------------------|----|
| c.1. Interesting               | 83 |
| c.2. Feeling up to date        | 84 |
| c.3. Distribution of responses | 84 |
| c.4. Positive / negative       | 84 |
| c.5. Relaxation                | 84 |
| c.6. Not restless              | 85 |
| c.7. Time                      | 85 |
| c.8. Manner of consumption     | 85 |
| c.9. Remembering               | 87 |
| c.10. Images                   | 88 |

**D. Final analysis and conclusion of result 88****E. Discussion 90**

|                  |    |
|------------------|----|
| E.1. Images      | 90 |
| E.2. Methodology | 91 |

**F. Implications 91****A. Discussion: findings and conclusions 94**

|  |    |
|--|----|
| A.1. Connection between UI and context | 94 |
| A.2. How the components interplay      | 98 |

**B. Research questions revisited 99****C. Reflection 100**

|  |     |
|--|-----|
| c.1. Future Work                         | 100 |
| c.2. Reflections on Process and Research | 100 |
| c.3. Impact                              | 102 |
| c.4. Sustainability                      | 103 |

**References 105****Appendix 108**



# A. Introduction

To introduce this thesis, two areas are worth touching on; user experience and news.

The realm of **user experience** is expanding by the minute but there are still many areas ripe for exploring. User interfaces (UIs) are often compensated due to an external impact of context and content. For instance, many smartphones automatically increase the brightness of the screen when the phone is used in bright sunlight, to compensate for the contextual change. This increases usability, and the content of the phone becomes easier to consume. However, this thesis project explores if the resulting user experience can be predicted based on contextual impact, and in addition, if the UI can be designed in such a way that the contextual impact can be compensated for, creating a desired experience for the user. To concretize, this is tested and explored with the content of news.

**News** is consumed daily by many people, in a variety of different contexts, on different devices and with different content. These factors influence how the news stories are perceived and experienced - i.e the user experience of news.

Arguably, keeping people well informed is key in a democratic society. Therefore, it is of great importance to present news stories that are accessible for every citizen. Enhancing the news consumers' user experience is believed to be a feasible method to increase accessibility of news, regardless of what the news story is about.

By understanding the factors that influence the UX of news consumption, it may be possible to affect them in a desired way – to enhance the appreciation of consuming news.

## A.1. Background

The origin of this thesis project relates to what is known as responsive user interfaces, or UI:s – which are most commonly used in adapting desktop content to mobile content without requiring user interaction. What the system generally does is that it looks for context characteristics (such as location or the size of the screen on which the user consumes the content) and then automatically chooses what UI to present to the user according some pre-determined measure (breakpoints) of the context ([material.io](http://material.io), 2020). By knowing the context and content, the UI can be chosen to reach constant usability. For example, if the device detects that you are using a small screen, the system provides you with a UI with larger font sizes to keep the *readability* constant. While such

measures are relatively easy to test and predict – you are either able to read the content or not – they state nothing about if and then how the user experience (UX) has changed with a different UI.

This is where an idea originated of being able to predict users' experiences. By understanding how context, content and UI interplay in creating UX, the experience may be understood through what components it exists of.

The digital design consultancy Humblebee was approached with the idea and joined the thesis work as supervisors with extensive UX and business understanding. As per their suggestion, the content in focus for the thesis project was chosen to be **news** due to their interest in the subject.

## **A.2. Aim**

The aims of the thesis project were:

- To investigate how consuming content using a specific UI in different contexts affects both the experience of the consumed content (news) and the experience of consuming that content (news).
- To understand how the UI, context and content (news) interplay to form the resulting user experience.
- To investigate if UI:s, contexts and experiences can be defined by analyzing the variables of which they consist.
- To investigate the possibility of inducing contexts through introducing relevant context characteristics.

## **A.3. Research questions**

The addressed research questions were:

- Can a specific UX aspect be predicted by finding and combining a specific UI element with a context characteristic?
- In what way – if any – does context and UI design interplay in the UX of digital content?

- Is it possible to subconsciously induce certain contexts through introducing relevant context characteristics?

#### **A.4. Process**

In general, the process for the thesis work was goal oriented – i.e it started with a set goal and worked backwards. The main aim of the thesis was to investigate how content, UI and context interplay in forming UX, and the set goal was therefore to prove a connection between these components. In order to determine if there was such a connection, it was necessary to determine what measures were going to be used to evaluate each of the components and what variables the components consisted of. Finding these measures, evaluating which were the most relevant and proving a connection between the components were achieved through **three separate studies** – each with implications leading to the next study.

At the start of the project, a study (**Study I**) was conducted with the aim of finding the primary motivations behind news consumption, in what context news is being consumed and experiences associated with that consumption. The first study combined literature research with a diary study and an online survey in order to investigate these issues. The primary motivations, the most common contexts and content discovered in Study I were then used in the subsequent study (Study II).

The aim of the second study (**Study II**) was to further investigate the measures found in Study I through remote user testing. All user tests had to be carried out remotely due to the corona crisis. The user tests consisted of participants reading news on a smartphone while conducting different tasks that were meant to resemble real life contexts. To be able to conduct the user tests, additional components had to be designed – UI, news feed and a digital prototype that contained them. By varying the UI and context in a controlled manner while gathering both quantitative and qualitative data of the participants experiences, it was possible to understand which combinations of UI:s and contexts that resulted in specific experiences. The contexts were then analyzed in order to determine if any of the findings could be attributed to a specific context characteristic. The context characteristics found were then brought to the last study (Study III).

**Study III** consisted of further user testing, but with focus on the most relevant variables related to the UI:s and contexts respectively. As in Study II, the user tests were conducted remotely with participants reading news on a smartphone while conducting different tasks. In this case though, the contexts only included the most relevant characteristics and did not attempt to resemble real life contexts.

Lastly, the results from Study III were analyzed and a general conclusion was drawn regarding how the tested variables interplayed with each other in forming the UX. Consequently, the impact and sustainability of these results were discussed, as well as a potential continuation of the research in future work.

## **A.5. Delimitations**

The delimitations of the project are presented below.

- This thesis project solely focused on news consumption on smartphones.
- The creation of UI:s was primarily constrained to software aspects such as screen content, as opposed to hardware aspects such as buttons on the side of the smartphone.
- All user studies and other thesis activities had to be conducted remotely due to the outbreak of covid-19.
- This thesis project did not aim to create fully functioning UI:s fitted to certain contexts, but rather to shine light on new ways of approaching UX and the aspects that form it.
- All the test participants involved in this project were individuals with Swedish as their native language and thus, the tests were conducted in Swedish and translated into English for the benefit of report.

## B. Framework

This section addresses and defines the concept of UX and its subcomponents UI, context and content.

### B.1. UX

This section describes which definition of UX that will be used in this thesis and argumentation for why it is appropriate.

#### B.1.1. *Definition of UX*

A study conducted by Roto, Rantavuo and Väänänen-Vainio-Mattila (2009) concluded that there are various definitions of what UX is – or more precisely, a lack of a unified definitions. For instance, the definition of UX by Nielsen Norman Group (2012, as cited in Pettersson, 2018) states that the “*User experience encompasses all aspects of the end-user’s interaction with the company, its services, and its products*”. This definition is quite broad and does not elaborate on what the user experience actually is. In contrast, the definition stated by Hassenzahl (2008) is arguably *too* narrow and could potentially exclude longer lasting experiences. Hassenzahl (2008, as cited by Pettersson, 2018) defines UX as “... *a momentary, primarily evaluative feeling (good-bad) while interacting with a product or service*”. This definition not only suggests that user experiences require an interaction with the product or service, but that it is an evaluative feeling.

Studies of the discourse regarding UX by online consultancies tend to reveal a very pragmatic approach to UX where it needs to be quantifiable and measurable (an example of which is an article by Latin, 2017). A common method for evaluating UX according to previously mentioned approach are in terms of Key Performance Indicators (KPI:s) (Nunnally & Farkas, 2016). It could be argued that KPI:s only measure traces (consequences) of the actual users’ experience. For instance, if using the KPI of *site retention* to evaluate the UX of a website, it is difficult to determine what an increase in site retention means in regard to the actual experience. On the one hand, an increase could indicate that the users had a desired experience interacting with the website and therefore chose to continue doing so, but it does not say what the desired experience was. It could equally be argued that the increase in site retention was due to the usability of the website being terrible to such a degree that users tell their friends about the website and regularly visit it for their amusement. Hence, it is arguably not possible to evaluate user experiences using this KPI.

Instead, how this thesis defines UX is closely related to the Multilayered Model of Product Emotions (Desmet, 2003) and a pursuit of describing the actual user

experience, rather than the consequences in behavior that the experience results in. The framework for the definition is retrieved from ISO (International Organization for Standardization, 2018) that defines UX as: “a person's perceptions and responses that result from the use or anticipated use of a product, system or service”. This definition is used in this thesis, but the applied definition also contains some important concepts that are not defined by ISO and that need to be further elaborated on.

#### B.1.2. *Perception and response*

According to the authors' interpretation of the ISO definition, it differentiates between two essential aspects of UX – experience *of* content (perception) and the personal experience (response). The *perception* is in this thesis defined as the attributes that the user projects on the product that they interact with – i.e. experience *of* the consumed content. In contrast, *response* is in this thesis defined as the resulting emotional experience and behavior from interacting with a product in a specific context. This is similar to the model of product emotions (Desmet 2003), in which the *appraisal* of the *product* in relation to a *concern* results in an *emotion*.

The *perception* and *response* are further considered to be interplaying in the overall experience and dependent on at what stage the experiences are being investigated. As an example, a user perceives a product as un-aesthetic and in extension undesirable, then uses it and has an emotional response in terms of pleasant surprise regarding the product's functionality – resulting in the product becoming desirable. Asking that person if they desired that product prior to using it would have resulted a negative answer, while asking the same question after use would result in a positive answer. This highlights another differentiation made by the ISO standard, the difference between *use* and *anticipated use*.

#### B.1.3. *Use and anticipated use*

The importance of making this differentiation is that, as mentioned above, experiences differ over time and result in different behaviors. This temporal aspect of the ISO-definition is also acknowledged by Pettersson (2018). In this thesis, experience of *use* is defined as what the user experiences while interacting the product, and *anticipated use* experience is defined as what the user expects the resulting experience of the interaction to be. While anticipated use appears to be related to the perception of the product, it can still create an emotional response. For instance, if anticipating that the product will be difficult to use and the context deemed as demanding, the resulting emotional response could be stress. Therefore, it is in this thesis argued that both *use* and *anticipated use* include some form of perception and response.

#### B.1.4. *Can experiences be good or bad?*

The literature often refers to the UX of a product being *good* or *bad* (Pinto, 2018), but these are normative statements that can only be evaluated in relation to an opinion, goal or context. An example would be the difference between a user visiting a scam website and experiencing trust compared to another user experiencing distrust. Trust is arguable referred to as a *good* experience, while *distrust* is arguable referred to as a *bad* experience. Though, due to the context in this example, *distrust* towards a scam website would certainly be beneficial. Therefore, this thesis uses a definition of UX that implies that an experience cannot be inherently *good* or *bad* – it can only be desired or undesired.

#### B.1.5. *Usability*

Usability is considered an important aspect of UX (Desmet, 2003) (Roto, Rantavuo & Väänänen-Vainio-Mattila, 2009), but they are not interchangeable constructs. Among others, Hassenzahl (2003) suggests that usability is a key metric of the pragmatic aspect of UX. He argues (2003) that there are different aspects of the initial user experience of a product – pragmatic and hedonic. The pragmatic attributes are related to usability and how the product can be used to achieve a set goal. He further explains that the hedonic aspect is defined as everything not related to the pragmatic aspect, but also states that it relates to pleasure and the psychological part of the experience.

This 'pragmatism' is repeated by ISO (International Organization for Standardization, 2018) who defined usability as “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.” This is of relevance for this thesis since any comparisons between the UX of different UI:s have to account for possible usability issues.

## **B.2. UI**

A user interface is necessary to enable interactions with a product. In the case of smartphones, the main aspect of the interface is the screen where content is displayed. Physical buttons located around the screen often provide additional functionality that needs to be accessible at all time – such as power and volume – but they are rigid as compared to the customizable, software buttons on the screen. Since this thesis project explores the resulting user experience from using different versions of a UI, the UI has to be customizable to be able to test different variations. Therefore, throughout the report, the word **UI** always alludes to the software aspect of a user interface and not physical buttons on the smartphone.

The UI can be divided into several different planes of different hierarchies (Garrett, 2010) – 'Surface', 'Skeleton', 'Structure', 'Scope' and 'Strategy' (in order from highest to lowest). Higher levels relate to sensory experiences such as visual stimuli from the layout, while the lowest levels relate to abstract concepts of the underlying purpose of the product. Changes made on higher planes are therefore not likely to change the perceived purpose of the product, but may very well change the experience of it.

### **B.3. Context**

Context becomes especially important when contemplating the fact that news consumption on tablets and smartphone is steadily increasing (Molyneux, 2018). This opens up the possibility of consuming news in various situations, without being limited to a desktop or a breakfast table.

Day (2001) defines context as *"any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves"*. This is interpreted so that context is an integral part of the entire user experience, and since it is one of the three cornerstones of this thesis - UI, context and content - it is essential to delve into. The importance of context is also supported in the ISO definition of user experience, which includes three factors that influence UX; the system, the user and the context of use (International Organization for Standardization, 2018).

Many prominent researchers in the area highlight the importance of context in user experience. To give an example, Jordan (2000) claims that context is a fundamental aspect of product pleasures, which are claimed not to be inherent in a product, but rather the result of the interaction between the product and the user in a specific context.

Boag (2016) sees a problem in that many people only think about physical location when defining a context. In fact, there are many components that need to be considered within a context. Boag (2016) exemplifies this by also including comfort of the users, emotional state of the users, time and influence from other people. For this thesis, these components were categorized into two types of contexts; internal and external context.

#### *B.3.1. Internal*

The internal context includes here the emotional state of the subject (user), such as their mood and feelings. For example, feelings can include emotions of stress, anxiety,

happiness and calmness. Emotions are often an integral part of a person's ability to perform a task (Västfjäll et al., 2016). In this case, that task was consuming, understanding and otherwise experiencing news.

#### B.3.2. *External*

Even though Boag (2016) downplays the importance of physical location, it was still deemed to be of high relevance in this thesis project. Also the components of external environment, setting, time and comfort were considered to matter. Arguably, these factors play a rather big role in an individual's news consumption. To draw an example, an individual might choose a different news medium depending on if the individual is traveling on the bus, or at home at the breakfast table - even though its emotional state might be the same.

### B.4. **Content**

This section contains research on news value and how to measure newsworthiness. Noteworthy is that the word 'content' throughout this report always alludes to news content.

#### B.4.1. *News value*

When discussing news content in general, and news value specifically, it is essential to establish what type of news value that is referred to in this thesis project. Brighton and Foy claim (2007) that there are three approaches to news value; the journalistic, the broader and the modern.

The **journalistic** approach regards the journalist and its perspective when searching for news value for a news article (Brighton and Foy, 2007). The journalist focuses on certain value features in order to find newsworthiness and, by extension, to get published. Journalistic value features include e.g. *relevance* (effects on the audience) and *composition* (suitability for a specific news outlet or medium).

The **broader** approach is, according to Brighton and Foy (2007), more complex and includes perspectives like common sense, philosophy and ideology. Examples of value features in this approach include *the mirror theory* (whether or not journalism is holding a mirror up to nature) and *external determinism* (whether or not factors including culture, economy and technology already are predetermined).

The **modern** approach became according to Brighton and Foy (2007) important when boundaries between producers and consumers of news faded. In other words, social media have made Average Joe a news producer, which carry consequences in how news value is perceived.

#### B.4.2. *Factors of News*

According to Zoch and Supa (2014), there are eight news factors determined by the journalistic value features. In turn, these news factors carry newsworthiness, or news value. These factors are listed below, with their definitions following.

**Proximity:** how close to home the news item takes place;

**Timeliness:** how current the news item is (or a new angle);

**Immediacy:** whether or not it is breaking news;

**Prominence:** whether or not it concerns well known people or institutions;

**Cultural proximity:** how close to local culture the news item is;

**Unexpectedness:** how likely the news item is (example: *man bites dog*);

**Human interest:** whether or not the news item concerns an individual in a personal rather than business sense;

**Significance/consequence:** whether or not the news item has high importance or carry huge consequences; if individuals should be aware of it

To clarify, the closer to home, the more current, the more breaking, the more well-known subjects, the closer to local culture, the more unexpected, the more personal and the higher the significance the news item is/has, the higher the news value, or greater the newsworthiness.



## Summary

Study I was conducted in order to define the target group of the project, find the primary motivations behind news consumption, investigate in what context news was being consumed and define experiences associated with that consumption. In addition, to investigate which international, national and local news topics were the most interesting. To explore these issues, the study combined a literature research with a diary study and an online survey. The primary motivations and the most common contexts, experiences and topics discovered in Study I, were later used in subsequent studies.

### A. Objectives

The following objectives were addressed in Study I:

- Investigate relevant factors on which to define target group boundaries.
- Explore context characteristics related to news consumption on a smartphone.
- Investigate which news topics the target group consumes.

### B. Study Design

This section describes the methods used in Study I, including the process of defining the target group.

#### B.1. Defining target group

The target group for the entire thesis project was defined as individuals in Gothenburg between the ages of 20 - 40 with a varied interest in news consumption and Swedish as their native language. This section describes on what basis the target group was defined.

##### *B.1.1. Demographics*

It was assumed that reading news in a foreign language would affect the experience of news partly due to the cognitive load associated with translation (Rojo & Ibarretxe-Antuñano, 2013). Therefore, it was decided that the news feed would be written in Swedish and that the participants therefore had to have Swedish as their native language.

Also, since the thesis project explores the UX of news consumed on smartphones and in order to avoid the influence from usability issues, the target group should consist of individuals who are used to consuming news on a smartphone. Daily consumption of news on a smartphone was determined to be most common between the ages of 20-50 (SOM-Institutet, 2017).

Further, the age of the target group is also defined by the age of the individuals who were reachable within the geographical and social limitations of the project. Therefore, the initial criterion of between 20-50 years old was lowered to 20-40 years old and focused on individuals living in Gothenburg. This age group was assumed to be more homogenous and to better coincide with the age of the reachable individuals attending universities or working at design consultancies.

#### *B.1.2. Interest in news*

The target group was narrowed down further by investigating the level of interest in news consumption between different ages. It was assumed that having *too* much or *too* little interest in consuming news could bias the gathered data. Further, the limitations of the thesis meant that the reachable individuals had a higher level of education (i.e. university) – which in turn may be correlated to a higher interest in consuming news. By looking at data from SOM-Institutet (2017), a comparison of the variables age, level of education and interest in news was conducted. The comparison showed that individuals between the ages of 20 and 40 and with higher education are slightly more interested in news. Still, the difference in news interest between higher education and lower education was only 5%, and both groups had an almost equal variation between levels of interest (SOM-Institutet, 2017). Therefore, it was assumed that the reachable group of individuals would also have a varied interest in news, making them fulfill the screening criteria for intended target group.

## **B.2. Diary study**

A diary study was conducted in order to make every-day observations of the participants and their news consumption. The main purpose of the diary study was to determine in what context(s) people consume news on their smartphone. A second purpose was to find out which news topics the participants were consuming.

Eight participants, all within the target user group, took part in the study. Six participants were women and two were men. All of the participants were between 25 and 35 years old.

The diary study was conducted in two phases. The participants first kept a diary during four days, one Sunday and three weekdays, in order to cover daily variations in news consumption - primarily the difference between the weekend and a work or school week. After having kept a diary, the participants partook in follow up interviews, discussing the data that they had provided on their news consumption routine.

#### *B.2.1. Keeping diary*

The actual diary was in the form of an online questionnaire, where the participants were to answer five specific questions directly after having consumed news on their smartphone. In most cases, this would amount to several times each day of the study. The complete questionnaire can be found in Appendix I.

The questions considered the particular situations that surrounded each instance when news was consumed, and included in which scenarios the participants consume news and what topics they spend most time on. Furthermore, participants specified through which medium the news was consumed; text, video or audio. This was included in the questionnaire to observe the variation in used media for news consumption. The participants also marked their frame of mind, ranging from **sleepy** to **agitated** in one case, and from **pleasant feelings** to **unpleasant feelings** in another. The data gathered from the diary study was in other words both quantitative and qualitative.

#### *B.2.2. Interview*

The subsequent follow up interviews took place on site at the Vinn Group offices. Each interview involved one interviewee (the participant), one moderator and one real-time transcriber. However, every interview was also audio recorded, in order to have the possibility to later recapitulate what was said.

As stated above, the main focus of the interview lied on expanding answers given in the diary study, primarily regarding the context in which the subject mostly consumed news. In addition, the interviewees assessed if and how the experience of consuming news is affected by the context, the content and the user interface of the medium in question. Thereto, which of these variables that carry the most importance for the user experience.

### **B.3. Online survey**

In order to quantitatively validate the data collected in the diary study, an online survey was created and distributed through relevant channels, such as Facebook groups and personal contacts within universities in Gothenburg and the Vinn Group offices. The survey was required to reach a larger amount of people than the number of diary study participants in order to increase validity and reliability of the gathered data.

The main focus of the survey was to validate the contexts in which people consume news as reported in the diary study. To expand further, it was important for the validity of the data that these contexts could also be found in a larger sample size, to prove that the identified contexts are in fact common.

In addition to validating the contexts, the second focus of the survey was to find participants for further involvement in the thesis project - mainly for subsequent user tests in Studies II and III. This was done by adding a section at the end of the survey, where survey respondents could leave their email address for the purpose of participating in further studies. Since a concern was that the study would attract participants who already were especially interested in news, a question about level of interest in consuming news was included in the online survey. It was essential to observe if the assumed distribution of interest found while defining the target group was present in the actual sample.

Furthermore, in order to build a value neutral but relevant news feed for the user test in Study II (see Study II: B.1.3 'News feed'), it was important to gather knowledge on which topics the survey respondents usually spend most time on. Similar to the context validation, these topics were first collected in the diary study, and subsequently validated and quantified in the online survey.

However, a geographical component was in the survey added to the questions about topics. Here, the topics regarded either local, national or international news. This was essential in order to, as previously touched upon in this section, create a value neutral news feed.

Lastly, the survey included questions on motivating factors for news consumption. In order to accurately steer the subsequent user tests in Studies II and III, it was important to understand and reflect on why people consume news in the first place.

## C. Results

This section contains the results of the diary study and the online survey in Study I.

### c.1. Diary study

The purpose of the diary study was to gather both quantitative and qualitative data. The former is presented under C.1.1 'Keeping diary', and the latter under C.1.2 'Interview - contexts' and C.1.3 'Interview - UX effects of UI, context and content'.

#### c.1.1. Keeping diary

Altogether, the eight participants consumed news and filled in the questionnaire a total of 95 times during the four day period, which yield an average of three times per day and participant. The results of finding out about the primary purpose of defining contexts, are as follows. Three main categories were found - **At home**, **Public transport** and **At work/in school**. The distribution in percentage of the most common contexts for consumption of news is presented in the table 1 below.

Table 1. The distribution in percentage of the most common contexts in which news was consumed. (N=8)

| At home | Public transport | At work/in school | Other |
|---------|------------------|-------------------|-------|
| 69 %    | 17 %             | 11 %              | 3 %   |

Out of the 66 times news was consumed in a home context, three subcategories were found: **in bed** (29%), while **eating** (14%) and while doing an active **simultaneous task** (13%). The percentages following the subcategories are calculated from all answers in the At home category, and not from all of the answers in total. These numbers are presented in table 2 below. Noteworthy is that out of every answer in the in bed subcategory, 77% refer to 'morning in bed' and 23% to 'evening in bed'.

Table 2. The distribution in percentage of subcategories of the context 'At home'. (N=8)

| AT HOME                    |        |                   |       |
|----------------------------|--------|-------------------|-------|
| In bed                     | Eating | Simultaneous task | Other |
| 29 %                       | 14 %   | 13 %              | 44 %  |
| (77% morning, 23% evening) |        |                   |       |

Furthermore, 11 topics were found as most common for the 95 instances of news consumption (in alphabetical order): **Business, Culture, Economics, Editorial, Environmental news, Health, Political news, Science, Sports, Travel** and **Weather**.

Lastly, the major part of this news consumption was in the form of text, and not video or audio. It was also concluded that news consumption did not differ substantially between weekends and weekdays.

#### *c.1.2. Interview - contexts*

The categorization of use contexts found in the quantitative part of the diary study had to be developed further, and expanded into rich scenarios in order to be used in subsequent user studies. The answers from the question about state of mind explained in section B.2.1 'Keeping diary', were used when anchoring the diary in the follow up interviews.

The 'At home in bed' context had several interesting characteristics to take into account. To start with, the participants experiencing this context claimed that they were sleepy at the time, something that can be considered reasonable. Continuing, they considered themselves calm, comfortable and without stress. However, to this particular context, two characteristics that were deemed relevant but that were not brought up during the follow up interviews were added. Firstly, reading news in bed, in the morning, during work or school weeks entails to eventually stop consuming news and actually get out of bed in order to get on with one's morning routine. This was an especially essential characteristic to include in the user studies. Secondly, to further enhance the experience of early morning bubble, with its sense of calmness, darkness was as well added to the equation.

'At home eating' did not entail as many characteristics, but it can be said that the majority of these participants consumed news watching video.

The context 'At home while simultaneously doing something else', however, yielded some specific results. Participants felt both distracted and active when trying to update themselves on today's news at the same time as they were doing something else. Generally, these feelings were neither experienced as positive nor negative, but rather a consequence of leading a busy lifestyle. The participants also expressed that their focus was split and that they often were interrupted during these activities. Again, this can be considered as highly reasonable due to the dual nature of the context. Activities included e.g. cooking, going to the bathroom and brushing one's teeth.

In contrast to the home contexts, the **public transport** context forced the participant to interact with, and react to, other people in the proximity. For example, one participant expressed anxiety to be observed while reading news on the phone. In this particular case, the participant felt that some type of news stories or news sites carry a certain cred factor, whereas others are considered guilty pleasures. Moreover, the participants had also to spatially adapt to other passengers. For example, when a co-passenger sits next to the window and they had to let the person out. Naturally, this entailed some sort of interruption in their news consumption. Lastly, the news consumption was in this context affected by the very specific amount of time they had available for consuming news; when the bus stopped, they had to stop consuming news and alight the bus.

The majority of participants consuming news in the **At work/in school** context, claim they do it during breaks in the work day. It was also expressed that the news break came with a cup of coffee or that they were checking emails simultaneously. Therefore, it was expressed that the news consumption often correlates with a moment of calmness and stretching their legs in between meetings or other work related tasks. This gave the news consumption a glow of pleasure. Other than this, the At work/in school context did not yield any relevant or interesting results.

### *c.1.3. Interview - UX effects of UI, content and context*

In the interviews the participants were asked to express the influence of the UI, the context and the actual content on their user experience. The results are conveyed in the form of select quotes below. Note: the quotes are translated from Swedish to English.

#### **Context**

— *It is easier to express feelings at home, so I think context affects me a lot.*

Interviewee nr. 1

— *Context and content correlate with each other, but context matter most.*

Interviewee nr. 1

— *Context affects choice of news medium and news length.*

Interviewee nr. 4

#### **Content**

— *Content definitely affects me most.*

Interviewee nr. 2

— *Content affects me much more than context.*

Interviewee nr. 7

— *Content affects me most, I try to block out the external context.*

Interviewee nr. 8

## UI

— *UI can affect my experience but mostly negatively, if it doesn't work or I don't understand.*

Interviewee nr. 1

— *UI affects the news site's trust but not my user experience.*

Interviewee nr. 2

— *The UI affects me the most.*

Interviewee nr. 5

These quotes on how UI, content and context affect the UX are just a sample of all quotes from the follow up interviews, but the remaining data consists of similar statements. They show that the participants had very varied experiences regarding influences of the UI, the context and the content.

### c.2. Online survey

The survey was answered by 84 individuals. Of these respondents, 72 individuals were within the age boundaries of the target group, i.e. 20-40 years old. The remaining 12 individuals were between the ages of 41 and 60 and were therefore excluded from further analysis. All respondents had Swedish as their native language and had – as a group – a varied interest in news consumption. Further, 20 of the respondents answered that they would like to participate further in user tests.

#### c.2.1. Validating contexts

The five contexts that were found in the diary study could be validated in the online survey. The percentages of respondents who had consumed news in the particular context during the last week is presented in table 3 below.

Table 3. Percentages of respondents who had consumed news in the particular context during the last week. Note: the respondents to the survey had the opportunity to choose several of the possible contexts, therefore the total percentage did not add up to 100% (N=72)

| <b>Morning in bed</b> | <b>Simultaneous task</b> | <b>Public transport</b> |
|-----------------------|--------------------------|-------------------------|
| <b>30 %</b>           | <b>70 %</b>              | <b>81 %</b>             |

Noteworthy is that the contexts 'Simultaneous task', 'At work/in school' and 'At home eating' were at this point fused together, since it was found that the major part of news consumption at work or in school also implied an active simultaneous task such as preparing/drinking coffee and checking emails. In addition, it was concluded not to matter if the simultaneous task was carried out at home or at work. For example, to eat at home was also interpreted as a simultaneous task. Together, these three contexts reached 70% of the respondents' contexts for consuming news.

To conclude the results regarding contexts in the diary study and the online survey, contexts were initially gathered from what the diary study participants stated in their diaries. Additional aspects of these contexts were then investigated through follow up interviews with the participants. The contexts were then quantitatively validated in the online survey.

### *c.2.2. Topics*

Similar to the contexts, information on news topics were initially gathered in the diary study and later validated in the online survey. A geographical component was however added to the topics in questions, the result of which is presented in order, with the most interesting topic first, in table 4 below.

Table 4. Percentages of the most common news topics with different geographical components. Note: the respondents to the survey had the opportunity to choose several of the possible topics, therefore the total percentage did not add up to 100% (N=72)

| <b>Most interesting topics - international news:</b> | <b>Most interesting topics - national news:</b> | <b>Most interesting topics - local news:</b> |
|--|---|--|
| Political news (65%)                                 | Political news (62%)                            | Weather (54%)                                |
| Science (52%)  | Culture (34%)                                   | Culture (51%)                                |
| Environmental news (47%)                             | Science (33%)                                   | Political news (36%)                         |
| Culture (23%)  | Economics (32%)                                 | Business (30%)                               |
| Sports (21%)   | Business (28%)                                  | Sports (20%)                                 |

| Most interesting topics - international news: | Most interesting topics - national news: | Most interesting topics - local news: |
|---|--|---------------------------------------|
| Business (21%)                                | Environmental news (25%)                 | Editorial (16%)                       |
| Health (17%)                                  | Weather (20%)                            | Environmental news (15%)              |
| Economics (15%)                               | Health (18%)                             | Health (15%)                          |
| Travel (8%)                                   | Sports (17%)                             | Science (13%)                         |
| Weather (7%)                                  | Editorial (17%)                          | Economics (13%)                       |
| Editorial (5%)                                | Travel (4%)                              | Travel (5%)                           |

### c.2.3. Motivation for consuming news

The question about why the respondents consume news yielded relatively unanimous results, where 87% of the survey takers claimed it was to feel up to date. The second most common reason was to discuss news with others and 53% claimed this was a main motivation to consume news. It can be argued though that by feeling up to date, one has the possibility to discuss news with others. The third and fourth most common reasons, i.e. to feel knowledgeable and to be engaged in global/domestic/local events, were chosen by approximately 40% of the survey takers. The fifth and sixth most common reasons, to be perceived as knowledgeable and to feel less anxious, were chosen by eight and five percent of the respondents respectively. Thus, the primary motivation to consume news was established to be **to feel up to date**.

## D. Discussion and Conclusion

This section includes a discussion about and conclusions regarding the methods and their results of Study I.

The following objectives were addressed in Study I:

- Investigate relevant factors on which to set boundaries for the target group.
- Explore context characteristics related to news consumption on a smartphone.
- Investigate which news topics the target group consumes.

In the online survey, twenty individuals answered that they would like to participate further in the thesis work. These individuals had (as a group) a varied level of interest in news consumption and 20% were very interested. The percentage of individuals that reported that they were very interested in consuming news was the same for both the group of individuals who chose to participate further in the study as for the group of individuals who chose *not* to participate further. Hence, the concern of finding a

disproportionate number of individuals with a high level of interest in news consumption willing to participate was determined to be unfounded.

Moreover, this study identified five contexts in which news is commonly consumed; 'At home in bed', 'At home eating', 'Public transport', 'Simultaneous tasks' and 'At work/in school'. Since both 'At home eating' and 'At work/in school' were determined to involve simultaneous tasks, they were incorporated into a 'new' context: 'Simultaneous tasks'. It is fair to question if this is a logical step and if the resulting context even exists in reality. It is indeed impossible, looking at this data, to determine if the resulting context 'Simultaneous task' exists in real life. However, this does not matter for the validity of this study since the purpose of defining contexts is to find plausible experiences within each context. Thus, the important thing is that the context is relevant for the involved participants of the user tests. In other words, as long as the contexts make sense for the participants, the validity remains high. This is evidently so, since the contexts emerged when defining the participants' experiences in the diary study and the online survey, and the same sample is used for subsequent user tests as well.

Similarly, there is no bulletproof evidence that the five established contexts are in fact *the most* common contexts wherein a larger population consumes news, but they are for this study common *enough* within the sample to continue exploring.

Lastly, noteworthy regarding news topics is that the topics identified in the diary study (see C.1.1 'Keeping diary'), may not correctly reflect a larger population's choice of topics, considering for example varied levels of education and professions. For instance, many online respondents were interested in science (2nd most interesting in the category international and 3rd most interesting in the category national). This may be explained by the fact that the target group mostly included individuals from a Swedish university of technology and Swedish design consultancies working mainly with digital products. However, this is not considered to influence the validity of the results since the same target group was approached in subsequent user tests (Study II and Study III), where the news feed was adapted accordingly (read more in Study II: B.1.3 'News feed'). Thus, the topics are not important per se, but rather a tool in order to develop a value neutral news feed.

## E. Implications

This section includes which findings were brought to the next study, Study II.

The diary study's quantitative data revealed which contexts to further investigate. The qualitative part of the diary study was the basis of how to build them, and which aspects to include. This was brought to the first iteration of components in the user tests in Study II below.

Further, the diary study identified several news which were validated in the on-line survey. These topics were brought to the first iteration in Study II and used when creating news feeds.

The fact that the major part of news was consumed through text was considered when continuing to Study II.

The primary motivation to consume news was to feel up to date, which formed the foundation of all succeeding studies.

It was also concluded that the influence of UI, context and content on the UX could not be fully established at this stage. Therefore, this was further addressed in Study II and Study III.

Lastly, the context of simultaneous task was considered too broad, and needed to be refined for further user tests.



## Summary

Study II was conducted in order to investigate the components found in Study I by conducting remote user testing. To be able to carry out user tests, several components were designed; UI:s, news feeds and a digital prototype that contained them. In addition, the most relevant UI elements, context characteristics and content factors were determined. The tests consisted of participants reading news on a smartphone while carrying out different tasks in certain contexts. The results were then analyzed to find specific UX aspects. It was also evaluated if the contexts were successfully subconsciously induced in the test scenario.

## A. Objectives

The following objectives were addressed in Study II:

- Explore UI elements and content factors related to news consumption on a smartphone.
- Determine the most relevant UI elements, context characteristics and content factors.
- Determine UX aspects and decide on measures.
- Evaluate the possibility of inducing contexts through their characteristics.

## B. Study Design

This section describes the preparations for and conducting the main user test.

### B.1. First iteration

This section addresses the parts required to conduct a user test. This first iteration concludes with a validating pilot test.

#### *B.1.1. Participants*

The decision regarding the number of participants was based on the number of variations of variables within the UI, content and context – which meant that number of participants had to be 4 (the number of UI:s) times 6 (the total number of contents and contexts). The number of participants was therefore defined to 24 (with an additional two participants required for the pilot test). Twenty of the participants were found through the online survey (see Study I: C.2 'Online survey'), while the others were

approached at Vinn Group and at Chalmers University of Technology. The participants were all between 20 and 40 years old, residing in Gothenburg, had Swedish as their native language and had, as a group, a varied interest in news consumption.

### B.1.2. UI

In order to have control over what elements that were varied between different versions of the UI:s, the lowest hierarchies of the UI (as described by Garret (2010)) were identical for all of the UI variations. This meant, in short, that the purpose of all the UI:s were the same – displaying news. As far as up to the second highest level – *skeleton plane* – all UI:s had the same basic level of functionality. To suit the purpose of this study, it was decided that a vertical scroll would most resemble an actual news application and be the simplest way of navigating a news feed.

The variable for the UI instead focused on the highest hierarchy – *surface plane* – where elements can be varied with little effect on the purpose of the product (Garrett, 2010). Using the element of a grid system, placeholders for the different parts of a news feed (headline, lead, body, images) could be arranged in different order and sizes. Grids was found to be a common element of existing news applications and was therefore assumed to increase the familiarity with the UI – hence reducing usability issues.

Still, the UI:s had to be different enough from each other to result in different experiences using them. Also, in order to investigate how elements in the UI and context interplay, each UI had to consist of elements that were clearly definable and compatible with each other (i.e the same UI can't logically have two different navigation systems at the same time). To minimize the number of possible combinations, each UI:s was designed to include two elements: **view** and **image** (Figure 1).

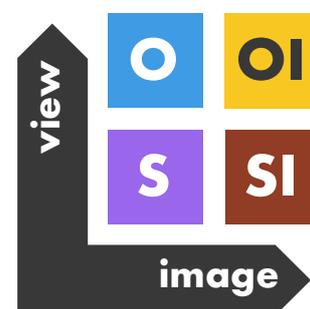


Fig 1. Illustration of possible combinations of UI-elements.

**View** relates to how much information is presented at once – i.e the size of the placeholders in the grid. Research suggest that each modality has a limited number of mental resources, resulting in information conveyed through one modality being more cognitively demanding than multi-modal information (Wickens, 2002). While no other modalities were used due to the delimitations of the thesis, the amount of information conveyed with the same modality was theorized to affect how participants managed simultaneous tasks (see Study II: B.1.5 'Context and task'). This element involved two variations: **overview** and **single view**.

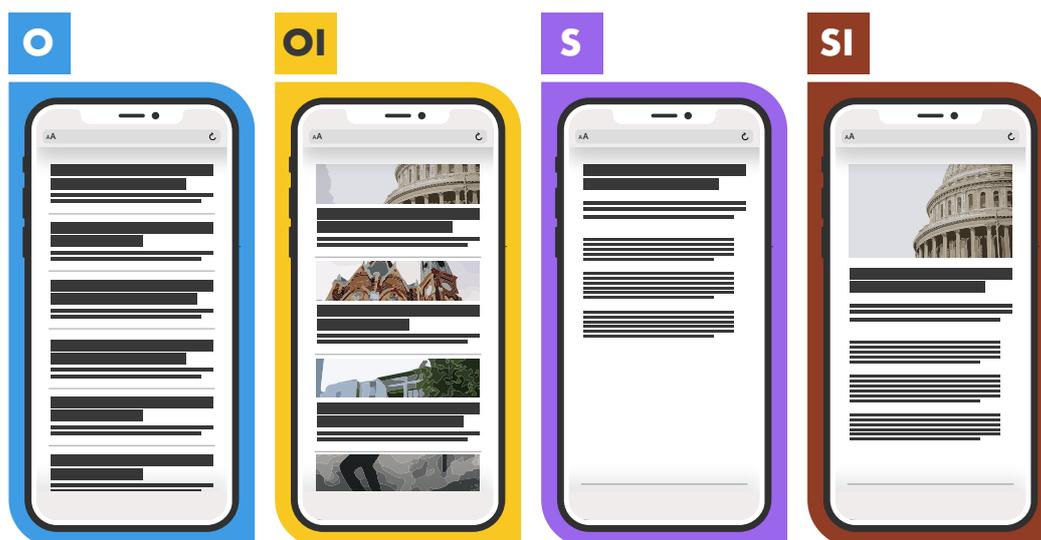


Fig 2. Illustrations of the UI:s used. **O**: Overview without images, **OI**: Overview with images, **S**: Single view without images, **SI**: Single view with images.

**Image** refers to whether or not the UI contains images and was relevant due to existing research suggesting that images affect how news is perceived and consumed (Keib, Espina, Lee, Wojdyski, Choi & Bang, 2018). This element also involved two variations: **with image** and **without image**.

The categories were then combined, creating four different versions of the UI - overview without image (**O**), overview with image (**OI**), single view without image (**S**) and single view with image (**SI**). These are presented in Figure 2.

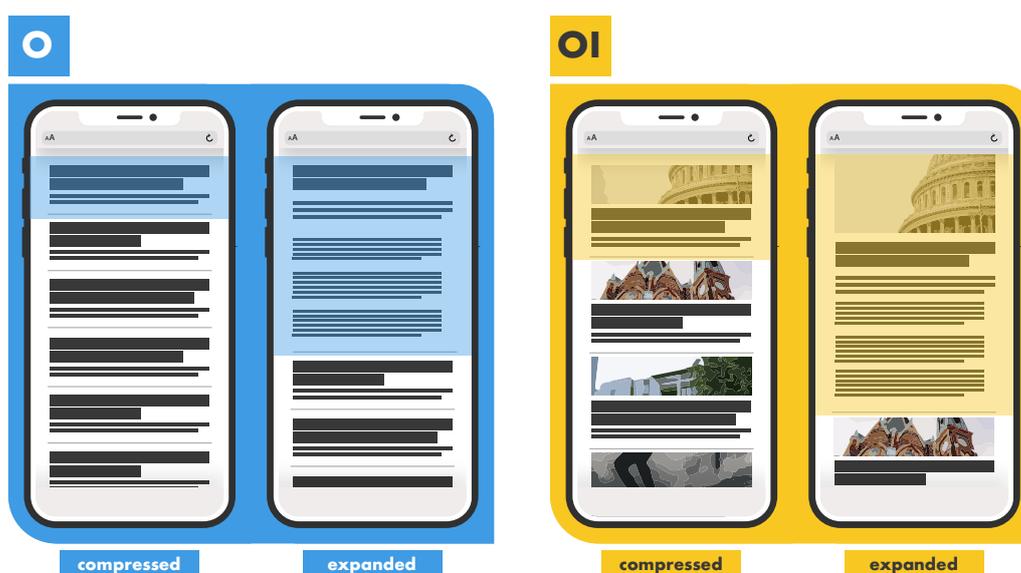


Fig 3. Compressed and expanded versions of the UI:s **O** and **OI**.

In the UI:s containing the element 'overview', the headline and lead of several articles were in view at the same time. By clicking the headline, an article could be expanded or compressed to reveal or hide head, lead and body (Figure 3). This was meant to represent a layout commonly found in online news.

In contrast, in a UI containing the element 'single view', one entire article was in view. This was instead meant to represent a layout commonly found in less news focused applications such as Instagram ([www.instagram.com](http://www.instagram.com)).

### B.1.3. News feed

Regarding the different approaches to news value stated in the framework section of this report, this thesis measured news value with **journalistic** value features. These features determine the news factors that are closest to the reader - which in this case was the most important stakeholder.

The importance of creating a value neutral news feed lied in fixating one variable in the UI/context/content combination, which is this the cornerstone in this thesis project. In order to significantly reduce the number of required user tests, due to limited time and resource in this project, one of these variables had to be fixated. Otherwise, it would be difficult and time consuming to cross factor analyze the influence of all of the three variables. Since the aims of this thesis project mainly revolved around investigating the UX effects of different UI:s in different contexts, the choice fell on fixating the content, i.e. the news feed. In addition, for obvious reasons, this thesis cannot influence the events around the globe that become news. Thus, it seemed logical to keep the content as is.

What this meant for the thesis project and the subsequent user tests, where the news feeds are used, is that the news feed should influence the user experience as little as possible. To illustrate, two examples of *imaginary* news headlines with widely different, but equally high, content influence are presented below.

1. **Imminent danger: World War III is upon us**
  
2. **Scientists: "We have a cure for cancer!"**

Naturally, the actual content of these headlines would arguably affect the reader's user experience more than any UI or context would. Granted, the context could perhaps intensify the user experience, if you would compare a cancer patient's to a healthy

person's experience of the second headline. Again however, it is a fair assumption that the actual news piece would affect the user experience the most.

This was the effect that was desired to be avoided when the news feeds were created. In other words, the news articles were neither supposed to generate extremely positive emotions, nor extremely negative emotions. However, it was not desired to write *too* dull articles and run the risk of participants losing interest in the news feed. In conclusion, the news feed was created with **value neutral articles** about **interesting subjects**.

In order to do so, the collected topics from the diary study and the online survey were used to create the news topics. As stated earlier (see Study I: C.2.2. 'Topics') it is not a concern that these topics may not represent the interests of a larger population, since the news feed is created to be neutral for the participants for this specific project. Thus, it does not have to reflect actual neutrality of e.g. the population of Sweden's news interests.

Furthermore, according to Zoch and Supa (2014), eight factors are considered essential when analyzing the newsworthiness of a news article; proximity, timeliness, immediacy, prominence cultural proximity, unexpectedness, human interest and significance/consequence. These are further explained in Framework: B.4 'Content'. These factors were used to create news feeds with just the right level of newsworthiness, so that the participants in subsequent user tests would feel not too much, and not too little, excitement. Examples of the influence of these factors include proximity, where the severity of the created news articles had to be decreased if they happened close to home, and vice versa. Mainly, old news items, mainly from SVT ([www.svt.se](http://www.svt.se)), DN ([www.dn.se](http://www.dn.se)) and DI ([www.di.se](http://www.di.se)), were rewritten with the purpose of leveling out all of the eight factors of newsworthiness, so they fitted the aim of creating a value neutral news feed.

In conclusion, three news feeds, with 20 news articles in each, were created using the theories presented above: **X<sub>0</sub> Y<sub>0</sub> Z<sub>0</sub>**. These feeds were then used in the pilot test described under Study II: B.2 'Pilot Test (on site)'.

#### B.1.4. *Prototype*

A digital representation of the UI:s was created in Adobe XD (Figure 4). The prototype had the same basic functionality for all UI:s, such as vertical scroll functionality and a finite feed. The only functionality that differed between the prototypes was the clickable headlines of the 'overview' category in the UI:s. This was necessary in order to make it possible to read the entire news feed (i.e headline, lead and body) on all UI:s.

During testing, the prototype was run on a smartphone (iPhone XR). The test moderator could select between UI:s and news feeds on a start up screen that the participants did not have access to. This meant that the moderator could choose the UI and feed designated for the specific test part without the participants being aware of all different versions of the UI – potentially leading to them thinking about comparisons during the test. Participants were otherwise free to interact with the prototype within the newsfeed.

#### B.1.5. Context and task

In order for an evaluation or testing scenario to work, the context somehow has to be introduced to the participant of the test. There are several ways of doing this, and arguably the best is to use the actual context in the test scenario. Although, many times this is logistically impossible, and other ways of introducing context, remotely or in a lab testing room, have to be used. The industry standard, and the most common way to do this, is according to Roto, Rantavuo and Väänänen-Vainio-Mattila (2009), simply to let the participant imagine a high level scenario in which the tested product or service is supposed to be used. For instance, the moderator can instruct the test participant to imagine sitting on a bus. A storyboard that illustrates how the product is used, is an example of appropriate methods to introduce the context to the participant (Roto et al., 2009). The advantage of such an approach is, according to the authors of this report, the richness that it entails. Since the participant can imagine a real life scenario and is able to fill in the introduced context with a self-lived experience, it can enhance the impact of the context.

However, the disadvantage is, arguably, having low control of how the context is perceived by the test person, and individual preferences and experiences of a particular context matter greatly. In other words, it is close to impossible to fathom if the context to which the participant is introduced, is perceived in a (by the moderator) desired way. Therefore, this approach carry a risk of bias based on the participants' prior experience, and whether they are positive or negative towards that particular context.

Instead, the approach taken in this thesis project to create the context for the UX tests is to subconsciously *induce* a specific emotion in the test person - an emotion that can be related to a participant's earlier experience of the particular context. Examples of these emotions are stress, restlessness and boredom. Consequently, this would imply

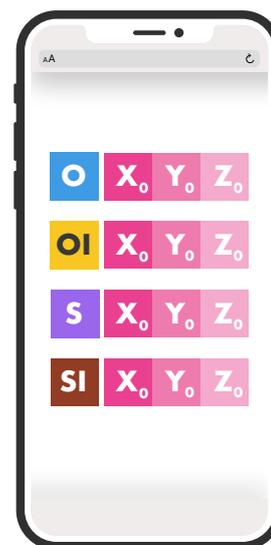


Fig 4. Illustration of the prototype used in user tests.

not telling the test person to imagine a certain context, but instead induce emotions that hopefully subconsciously reminds the test person of the particular context. The emotions are part of certain characteristics of the three contexts presented below (**A<sub>0</sub>**, **B<sub>0</sub>**, **C<sub>0</sub>**), and are carefully induced in the participants in order for them to experience the context without actually knowing what the real context is, therefore minimizing the risk of bias.

To be clear, this approach/method is created and hypothesized by the authors of this thesis, and is evaluated in Study II: B.2 'Pilot test (on site)', Study II: D.3.1 'Inducing contexts', and in General Discussion & Conclusions: A.1.6 'Did they experience the context?'

Regarding the actual contexts, using the results from the diary study, which were validated in the online survey, contexts were defined. It was observed in the context validation that three of the four categories stood out in terms of richness in data; 'Morning in bed', 'Simultaneous task' and 'Public transport'. As concluded in Study I: C.1.2 'Interview - Contexts', the 'At home eating' context did not yield many relevant results. In addition, the majority of participants consuming news in this particular context watched news videos. For these two reasons, the 'At home eating' context was discarded. Thus, the three aforementioned contexts were decided to move forward with. For clarity, these contexts are further broken down, developed and named; **A<sub>0</sub>**, **B<sub>0</sub>** and **C<sub>0</sub>**. Each context is defined by a few essential characteristics, and in order to be able to fully separate and analyze the contexts, two contexts *cannot* have the same characteristic. It is also described how the contexts are used in the test scenarios. These scenarios include specific tasks that the participants were given during the tests.

The time frames that were introduced in the contexts (the number of minutes the participants were to read news or the number of minutes they were supposed to complete a specific task in) were based on how long the news feeds were, and how long it took to read them carefully. For example, if a context should be more stressful, the participants had less time than it took to finish the feed, and if a context should be less stressful, participants had more time than it took to finish the feed.

### **A<sub>0</sub> - Public transport**

Firstly, most individuals consuming news on the bus or tram generally do this sitting down. Therefore, during this test scenario, the participants sat in a standard chair.

Secondly, there is always a specific time when the individual reaches their destination and has to alight, i.e. when you reach the destination, you have to get off the bus. Therefore, the given task was time defined - the participants were asked to read their

given news feed through their given UI, with the aim of feeling up to date, for exactly four minutes.

Thirdly, using public transport means actually going somewhere, whether it is a place with positive or negative connotations. Hence, going somewhere creates an anticipation, either positive or negative. To separate this characteristic with an anticipation also found in the 'Morning in bed' context, the public transport anticipation is positive, i.e. the individual is going somewhere fun. In the test scenario, this means a positive anticipation was created. Therefore, the participants had the opportunity to fiddle around with a few toys, including a fidget spinner and a bouncing ball, after the public transport test part was finished.

Lastly, since the individual is seldom alone on the bus, there is a risk that the individual is observed while e.g. reading news on the phone. In addition, there is sometimes a need to adapt to other passengers. For example, it might be required to rise and let the person sitting by the window out. Therefore, the participant was asked to change seats once during the four minutes of reading time, an action that the participant was prepared for. The participant was also observed by one of the moderators during the test, to simulate people looking over the shoulder on a crowded bus.

### **B<sub>0</sub> - Simultaneous task - cooking**

Since the action of carrying out a simultaneous task while reading news encompasses many different scenarios, this context is focused on the act of cooking food while reading news on the phone. This specific scenario was common in the diary study.

Firstly, cooking is something most often done standing up. Therefore, the participant during this test scenario stood up at a high desk.

Secondly, and mainly, cooking food requires a certain focus, creativity and energy, with everything from following a recipe to chopping vegetables and boiling pasta water. If an individual simultaneously reads news, it requires a split focus between the cooking and the news consumption. Naturally, the cooking process also gets interrupted. Therefore, the participants were asked to control a stopwatch while reading news and carrying out tasks. To expand, the given task was to follow written instructions (to simulate following a recipe), where the participant first built a simple figure out of LEGO blocks. LEGO blocks were chosen to simulate an easy task while cooking, e.g. boil pasta water. Afterwards, the participant started a stopwatch.

Thirdly, the participant read their given news feed through their given UI, with the aim of feeling up to date, and when the stopwatch read between two and two and a half

minutes, they were to stop reading news. This forced the participant to have a split focus between the news and the stopwatch, which simulated the split focus while cooking. This procedure was done twice to simulate several steps in a recipe, and also to equate the total reading time to the one in the public transport scenario.

The written instructions as given to the participants can be found in Appendix II.

### **C<sub>0</sub> - Morning in bed**

Firstly, the natural setting of this context is the bedroom, early morning, where it (arguably) is comfortable, safe and dark. Therefore, the participant was asked to carry out this test scenario in a comfortable chair. The curtains were closed to make the room dark.

Secondly, this context also entails an anticipation. Reading news in bed, in the morning, during work or school weeks implies eventually stop consuming news and actually get out of bed in order to get on with one's morning routine. Arguably, leaving a warm and comfortable bed in order to get ready for work, can be disheartening. Thus, the anticipation in this context is deemed to be negative. This was an especially essential characteristic to include in the user tests, even if no interviewee actually brought it up during the follow up interviews in the diary study.

In addition, the act of procrastinating in bed naturally does not have a defined end time, so one must decide oneself when it is time to get up. However, the longer one stays in bed, the less time can be dedicated to the morning routine, which arguably is undesired.

In the test scenario, to simulate the negative anticipation, the participant was first prepared to, after the reading phase of the test, verbally count out loud (one, two, three, and so on, upwards). This was considered a dull and tedious task. Following this, the participant read their given news feed through their given UI, with the aim of feeling up to date, for four minutes. Next, to simulate the choice of getting out of bed at any moment, the participant was able to choose at what point they wanted to stop reading and instead start counting, according to the time model below (Figure 5), i.e. between the four minute and the eight minute mark. The remaining time (up to 12 minutes) was described to be counting time. For example, if the participant wanted to stop reading after five minutes, they were told to have to count for seven minutes.

**However**, since the reason for the counting was only to induce negative anticipation, i.e. that the participant *thought* they had to count, that participant was stopped after counting for a few seconds. To clarify, the participant *did not* have to count for the

remaining of the 12 minutes. This method indeed raises an ethical question, which are discussed in General Discussions & Conclusion: C.4.1 'Ethical sustainability'.



Fig 5. Model that explains the time frame of the task.

#### B.1.6. *Setting*

The setting for the user tests had to be a location in Gothenburg that the test supervisors had access to and that was, to some degree, customizable. Due to the fact that contexts were to be induced, it was important to find a location where the influence from external stimuli could be minimized, while the stimuli inside the room could be controlled by the supervisors. Since the user tests were to be conducted *on site*, the location also had to be large enough to house both the test leader, an assistant and a participant.

In order to give the participants the option to choose a location for their test, two separate locations were decided upon. The primary location was a conference room at Vinn Group, Gothenburg, with a maximum capacity of 13 people (Figure 7). This room was sound isolated, shades could cover the windows and the lighting could be dimmed and color adjusted. The furniture consisted of a large immovable table, surrounded by chairs. To accommodate the solitary and comfortable environment required for context  $C_0$ , a lounge chair was placed in the room in such a way that the supervisors could enter and exit the room without disturbing the participant.

An additional location was found at Chalmers University of Technology (Figure 6). This location was a small lecture hall (room) that could be physically closed off from the outside with sliding doors. While the lighting was not dimmable and there was limited possibility for using comfortable furniture, the room had moveable sound isolated screens – which were used to surround the participant in order to create a sense of solitude for context  $C_0$ . Furniture in the room (chairs and tables) could be moved freely and was placed similarly to the fixed furniture at the primary location.

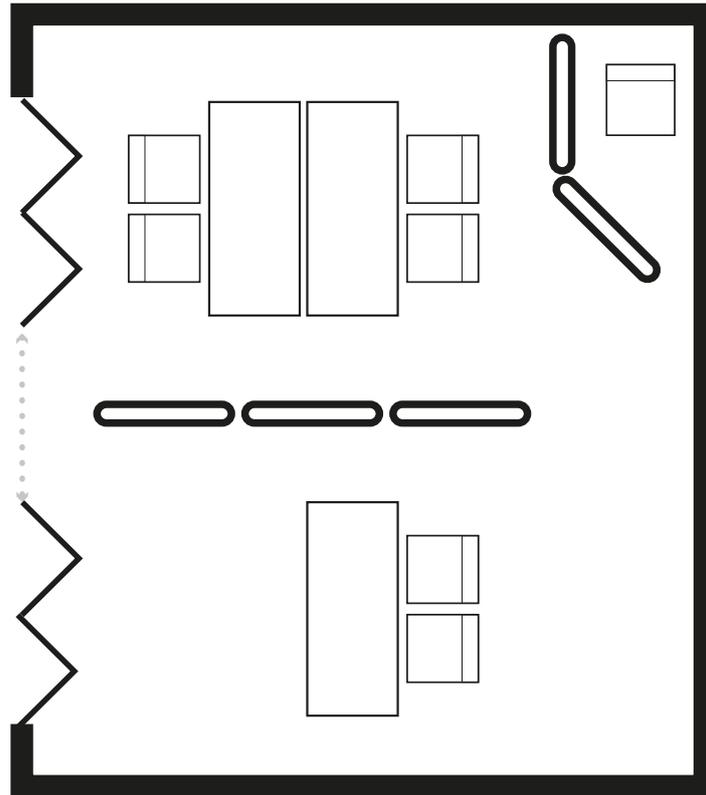


Fig 6. Location setup of the lecture room at Chalmers.

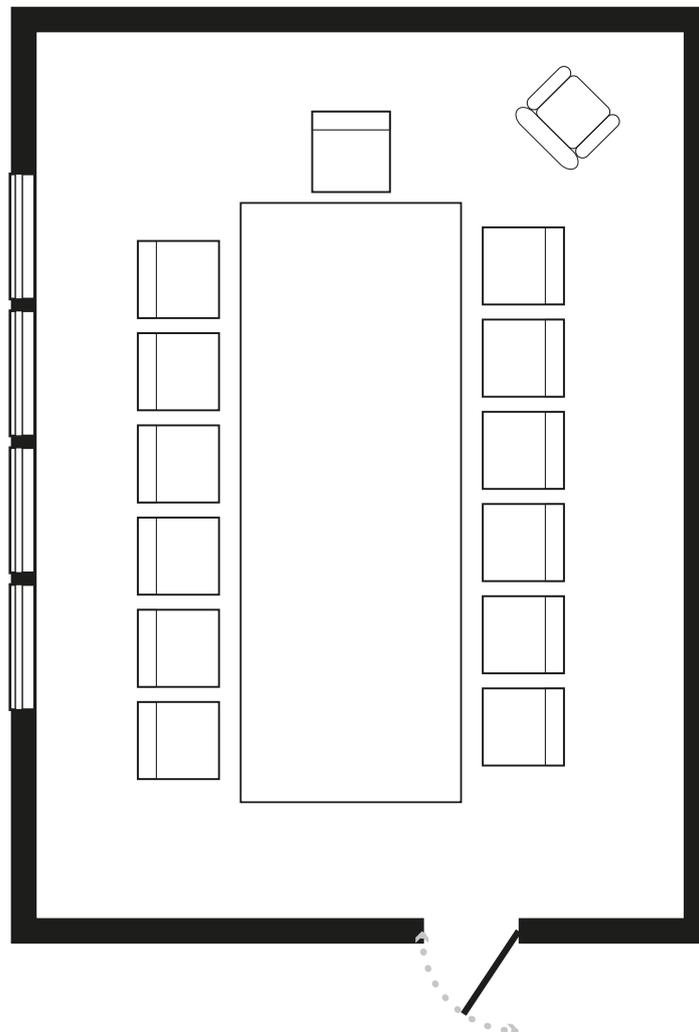


Fig 7. Location setup of the conference room at Vinn Group.

### B.1.7. Procedure

Each test involved three individuals: a **test leader** – introducing tasks and conducting interview – an **assistant** – responsible for taking notes, changing prototype content and contexts – and a **participant** who followed the instructions from the test leader. Both the test leader and the assistant followed a predefined, common script (see Appendix III), while the participant was unaware of the test procedure.

To avoid influence from the order in which the test was conducted, all different combinations of context and content variables had to be included in the test. Arranging the variables **A<sub>0</sub>**, **B<sub>0</sub>**, **C<sub>0</sub>** and **X<sub>0</sub>**, **Y<sub>0</sub>**, **Z<sub>0</sub>** in different orders resulted in 6 possible variations. The number of tests was then determined by this number of variations, distributed over four different UI:s – conducted twice to increase the sample size (Figure 8).

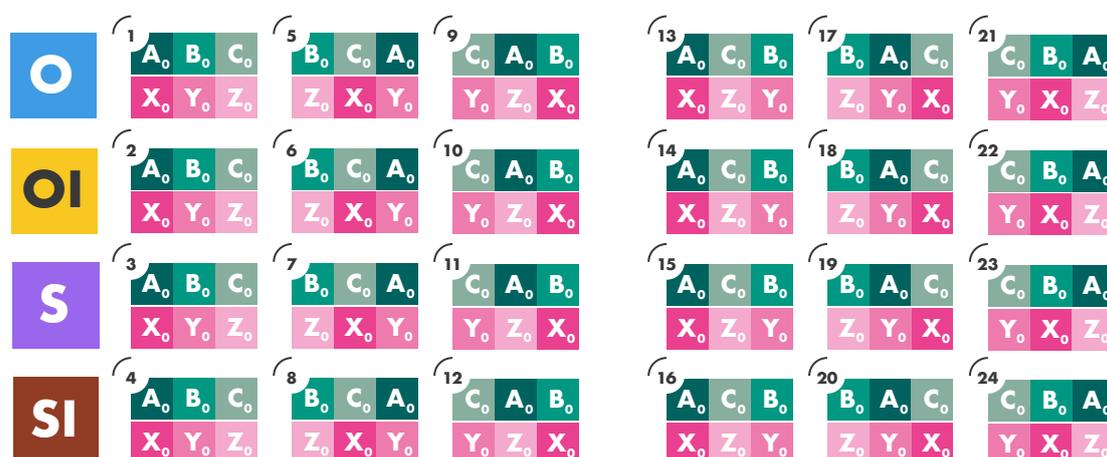


Fig 8. Illustration of test procedure with 24 participants reading a specific news feed - **X<sub>0</sub>**, **Y<sub>0</sub>**, or **Z<sub>0</sub>** in a specific context - **A<sub>0</sub>**, **B<sub>0</sub>** or **C<sub>0</sub>**, with a specific UI - **O**, **OI**, **S** or **SI**.

Each test consisted of three parts:

Firstly, the participant received a consent form where they could choose whether or not to agree to having their voice recorded during the test. They also signed when having received a cinema ticket as a reward for their participation.

Secondly, the participant read a news feed (**X<sub>0</sub>**, **Y<sub>0</sub>** and **Z<sub>0</sub>**) on a smartphone using the prototype – set to their designated UI (**O**, **OI**, **S** or **I**) – while they performed a specific task in a specific contexts (**A<sub>0</sub>**, **B<sub>0</sub>** and **C<sub>0</sub>**). After completing the task, the participants filled in a self-assessment questionnaire that described their experience of the content and the context. The participants rated their experience on a scale from 1-10 on three different items: "How up to date are you on the feed you just read? (**UTD**)", "Was the

feed positive / negative? (**POS/NEG**)”, ”Was the feed interesting? (**INT**)”. Participants also named the article that they found most rememberable. Due to the fact that comparison between subjects was going to be made, it was important to establish common measures on which all subjects evaluated their experiences (Roto, Rantavuo & Väänänen-Vainio-Mattila, 2009). The measures focused on common motivations for consuming news found in the online survey and diary study.

The assistant then changed the context and content and step 2 was repeated for all three contexts **A<sub>0</sub>**, **B<sub>0</sub>** and **C<sub>0</sub>**.

Thirdly, an in-depth interview was conducted to elaborate the self-assessment responses and to further understand the experience that the participants had in the different contexts. The interview questions focused on the differences in the self-assessments between different contexts. These questions can be found in full in appendix VI. Further, the participants were asked to elaborate on their experience of the context and could describe it in their own word. (as opposed to being constrained to the questions in the self-assessment questionnaire). They were then asked to guess what common situation they perceived the contexts to be emulations of. As a way of investigating if it was easier to remember the articles from a specific context, the participants were asked to name an additional (i.e. other than the article named in the self-assessment questionnaire) article from each of the contexts. This then served as a reference point for a continued discussion on the topic of remembering in relation to the different contexts.

## B.2. Pilot test (on site)

A pilot test with two participants was conducted according to the procedure described in Study II: B.1.7 'Procedure'. To be able to practice the logistics and evaluate the prototype, the participants used different UI:s – **OI** and **SI** – and performed tasks in different orders (Figure 9). One test was conducted at each of the locations (primary and secondary), in order to investigate if the settings were suitable. In addition to the interview intended for the upcoming 'main test', pilot test participants were asked questions regarding the contexts in order to determine if they were at all affected by the attempts to induce experiences.

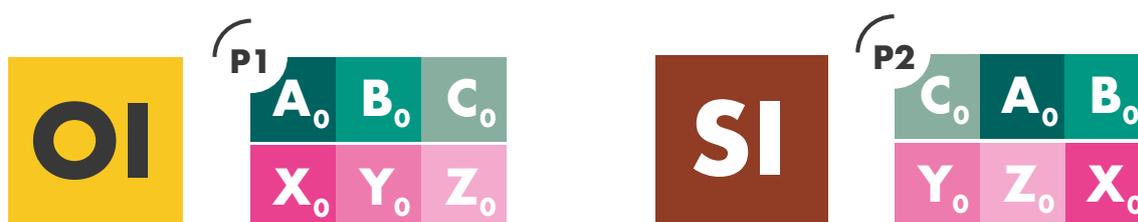


Fig 9. Illustration of test procedure with two pilot test participants reading a specific news feed - **X<sub>0</sub>**, **Y<sub>0</sub>**, or **Z<sub>0</sub>** in a specific context - **A<sub>0</sub>**, **B<sub>0</sub>** or **C<sub>0</sub>**, with a specific UI - **OI** or **SI**.

In general, the results from the pilot test was in favor of the planned test procedure. The participants did experience emotional differences between contexts and the interview questions were able to investigate this aspect. This indicates that inducing contexts worked according to plan. This is further discussed in Study II: D.3.1 'Inducing context' and in the General Discussion & Conclusions: A.1.6 'Did they experience the context?'

In addition, prototypes, settings and logistics worked without issues. The total test time (not accounting for questions specific to the pilot test) did not exceed the intended one hour.

However, the pilot test revealed two issues. Primarily, both participants acknowledged that some articles in the feed were too severe (in comparison to the other articles). This means that the participants in the pilot test described the particular articles as too upsetting or horrible, which affected their experience. Secondly, during the context C<sub>0</sub>, both participants felt confounded regarding why they were supposed to count and therefore spent time pondering this instead of focusing on the task.

### **B.3. Second iteration**

Based on findings from the pilot test, a second iteration of the study design was carried out. In addition, the corona crisis meant that all further work had to be conducted remotely – which in turn changed the requirements for the second iteration. Since many of the students and professionals at Vinn Group at this time worked from home, the remaining tests described in this thesis had to be carried out in the participants' own homes.

#### *B.3.1. Setting*

Due to the requirement of conducting tests remotely, the setting was different for every test. Instead of having a physical location, every participant attended the user test via the video chat service Google Hangout ([www.hangouts.google.com](http://www.hangouts.google.com)). While the downside was that there was limited control over how customizable each location was, the participants were at home – resulting in a more natural and relaxed environment that could be used to enhance some contexts (see context C<sub>0</sub> - 'Morning In bed' in Study II: B.1.5 'Context and task'). This physical distance between test supervisors and participants also had implications for the procedure (Study II: B.3.6 'Procedure').

#### *B.3.2. Participants*

Due to the change in the number of contexts and news feeds from three to two, the possible number of variations also changed - to four. This meant that the total number of participants had to be divisible by 4 (the number of UI:s) times 4 (the total number of

contents and contexts). The number of participants was therefore decided to be 16 (with an additional two for a second iteration pilot test). The demographic of participants was identical to that of the first iteration.

### *B.3.3. Context and task*

Due to the new limitation of testing remotely, three contexts had to become two. This was a major adaptation of the thesis project, and perhaps the biggest change that had to be made due to the corona crisis. After discussions and a week of adapting the test to work remotely, it was concluded that the **public transport** context had to be discarded. The characteristics of the context (mainly the observation of the participant and their phone) were simply deemed too difficult to induce remotely. Therefore, two contexts were further developed and adapted in the second iteration. These adaptations, **B** and **C**, are presented below.

#### **B - Simultaneous task - cooking**

The major part of this test scenario and given tasks were similar to the first iteration. However, some changes were made.

Firstly, it was assumed that few of the participants had access to a stand-up-table at home. Therefore, the moderators settled with carrying out the tasks with the participants sitting down at a standard table; thus removing the characteristic of standing up in the cooking context.

Secondly, it was assumed that not all of the participants had access to LEGO blocks, so the task of arranging the LEGO in simple forms was switched to arranging cutlery in different formations. It was considered likely that all of the participants had access to cutlery. Arguably, this did however not change the quality of the gathered data.

Thirdly, the participants had to stop the stopwatch in between one and one and a half minutes, instead of the former two and two and a half minutes. This was done to further enhance the characteristic of split focus. See Appendix IV for the complete instructions that the participants followed in context B.

#### **C - Morning in bed**

Similar to the previous presented context, the majority of the test scenario could be reused regarding this context as well. However, since the natural context of reading news in one's bed takes place at home, the ecological validity of this context could in fact be improved when working remotely. Instead of carrying out the tasks in a comfortable chair in the test room, now the participant was asked to carry out this test

scenario in bed, with lights off and curtains closed. A comfortable sofa in a living room with closed curtains was also accepted as a setting.

Furthermore, as stated in Study II: B.2 'Pilot test (on site)', both participants in the two pilot tests claimed they were confused by why they had to count at the end of the in bed context. Therefore, a white lie was introduced in the procedure, where the moderator claimed the counting was to be used in another and separate part of this thesis project

Noteworthy is that since the chosen way of inducing contexts works on site as well as remotely, no changes had to be made in regards to that.

#### B.3.4. *News feed*

Since one of the contexts was discarded when adapting to remote testing, and to simplify the variations of the combination content/context for each test group, one news feed was also discarded (see Figure 11). This means there were two contexts, B and C, and two news feeds, X and Y, left when moving into the second pilot test.

In addition, the two remaining news feeds were slightly adapted due to the results from the first pilot test, where one participant in the pilot claimed that the content of some articles was too severe. Thus, the severity of the mentioned articles was reduced by removing mentions of fatalities and reducing the number of people injured in articles.

#### B.3.5. *Prototype*

No adjustments were made to how the prototype worked. The only difference was that it had to be run on the participants' own smartphones. This was done by using an online version of Adobe XD, where participants could access the prototype on a website. While it had the same functionality, the online version of the prototype was slower and was not as responsive as the version running in the Adobe XD application. Since the prototype was run in a web browser, it further meant that if the participant would accidentally scroll backwards, the prototype would exit to whatever website was previously visited. To avoid this, these issues were explained to participants before the test began. The available news feeds were also changed on the main screen (Figure 10).



Fig 10. Illustration of the main screen of the prototype used in user tests.

#### B.3.6. *Procedure*

The first and second iterations of the procedure were identical regarding the roles of the test leader and assistant. Where it did differ was in the role of the participant who

now had to supply many of the things necessary to be able to conduct the test – a smart phone, computer and necessary equipment for tasks.

Prior to the test, essential material was sent to the participants via email. This included a PDF with links to the self assessment form, consent form and to a digital version of the prototype (see Study II: B.3.5 'Prototype').

Due to the fact that the number of contexts and news feeds was changed for the second iteration, a new order of test was established with a new total number of variations (Figure 11).

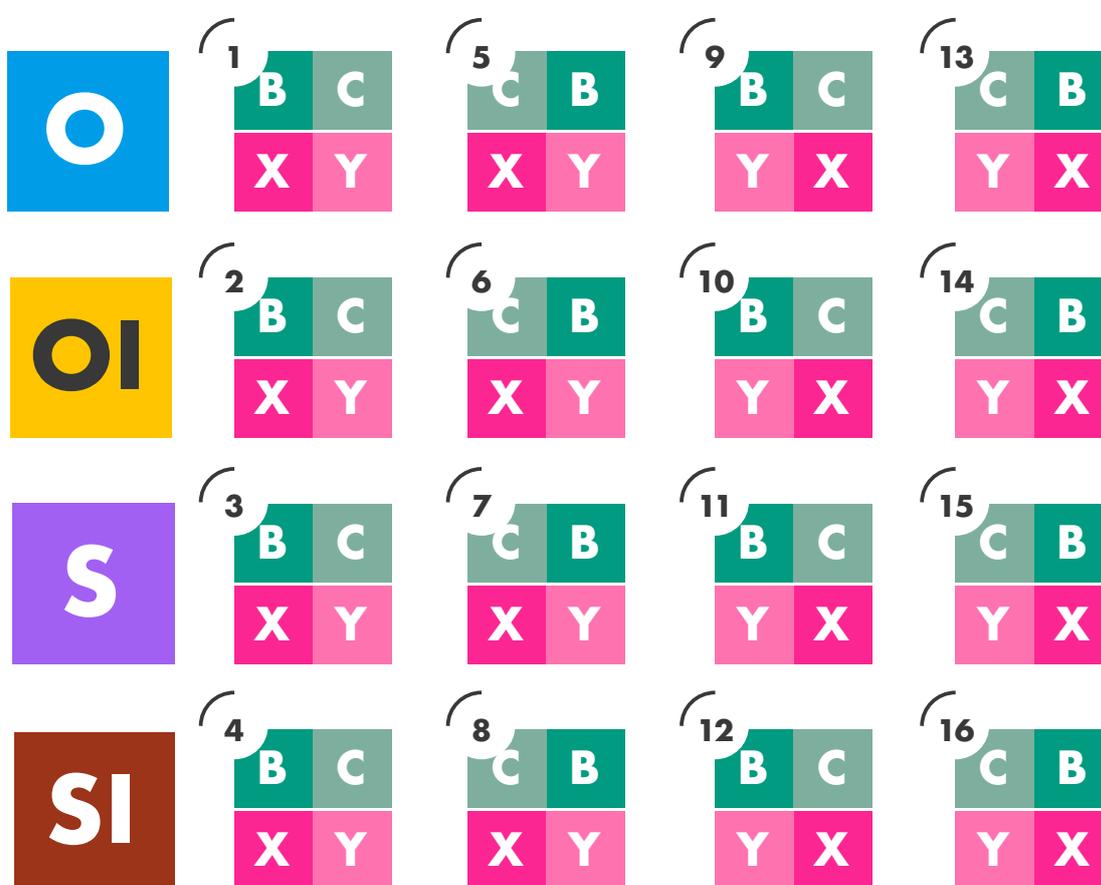


Fig 11. Illustration of test procedure with 16 participants reading a specific news feed - **X**, or **Y** in a specific context - **B** or **C** with a specific UI - **O**, **OI**, **S** or **SI**.

As in the first iteration, each test consisted of three parts:

Firstly, the participant opened the consent form on their computer, where they could choose whether or not to agree to having their voice recorded during the test. They also signed when having received a cinema ticket as a reward for their participation.

Secondly, the participant opened the prototype link and was told by the test leader what option to choose from the main screen. They then read a news feed (**X** and **Y**) set to their designated UI (**O**, **OI**, **S** or **SI**) – while they performed a specific task in a specific context (**B** and **C**). After completing the task, the participants filled in a self-assessment questionnaire where they rated their experiences of the content and the context (see Appendix V). The participants rated their experience on a scale from 1-10 on: "How up to date are you on the feed you just read? (**UTD**)", "Was the feed positive / negative? (**POS/NEG**)", "Was the feed interesting? (**INT**)". Participants also named the article that they found most rememberable.

The participant was then instructed to restart the prototype and select another option from the main screen. Step 2 was repeated for both contexts B and C.

Thirdly, an in-depth interview was conducted to elaborate the self-assessment questionnaire responses and to further understand the experience that the participants had in the different contexts. The interview questions focused on the differences in the self-assessments between different contexts. These questions can be found in full in Appendix VI. Further, the participants were asked to elaborate on their experience of the context and could describe it in their own words (as opposed to being constrained to the questions in the self assessment). They were then asked to guess what common real life situation they perceived the contexts to resemble. As a way of investigating if it was easier to remember the articles from a specific context, the participants were asked to name an additional from each of the contexts (i.e. other than the article named in the self-assessment questionnaire). This then served as a reference point for a continued discussion on the topic of remembering in relation to the different contexts.

#### **B.4. Pilot test (remote)**

A pilot test with two participants was conducted according to the procedure in Study II: B.3.6 'Procedure'. The second iteration of the pilot test mainly aimed to practice the logistics and evaluate if contexts could be induced remotely. As in the first iteration, the UI:s **OI** and **SI** were used and tasks were performed in different orders (Figure 12). In addition to the interview intended for the upcoming 'main test', pilot test participants were asked questions regarding the contexts in order to determine if they were at all affected by the attempts to induce experiences.

The pilot test revealed that it was possible to conduct the tests remotely. As in the first iteration, both prototype, settings and logistics worked without issues. The only difference was that the logistics of having the participant switching contexts and setting



Fig 12. Illustration of test procedure with two pilot test participants reading a specific news feed - **X** or **Y** in a specific context - **B** or **C** with a specific UI - **OI** or **SI**.

up the prototype meant that the tests ran longer. Still, since the number of contexts was reduced for the remote tests, the total test time was still shorter than the intended one hour.

### B.5. Main test

The main tests were conducted remotely during a one week period with a total of 16 participants. The test were run according to the procedure designed in the second iteration and validated in the pilot test. During the interview part of the test, the assistant transcribed on a computer in real-time what the participants said. This material was then used as a basis for the analysis.

### B.6. Analysis

This section describes the methods used to analyze the collected data. Quantitative data was transferred from the self-assessment questionnaire to an Excel document where different operations could be performed with the data – such as calculating the mean values. Qualitative data was retrieved from the transcribed interviews.

#### B.6.1. Mean values

To be able to compare the experiences rated in the self-assessment questionnaire (for instance when comparing UI:s in a particular context) the mean value for each UX aspect (UTD, INT and POS/NEG) was calculated. Using mean values for comparisons was chosen due to the fact that this could describe a generalized experience and was therefore suitable for comparisons between different aspects. The downside with using the mean value is that it does not show if there is a large distribution of answers, hence further analysis was done to determine this.

#### B.6.2. *Distribution of responses*

In order to investigate if the experiences that participants had with a specific UI in a specific context were similar within that group, the distribution of response within the dataset was calculated. This was done by looking at the difference between the highest and lowest values (highest value and subtracting the lowest value). This value was calculated for all the quantitative aspects and summed up to determine a value for a specific UI in a specific context. It was assumed that a low distribution would equal a more homogenous (and in extension a possibly more predictable) experience – since all the participants within that group would have had to rate their experience equally.

#### B.6.3. *Affinity diagram*

The qualitative data was analyzed by looking for similar answers between different participants. Further, additional information regarding the UX aspects **UTD**, **INT** and **POS/NEG** was investigated in the data. All data points were then collected in an affinity diagram where common topics and answers created clusters. To determine which UI was responsible for which data point, the different UI:s were given a color. Each of the clusters was further divided into responses specific to a particular context or general statements. In turn, these responses formed the basis for the created UX profiles

#### B.6.4. *UX profiles*

After completing the affinity diagram, the responses related to each UI within every cluster was combined into a concluded version of the experience that the participants using that UI had in a specific context. This meant that eight different "UX profiles" (two contexts times four UI:s) were created that contained both quantitative data collected in the self-assessment questionnaire, as well as qualitative data describing their experience. The completed UX profiles was then used to support in the comparison between different UI:s and contexts.

The quantitative data was illustrated in a radar chart using the UX aspects **UTD**, **INT**, **POS/NEG**, **Relaxation** (see Study II: C.1 'UX profiles'), **Easy to remember**. The direction of the axis meant that normatively more positive experiences – such as being *more* up to date – had increasing values.

The qualitative data was illustrated in categories regarding the participants' particular experiences of the respective UI:s. The categories related both to participants' anticipations, manner of consumption, their emotional experience as well as their experience of the content.

## C. Results

This section contains the results from the Study II user tests, divided into findings, concluded experiences in UX profiles, context break downs and comparisons of UI elements with these broken down contexts. The UX profiles are presented first, which act as a visual summary of Study II: C.2 'Findings', presented after the UX profiles.

### c.1. UX profiles

To fully understand the experience of every UI in every context, UX profiles were made. These UX profiles are descriptions of the overall experience that participants from user tests in Study II had of every UI in each context. In order to create the UX profiles, all of the findings from the qualitative data that were categorized in the affinity diagram, were recategorized under a certain UI in a certain context. This categorization composed the basis for the creation of the UX profiles, presented below.

To explain the profiles, the bottom left corner regards how the context affects experience. As stated in Study II: C.2.10 'Perceived contexts', the context **B** is with every UI perceived as public transport. The two columns to the right depicts how the participants' planning and execution of the task depend on their prior anticipation. To the right, experiences of the specific UI in the specific context are presented; feeling and mood-based experiences at the top, and content-based experiences just below.

This radar chart in the middle graphically describes the UX profile based on the most important UX aspects found; **UTD**, **INT**, if the content is **easy to remember**, **POS/NEG** (where the farther out the mark is placed, the more positive the experience of the news feed) and **relaxation**. To the right of the radar chart, a small numbered triangle is placed. This value shows the distribution of responses, deeply analyzed in Study II C.2.4 'Distribution of responses'. Basically, these values show how varied the experience of the specific UI in the specific context is. Thus, the UX profile with the highest distribution of responses, **OI-C**, is arguably not as representative of what the participants using that UI in that context actually experienced.

## C.1.1. O-B

The overall experience of **O-B** is presented below. Firstly, the context was perceived as public transport, and entailed a split focus between news and something else. It was claimed that it felt like a test, and that it was fun to carry out. The participants anticipated that there was only time for a shallow understanding of the news articles and read for that reason from the top of the news feed without skipping any articles. Moreover, they read mostly headlines and the first paragraphs, without delving into the text body of every article. On average, the participants read four to five articles with UI **O** in context **B**.

Furthermore, the participants defined their experience as feeling distracted and annoyed. These feelings are interpreted to stem from the fact that context **B** offered a short reading time with external diversions (arranging cutlery) in combination with UI **O** having an overview style, where many articles could be seen at the same time. This is believed to create annoyance and the feeling of distraction. This claim is backed up by the fact that participants only felt distracted with **O-B** and **OI-B**, and not **S-B** and **SI-B**.

Moreover, it is claimed that positive articles colors the entire experience of the news feed, as opposed to negative articles, even though the first few articles in a feed are claimed to be negative. Therefore, it can be concluded that first articles in a feed with **O-B**, do not color the entire experience more than any other, even though most focus is put on reading from the top.

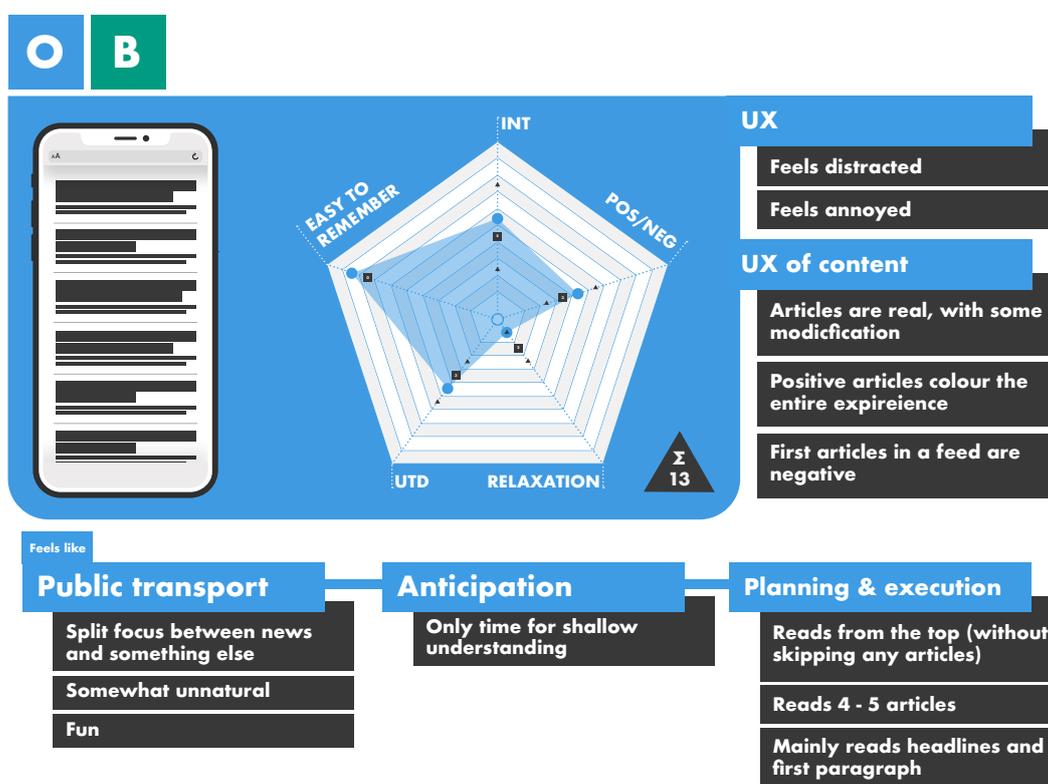


Fig 13. UX profile illustrating the participants' experiences of the UI **O** in context **B**.

C.1.2. *OI-B*

The overall experience of **OI-B** is presented below. Firstly, the context was perceived as public transport, and entailed a split focus between news and something else. It was also claimed that it felt like a test.

Secondly, the participants' anticipation differed from the anticipation with **O-B**. With **OI-B** it was claimed that they only had time to read interesting articles, *or* to read articles in order to feel up to date. Two things can be concluded from this data. One, reading only interesting articles is not the same as reading with the goal of feeling up to date; i.e. you do not feel up to date if you only read interesting news stories. Two, the mere addition of images makes the user think of which articles are interesting, and which are not. This was not the case with **O-B**, where the participants read from the top, without reflecting on interests.

In turn, this anticipation lead to the participants scrolling through the feed, reading only interesting articles (on average, they find and read three). In other words, when faced with either reading interesting articles or feeling up to date, participants with **OI-B** choose interesting articles. On average, participants with **OI-B** read 4 articles.

Furthermore, the participants defined their experience as feeling distracted and curious, and not being susceptible to news. In addition, they felt curious, which might be the consequence of seeing images. They also had the lowest value of feeling up to date of all UI:s in any context. See more in Study II: C.2.2 'Feeling up to date (UTD)'. In addition, participants claimed the news feed mostly included non-trivial news.

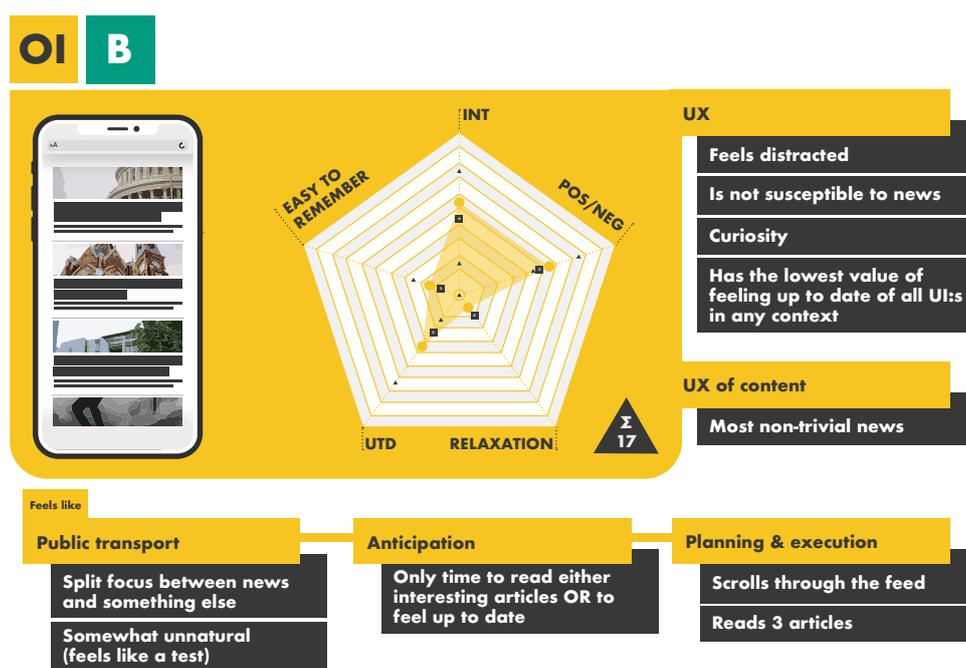


Fig 14. UX profile illustrating the participants' experiences of the UI **OI** in context **B**.

## C.1.3. S-B

The overall experience of **S-B** is presented below. Firstly, the context was perceived as public transport, and entailed a split focus between news and something else. The test was claimed to simulate a short attention span, something that was at least partly true. The participants also believed the context to be realistic.

Moreover, the short reading time generated in this case an interesting anticipation. The participants with **S** in **B** anticipated to accept less info to feel up to date. This means that their definition of feeling up to date changes depending on external characteristics, such as total reading time.

In execution, this means reading from the top without skipping any articles, reading in a high tempo and not reaching the bottom of the feed. See more about reaching the bottom in Study II: C.2.5 'Manner of consumption'. On average, participants with **S-B** read 6 articles.

Furthermore, the participants defined their experience as having a high concentration, but at the same time that it is easy to lose focus. This might seem contradictory at first, but is analyzed to stem from two different things. The participants had a high concentration on the given task as a whole, but easily lost focus on the news reading per se. They also claimed they felt safe. In addition, the participants with **S** felt more up to date than participants with any other UI in context **B**, and claimed the news feed was more interesting than news feeds in any other UI in context **B**.

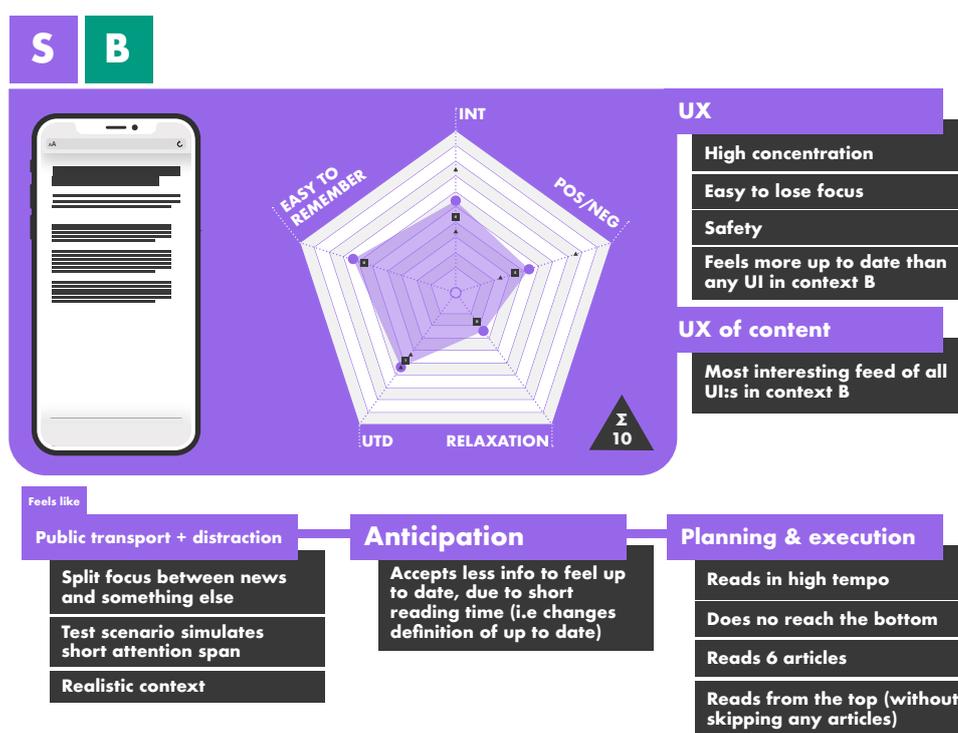


Fig 15. UX profile illustrating the participants' experiences of the UI **S** in context **B**.

C.1.4. SI-B

The overall experience of **SI-B** is presented below. Firstly, the context was perceived as public transport, and entailed a split focus between news and something else.

Secondly, the participants had the anticipation of not having enough time to read everything. This led to the participants reading from the top without skipping articles, reading mostly headlines and not reaching the bottom of the feed. On average, participants with **SI-B** read 4 articles.

Thirdly, the participants defined the experience as confusing with low focus on news and it being difficult to shift focus between tasks. The experience of curiosity is explained the same way as with **OI-B**; the curiosity comes with images.

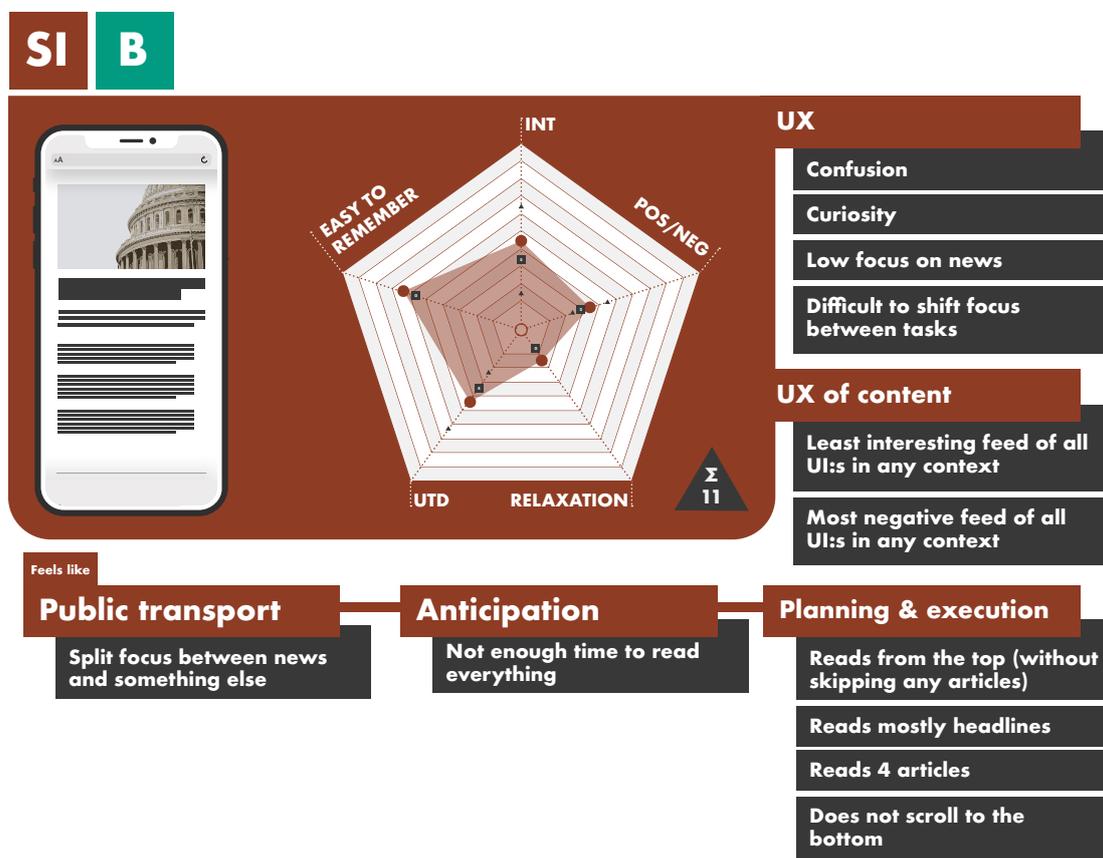


Fig 16. UX profile illustrating the participants' experiences of the UI **SI** in context **B**.

## C.1.5. O-C

The overall experience of **O-C** is presented below. Firstly, the participants believed this context was quiet with no external distractions, realistic and monotonous. Their anticipation of the context was that there was enough time to choose which articles to read. This led to the participants scrolling through the feed, only reading interesting articles, scrolling to the bottom and reading approximately half of the articles in the feed (10/20 articles).

The defining experiences were focus and reaching a deep understanding of the news. Participants with **O** in **C**, felt more up to date than any UI in any context. This is a major finding which will be brought to Study III.

Similar to participants with **O** in **B**, participants with **O** in **C** also claimed that positive articles color the entire experience of the news feed, as opposed to negative articles, even though the first few articles in a feed are claimed to be negative. Therefore, it can be concluded that first articles in a feed with **O-C**, do not color the entire experience more than any other, similarly to **O-B**.

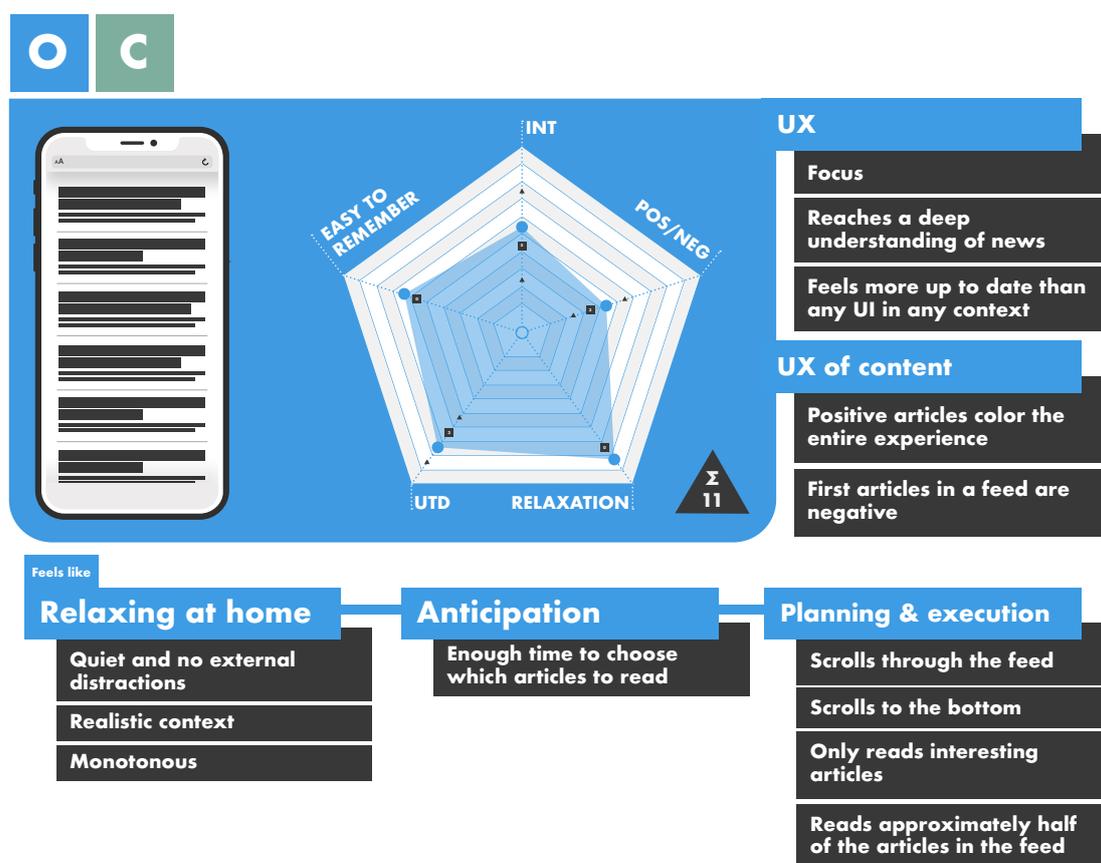


Fig 17. UX profile illustrating the participants' experiences of the UI **O** in context **C**.

C.1.6. *OI-C*

The overall experience of **OI-C** is presented below. Firstly, the participants believed this context was quiet with no external distractions. They also claimed this did not feel like a test. This is interpreted to mean the same thing as realistic context, similarly to **O-C**.

Moreover, the anticipation of this context was that reading was preferred over counting, and that there was enough time to choose which articles to read. This led to the participants avoiding counting for as long as possible and instead scrolling through the feed, scrolling to the bottom and reads most of the articles. The participants with **OI-C** reads the most articles of any UI:s in any context.

The defining experiences were pleasure and cosiness, probably brought on by the in bed context per se. The participants also claimed that the news feed was short. This is logical since the overview style of UI allows the reader to perceive the length of the news feed, and thereby feel that it is graspable.

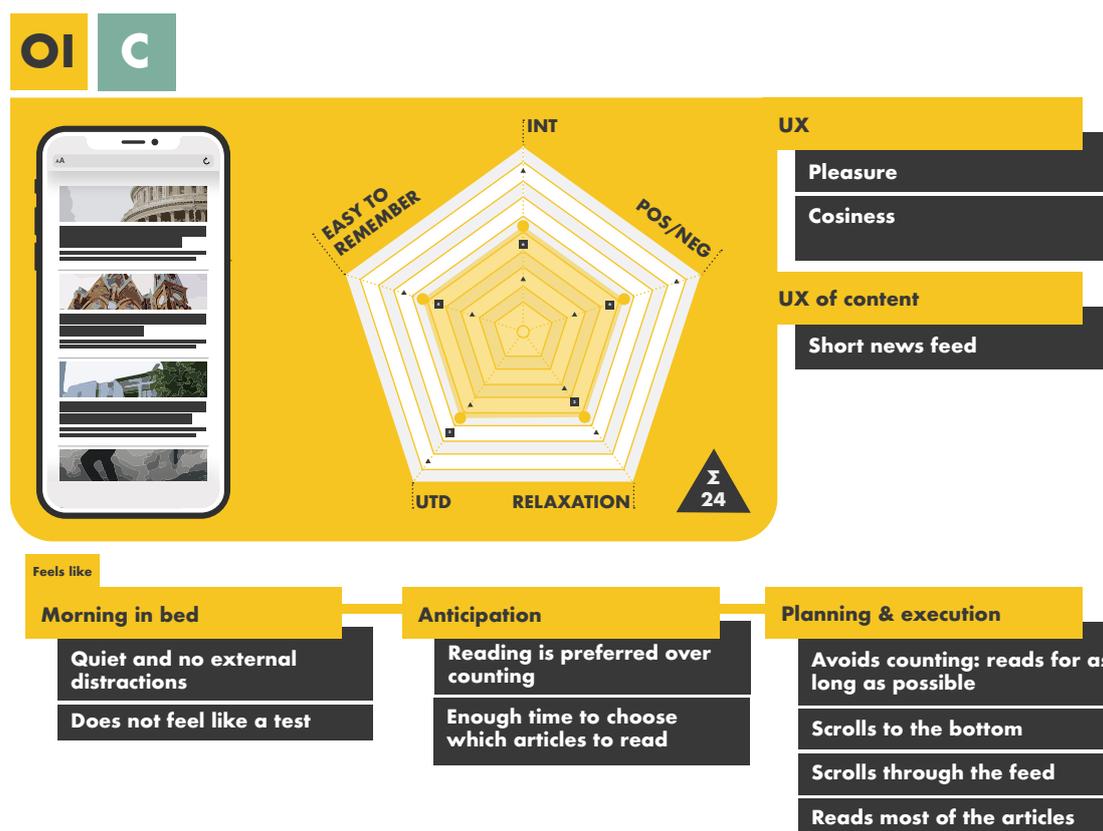


Fig 18. UX profile illustrating the participants' experiences of the UI **OI** in context **C**.

## C.1.7. S-C

The overall experience of **S-C** is presented below. Firstly, the participants believed this context was quiet with no external distractions. However, as opposed to **O-C** and **OI-C**, **S-C** felt like a test, and was claimed not to happen often in reality.

Moreover, the anticipation of this context was that there was enough time to delve into the news stories and that counting was boring and stressful. This led to the participants avoiding counting for as long as possible and instead scrolling through the feed, scrolling to the bottom and reads most of the articles. The participants with **S-C** read four to five articles.

The defining experiences of **S-C** were rather negative. The participants felt overwhelmed, impatient and had as a result the lowest value of feeling up to date of all UI:s in context **C**. This however, contradicts the quantitative results presented in the radar chart under relaxation, where participants claimed they were very relaxed. In addition, there was not a large distribution of responses, which makes the data valid. There was no logical reason of this contradiction, so it has to be verified and further analyzed in and after Study III.

In addition, **S-C** had the least interesting news feed of all UI:s in **C**.

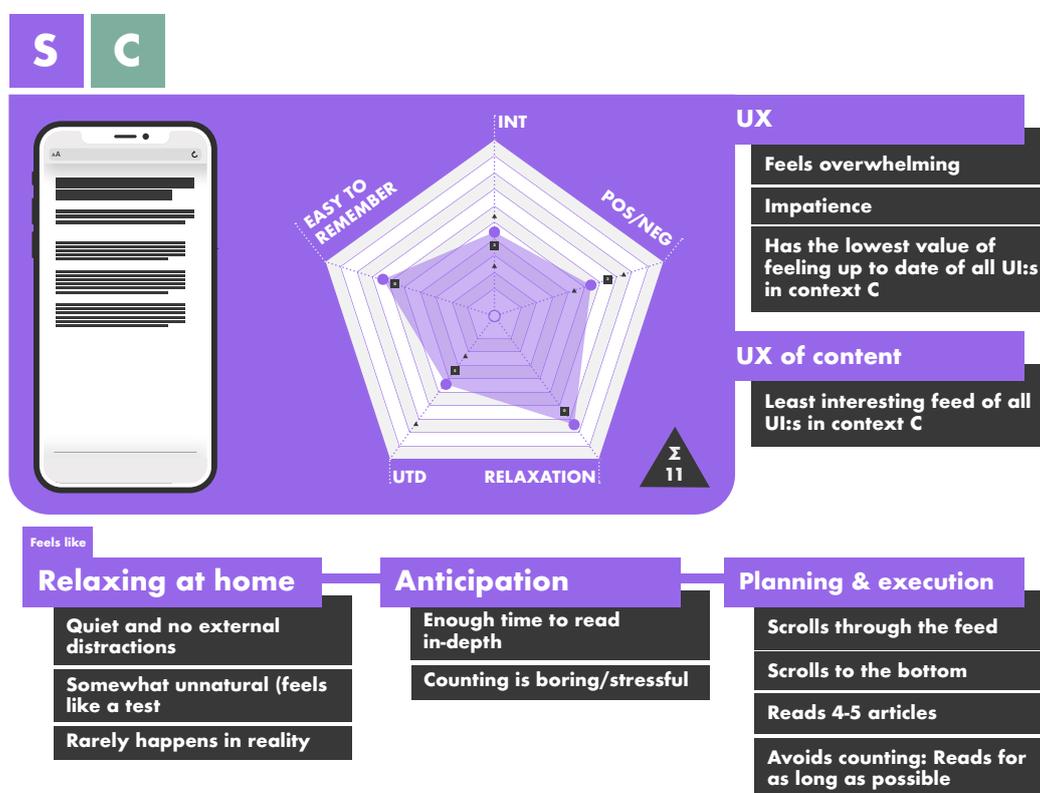


Fig 19. UX profile illustrating the participants' experiences of the UI **S** in context **C**.

C.1.8. SI-C

The overall experience of **SI-C** is presented below. Firstly, the participants believed this context does not happen often in reality. Their anticipation of the context was that there was enough time to choose which articles to read. This led to the participants skipping articles to only read interesting news stories. On average, the participants read five articles.

Defining experiences included curiosity which can be explained with the presence of images like with other UI:s. Participants also claimed that time passes slowly with this UI in this context. This is something that is brought to Study III and developed further. Noteworthy is that the news feed was considered trivial and it was the most negative feed of all UI:s in context **C**.

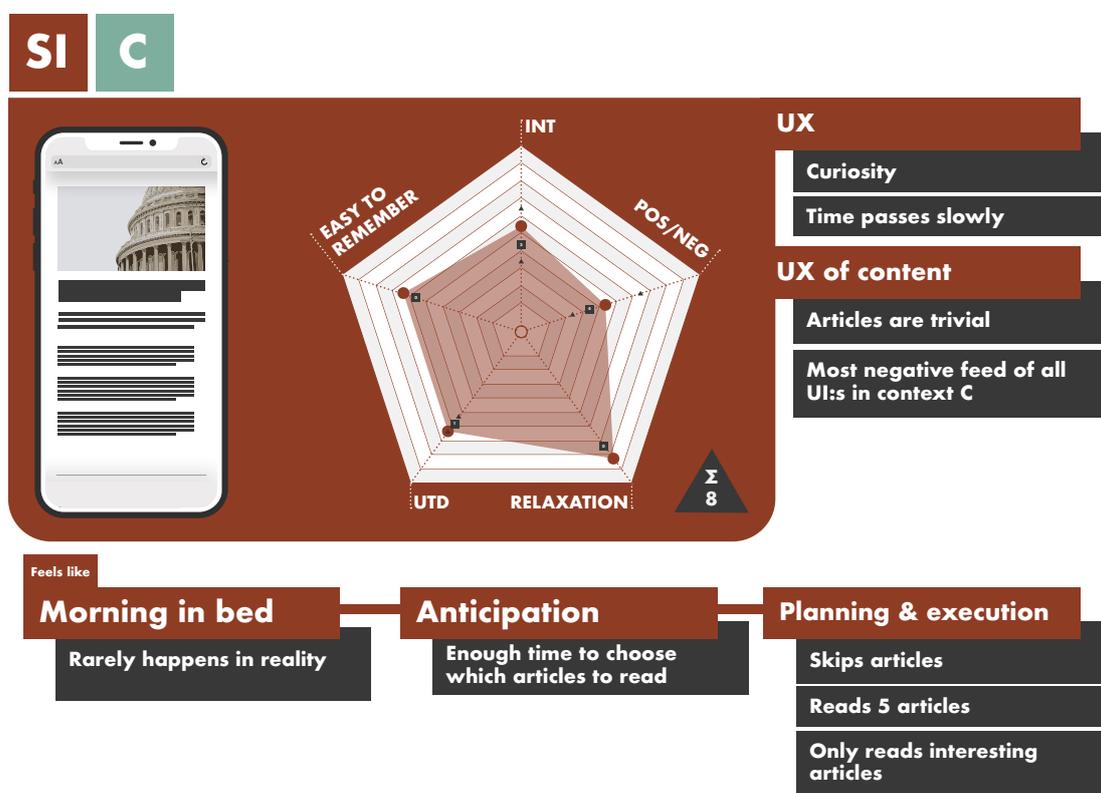


Fig 20. UX profile illustrating the participants' experiences of the UI **SI** in context **C**.

## c.2. Findings

This section contains both quantitative and qualitative findings from the responses to all UIs in all contexts. The contexts are below coded as **B**= 'Simultaneous task (cooking)' and **C**= 'Morning in bed', and the UIs are coded as 'Overview without image'= **O**, 'Overview with image'= **OI**, 'Single view without image'= **S** and 'Single view with image'= **SI**. A specific UI in a specific context is coded **UI-context** (e.g. "**O-C**" is UI **O** in context **C**).

Furthermore, this section elaborates on findings of various UX aspects, such as **UTD**, **INT**, **POS/NEG** and **REL**. These findings are based on the four UIs **O**, **OI**, **S** and **SI**. They are also based on different UI elements that describe the UIs – such as overview, single view, with image and without image. Only results where the mean ratings between variables differs more than  $\pm 0.5$  are considered relevant for further discussion. The number  $\pm 0.5$  was an estimation based on  $\approx 10\%$  common mean values of the data set.

The **most relevant** (e.g. highest and lowest) **mean values** (i.e. quantitative data) for UX aspects in contexts **B** and **C** are presented in table 5 below. These numbers were collected from the self-assessment questionnaire and are elaborated on below.

Table 5. Mean values of UX aspects in contexts **B** and **C**. Data gathered from self-assessment questionnaire.

| <b>B</b>         | UTD | INT | POS/NEG | <b>C</b>         | UTD | INT | POS/NEG |
|------------------|-----|-----|---------|------------------|-----|-----|---------|
| <b>O</b>         | 4.8 | 5.5 | 4.8     | <b>O</b>         | 7.5 | 6.5 | 6.0     |
| <b>OI</b>        | 4.3 | 5.3 | 6.3     | <b>OI</b>        | 5.8 | 6.0 | 5.8     |
| <b>S</b>         | 5.5 | 6.3 | 5.3     | <b>S</b>         | 5.0 | 5.5 | 5.8     |
| <b>SI</b>        | 4.5 | 4.8 | 4.0     | <b>SI</b>        | 6.5 | 5.8 | 5.0     |
| OVER VIEW        | 4.5 | 5.4 | 5.5     | OVER VIEW        | 6.6 | 6.2 | 5.9     |
| SINGLE VIEW      | 5.0 | 5.6 | 4.6     | SINGLE VIEW      | 5.8 | 5.7 | 5.4     |
| <b>B - total</b> | 4.8 | 5.4 | 5.1     | <b>C - total</b> | 6.2 | 5.9 | 5.6     |

### c.2.1. *Interesting*

The data revealed that **O-C** received the highest mean value of **INT** (INT=6.5) while **SI-B** received the lowest mean value (INT=4.8). Participants using UI **O** did not specifically mention any feed being more interesting, while participants using UI **SI** acknowledged that they scrolled through the feed quickly in context **B**, resulting in them not noticing if the feed was interesting or not.

Comparing levels of **INT** between contexts revealed that contexts **C** and **B** were rated equal. This was contradicted by statements suggesting that in-depth reading increased **INT** - and that the longer reading time in context **C** meant that there was time to read articles in depth. The number of statements reporting that context **C** was more interesting would suggest that there should have been a difference in the quantitative data in favor of context **C**.

Regarding the difference in rated **INT** between the UI:s, it was found that **overview** rated higher than **single view** in **C** (INT=6.2 compared to INT=5.7), but equal in UI **B**. The element '**image**' received a lower mean of **INT** than the element '**view**' in both contexts **B** and **C**.

### c.2.2. *Feeling up to date*

The data revealed that **O-C** received the highest mean value of **UTD** (UTD=7.5) while **OI-B** received the lowest mean value (UTD=4.3). While participants using the UI **OI** mentioned that longer reading time and depth increases **UTD**, this sentiment was reported by participants from each of the groups using different UI:s.

Comparing levels of **UTD** between contexts revealed that context **C** rated higher than context **B** (UTD=6.2 compared to UTD=4.8). This is again supported by the already mentioned statements regarding longer time and depth increasing the level of **UTD**. Further, the element **overview** rated lower than **single view** in context **B** (a mean of UTD=4.5 compared to UTD=5.0), but higher than **single view** in context **C** (UTD=6.6 compared to UTD=5.8).

### c.2.3. *Positive or negative news?*

The data revealed that **OI-B** received the highest mean value of **POS/NEG** (POS/NEG=6.3) while **SI-B** received the lowest mean value (POS/NEG=4.0). This result was contradicted by the qualitative data where participants using UI:s **OI** as well as participants using **SI** reported that they experienced the news feed in context **B** as more negative. Participants using UI **O** responded that they experienced the feed as neutral, which supports the quantitative data (a mean of POS/NEG=4.8 on a scale ranging from 0-10).

Regarding levels of **POS/NEG** between contexts, context **C** rated higher than context **B** (a mean of POS/NEG=6.2 compared to POS/NEG=4.8). Comparing the elements within the UI:s showed that **overview** rated higher than **single view** in both contexts **B** (a mean of POS/NEG=5.5 compared to POS/NEG=4.6), and **C** (a mean of POS/NEG=5.9 compared to POS/NEG=5.4). A UI **without images** resulted in a more positive experience of the feed in context **C** (a mean of POS/NEG=5.9 compared to POS/NEG=5.4).

#### *c.2.4. Distribution of responses*

It was found that **SI-C** had the lowest overall value (8), while **OI-C** had the highest overall value (24). Comparing the UI:s based on the categories 'view' and 'image' showed that UI:s with the element 'single view' had lowest values regardless of context and combined had much lower than UI:s with the element 'overview' (40 compared to 67).

Comparing different contexts based on this measure revealed that context **C** had slightly higher values (all UI:s combined) than context **B** (32 to 27). Investigating different UI elements between the contexts showed the same results – context **C** always scored higher.

All of these values can be seen in the illustrations of the UX profiles (Figures 13-20), where the significance of the values is also explained.

#### *c.2.5. Manner of consumption*

During the analysis, it was discovered that participants changed the manner in which they consumed news based on the context and what UI they were using. This was assumed to be attributed to their anticipation of the context and them changing their behavior to optimize their performance of the tasks. Generally, UI:s with **single view** in context **B** consumed the news in sequential order from the top downward. This was only occasionally the case in UI:s with **overview**. Instead, **overview** resulted in the participants experiencing a stressful situation where the UI forced them to choose an article, while the nature of the context prohibited them from making a desired choice.

In context **B**, half of the participants with **overview** reached the bottom of the feed (i.e. scrolling to the bottom of the feed. This does not imply that every article has been read). In comparison, neither of the participants reached the bottom of the feed with UI:s with **single view**. This further supports the observation that **participants** with **single view** read from the top of the feed with limited or no scrolling past articles.

c.2.6. Remembering

In the self-assessment questionnaire, participants were asked to write down one article that they found most interesting. By investigating where these articles were placed in the feed, it is possible to further describe the manner of which different UI:s influenced the consumption of the feed (Figure 21). The analysis showed that there was a noticeable difference in distribution between UI:s **with image** and **without images**. UI:s **with images** tended to result in a recall of articles early on in feed (both in **B** and **C**), while UI:s **without images** resulted in a more even distribution across the feed (with a larger distribution in **C**, attributed to the participants reaching articles further down in the feed).

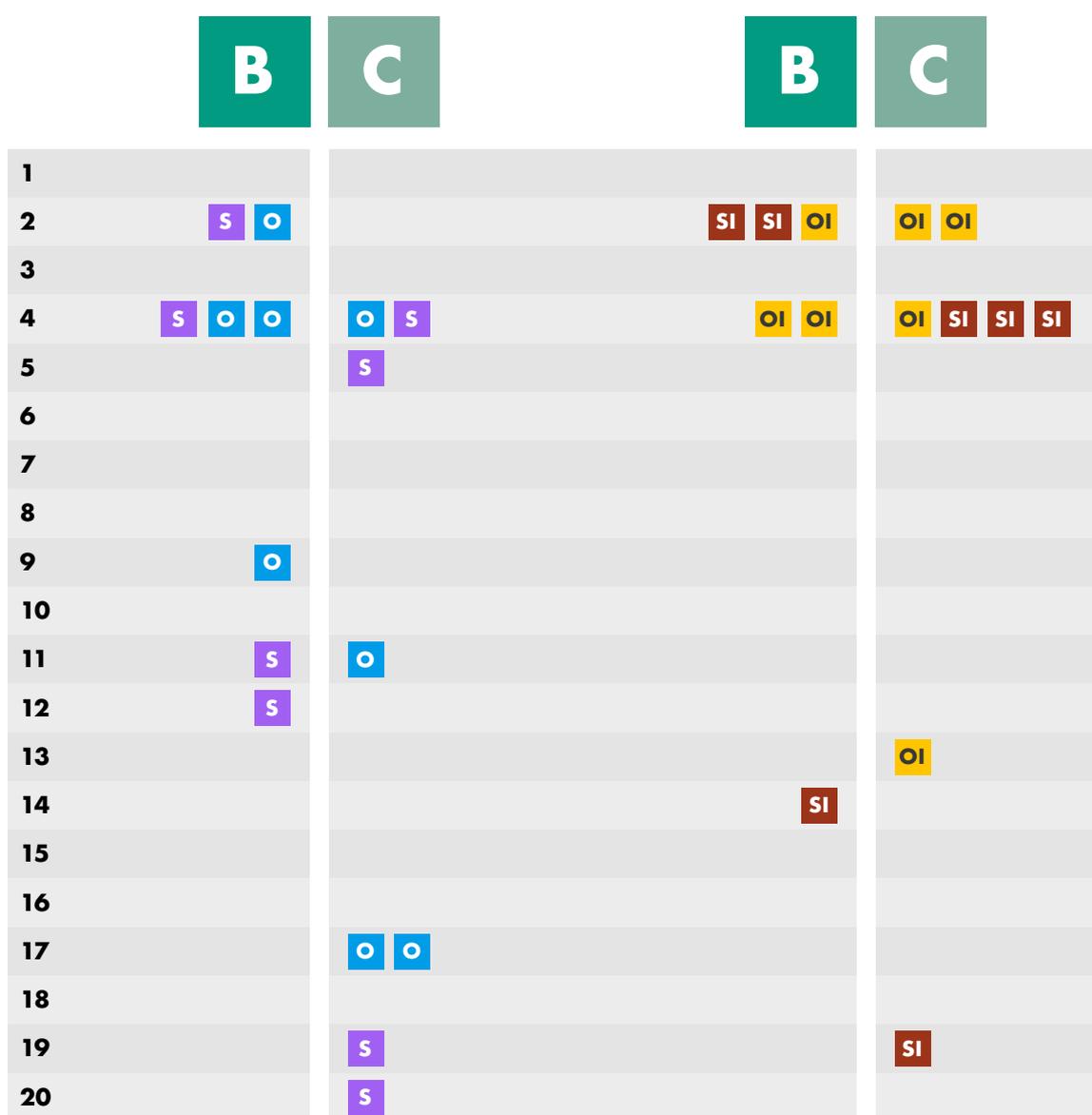


Fig 21. Participants that used UI:s with images remembered articles earlier in the feed than participants that used UI:s without images.

To further investigate if it was easier to remember articles from a specific context or with a specific UI, participants were asked to name additional articles from either feed and elaborate on whether or not they found this difficult. Participants generally responded that it was equally easy to remember articles in contexts **B** and **C**. The only exception was **OI-B** where a number of participants found it difficult to remember specific articles and one participant failing to recall any article.

#### *c.2.7. Relaxation*

In the affinity diagram, a cluster called 'stress' was included due to the number of responses regarding this topic. In order to consistently rate increasingly positive experiences higher on a scale, this cluster was converted to relaxation (i.e. high stress = low relaxation).

The responses from different participants with different UI:s revealed that UI **S** had the highest level of relaxation of all UI:s in context **B**, while UI **SI** and UI **O** had the highest level in context **C**. Comparing different UI elements showed that participants with **single view** were consistently more relaxed in both contexts **B** and **C** than participants using **overview**. Further, participants **without images** were consistently more relaxed in both contexts **B** and **C**.

#### *c.2.8. Time*

Participants often referred to the factor of time and attributed their experiences to the difference in time allocated the tasks and limitations in the different contexts. In addition, participants with **single view** reported that they experienced time passing slowly in context **C** with boredom as a consequence. This was not reported by participants with **overview**. It was assumed that this was due to **single view** requiring more effort to navigate, making the participants lose interest in the news and experiencing boredom. This is also supported by the fact that participants with **single view** read half as many articles as participants with **overview** in context **C**.

#### *c.2.9. Value neutral content*

Comparing the mean values of the UX aspects **UTD**, **POS/NEG** and **INT** based on what content they were rated, showed that the news feeds **X** and **Y** differed on **POS/NEG** (POS/NEG=5.7 compared to POS/NEG=5.0).

#### *c.2.10. Perceived contexts*

Interesting findings were gathered from when the participants guessed which context they believed the test scenario was supposed to simulate. The majority of participants perceived context **B - Simultaneous task (cooking)** as public transport. Noteworthy is that it is a mere coincidence that this perception coincides with the actual context of

public transport (**A**), which was discarded in the second iteration (Study II: B.3 'Second iteration').

However, there might be a logical explanation for this. It was claimed that many participants found the characteristics of the cooking context to coincide with characteristics of the public transport context. Mainly, the characteristic of having a split focus, which in the user tests was simulated by controlling a stopwatch. Many participants interpreted this as checking where the bus is located during a bus journey, in order to get ready to exit the bus at the right stop. This is further expanded in Study II: D.3 'Context'.

### c.3. Breaking down contexts into characteristics

The contexts used in the tests were constructed by combining different context characteristics. To ensure that these characteristics were in fact present in the induced contexts, an analysis was conducted with the aim of breaking down the induced contexts to characteristics.

#### c.3.1. Characteristics of context B and C

It was found that the intended characteristics of varying total reading time and reading in short/long episodes were all present. The characteristic of 'split focus' in context **B** was present but did not have a corresponding, opposite characteristic in context **C**. The characteristic of having 'single focus' was therefore introduced in context **C**.

Similarly, the characteristic 'control over reading time' was only present in context **C** and did not have a corresponding, opposite characteristic in context **B**. The characteristic of not 'being in control over reading time' was therefore introduced in context **B**. To what extent this specific characteristic affected their experience was not apparent, but a general category of **control** could relate to several of the statements made by participants.

### c.4. Comparing UI elements with context characteristics

The characteristics of the contexts were combined with the elements of the UI:s to determine if a specific combination created a specific experience.

#### c.4.1. Episode length (short, long)

Episode length appeared to affect the manner of consumption. When reading in short episodes, participants with **single view** UI:s stated that they mainly read from the top of the feed. This was partially also true for **overview** UI:s with a few exceptions stating

that the participants scrolled through the feed. Longer episodes resulted in reverting scrolling through the feed in all UI:s.

#### *c.4.2. Total reading time (short, long)*

Another aspect of time – total reading time – mainly affected the selection of articles. At least one participant from every group that used different UI:s noted that they chose articles when they had longer total time to read – but that they tended to select more interesting articles. In comparison, when the total reading time was short, participants with **single view** UI:s read at a higher tempo and then mostly headlines. **Overview** UI:s still chose to read interesting articles.

#### *c.4.3. Focus (single, split)*

Having split focus led to all participants reporting that they got distracted to some degree. The biggest difference was found in relation to single focus where participants with **single view** UI:s reported that they became restless, bored and/or overwhelmed by the information intake.

#### *c.4.4. Control over reading time (yes, no)*

Control over reading time was not apparently connected to any observed behavior, experience or specific UI element. Yet, it was stated by the participants that they in context C felt that they had control over the reading time.

## D. Discussion and conclusion

This section discusses findings divided into different categories and concludes with noticeable findings.

### D.1. General

Regarding Study II in general, the number of participants was relatively small. Attempts to increase the validity was made by adhering to a strict procedure in the tests and testing all different combinations of UI:s, contexts and content in different order. Still, the overall results may have lower validity due to the small sample size, particularly the UX profiles which are based on four participants each.

Using UX profiles as a way of illustrating the difference between UI:s proved to be difficult. While they did function as a way of illustrating the overall experience that a participant with a specific UI had in a specific situation, the differences in mean values was not noticeable in the illustrations (Figures 13-20) – i.e. the profiles looked almost identical regardless of what the quantitative data showed in numbers. This was a visual

design fault of the UX profile and not an inherent method issue – which is apparent in the fact that it successfully illustrated the difference between contexts **B** and **C** regarding the UX aspect '**stress**'. Further, the UX profiles were at this stage considered definitive and illustrated what had been found in Study II.

As explained in Study II: C.2 'Findings', the mean values were used to easier compare different groups of participants and UX aspects. Still, using the mean of a data set can result in unrepresentative results. For instance, comparing a data set containing four scores of 5:s, compared to a data set containing two scores of 1:s and two scores of 9:s – both have the same mean value, but would suggest very different experiences. Therefore, a value of the distribution of responses was calculated to determine the distribution of scores. Since the data set was limited in size, the distribution was measured by simply subtracting the minimum response from the maximum response. Granted, this only served as a reference point in further work rather than absolute proof of the varied experiences.

Some of the 'noise' present in the quantitative data was believed to relate to participants having issues with the concept of rating how up to date they felt based on a news feed that they could assume was not breaking news. Further, collecting data using a numbered scale is introducing noise since different people have different definitions of the extreme points on the scale – as well as the difference between the steps. When rating a news feed from positive (maximum rating 10) to negative (minimum rating 1), it is arguably easier to understand that a score 5 out of 10 suggests a neutral news feed since a scale between the extremes of positive and negative has a natural middle point which is neither positive nor negative. Arguably, such a natural middle point does not exist for the feeling of being up to date, resulting in a score 5 out of 10 on feeling up to date being much more ambiguous. In addition, due to possibly varying definitions of the scale, participants may have different understandings of the measure itself.

Only results where the mean value between variables differs more than  $\pm 0.5$  are considered relevant for further discussion. The number  $\pm 0.5$  was an estimation based on  $\approx 10\%$  common mean values of the data set.

Still, comparing the quantitative data with qualitative statements from the interviews, there was little discrepancy – suggesting that the validity of the quantitative data was still high.

## D.2. Content

Another issue concerning validity was that the data revealed that there was a difference in mean value of POS/NEG between the contents **X** and **Y**. This could suggest that the news feed was not completely value neutral. Still, the difference in mean values when comparing different contents was smaller than when comparing the difference in mean values between UI:s or contexts.

## D.3. Context

The fact that participants stated that they experienced context **B** as public transportation (though it was intended as cooking) was thought to be due to the fact that public transport also included simultaneous tasks and split focus – and that these characteristics were more important than previously assumed. The reason why participants in the pilot test (which consisted of all three contexts **A<sub>0</sub>** **B<sub>0</sub>** **C<sub>0</sub>**) stated that they experienced **A<sub>0</sub>** as public transport and **B<sub>0</sub>** as conducting a simultaneous task may simply be due to **A<sub>0</sub>** still having identifiable characteristics from public transportation – such as being observed – and the participants assuming that public transport would only appear once. An assumption is that if the participants in the pilot test had been situated in context **B<sub>0</sub>** (without having been in context **A<sub>0</sub>**) they would have experienced it as public transport. Due to the procedure of the pilot test, i.e. context **A<sub>0</sub>** was placed before context **B<sub>0</sub>** in both tests, possibly explain why this occurred.

Relating to the context characteristics, it is possible to argue that 'long episodes' in context **C** should not be defined as an episode since it covered the entire total time. While this of course depends on the definition of an *episode*, it does in this case only suggest that the participant read continuously without interruptions (long episode), for a long total time.

Additionally, when responding to the self-assessment questionnaire, it was assumed that participants would compare their experiences in different contexts and respond according to how they perceived the difference between the contexts. Therefore, it was essential that the order of contexts was varied to test all different combinations. Comparing the mean values of UTD, INT and POS/NEG from the self-assessment questionnaires by participants who had conducted the test in the same order did not show to what extent the order had influenced the results.

### D.3.1. *Inducing contexts*

It is also relevant to briefly discuss the hypothesis of subconsciously inducing contexts in the participants. When performing a meta analysis of the results of the user tests, the

conclusion can be drawn that inducing contexts worked as intended. Evidently, there are clear differences between contexts **B** and **C**, and this is interpreted as though the participants at least had different experiences of context **B** in comparison to context **C**. In comparison, there are far larger differences between contexts **B** and **C** than for example between news feeds **X** and **Y**, which were supposed to stay neutral throughout all tests. Granted, this is not conclusive proof that contexts can be induced according to the hypothesis, but a noteworthy inclination of success.

#### D.4. UI

Due to the fact that the overview UI:s required additional navigation – clicking headlines to expand articles – meant that the overview and single view UI:s included more factors that made the difference between them larger than simply how content was viewed. To what degree this affected the results was not apparent. Further, the study did not investigate if combinations of basic functionalities (such as scrolling, shared by all UI:s) and UI elements (such as overview or single view, specific to UI:s) influenced the results. If the combination of factors had a large influence, it would entail that it is difficult to attribute differences in experiences between UI:s to specific elements.

#### D.5. Conclusions

Taking into consideration what has been discussed, a few conclusions can be drawn.

UI:s **without image** were rated **significantly** higher than UI:s **with image** for almost every UX aspect. Only exceptions were **POS/NEG** in context **B**, and **UTD** and **INT** in context **C** where they performed equally. The arguable most relevant UX aspect for the thesis is level of UTD. Based on this UX aspect, UI **S** performed best of all UI:s in context **B**, while UI **O** performed best of all UI:s in context **C**.

### E. Implications

The discovered findings of relationships between UI elements and context characteristics were mainly based on qualitative findings in terms of **UTD**, **INT** or **POS/NEG**. This meant that the quantitative UX aspects needed to be investigated further in a validation test. It was also determined that questions regarding how easy it was to remember a specific feed were inadequate and a different approach was needed.

Due to the fact that the difference in mean values between contents **X** and **Y** was smaller than the difference in mean values between both contexts and UI:s, the news feed was deemed sufficiently value neutral and could be used in further tests.

Based on the number of data points regarding 'time', it appeared to be the most prominent characteristic in affecting the experience in different contexts. It was therefore decided that this would be the focus of a validation test.

Since it was found that UI:s **with images** was rated lower on a majority of UX aspects, the focus of the project shifted to comparing **overview** to **single view** – which in turn results in a focus on the UI:s **O** and **S**.



## Summary

Study III was conducted in order to validate the measures, mainly the most relevant UI elements and context characteristics, found in Study II. The user tests were, similarly to Study II, carried out remotely with participants reading news on a smartphone while conducting different tasks in certain contexts. The results were analyzed and a general conclusion was made regarding how the tested variables interplayed with each other in forming the user experience. Subsequently, it was determined which UI element combined with which context characteristic generates the "best" user experience (normatively). In addition, the UX aspects UTD and INT were defined.

### A. Objectives

The following objectives were addressed in Study III:

- Validate the most relevant UI elements, context characteristics and content factors.
- Connect UX aspects with specific UI elements and context characteristics.

### B. Study Design

This section describes the process in which the validation test was designed and conducted. Since the procedure closely resembles that of Study II, no pilot test was conducted.

#### B.1. Participants

The number of participants was based on the number of different variations of the variables: UI, content and context – which meant that number of participants had to be a factor of 8 (2 (the number of UI:s) times 4 (the total number of content and context)). The number of participants was therefore set to 16. The participants were all within the ages of 20-40, residing in Gothenburg, had Swedish as their native language and had (as a group) a varied interest in news consumption.

#### B.2. UI

No redesigns of the UI were conducted after Study II. Further, the implications of Study II meant that only UI:s solely consisting of **overview** and **single view** were used in the

tests (i.e **O** and **S**). UIs **with images** were only showed to participants briefly in order to investigate if the participants believed that they would have had a different experience reading news with images.

### B.3. Prototype

The prototype used in Study II – running on participants’ smartphones – proved functional during previous tests. Thus, no revisions to the prototype design were done prior to the validation test – except for available options on the main screen (Figure 22).

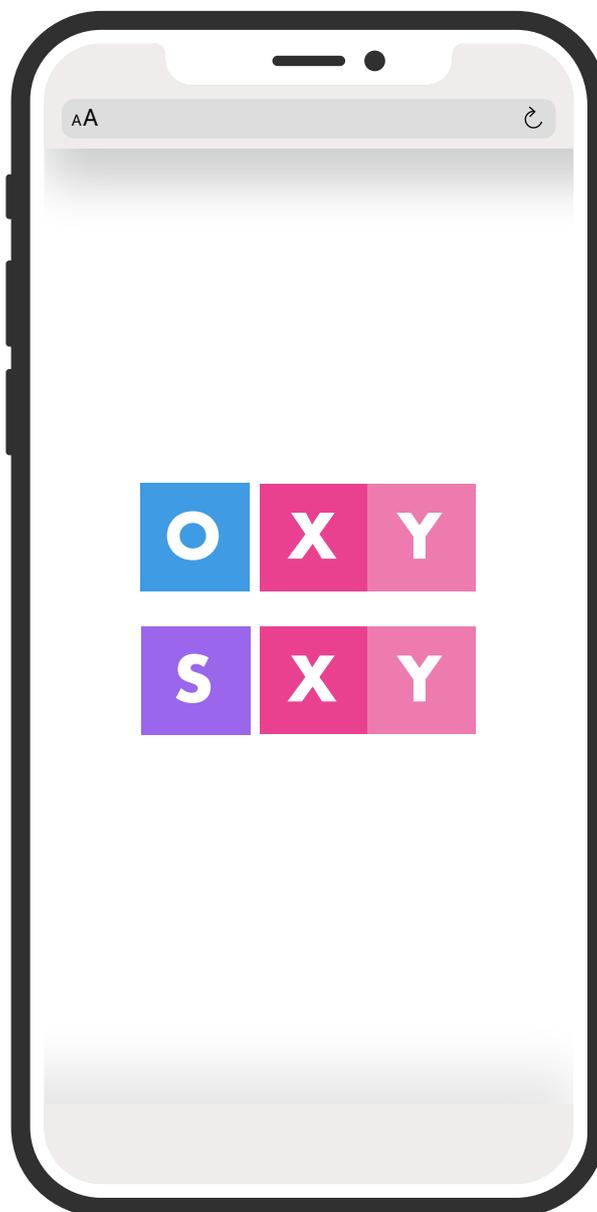


Fig 22. Illustration of the main screen of the prototype used in user tests.

## B.4. Context

The focus of the validation test was to investigate context characteristics – specifically total reading time and length of reading episodes. New versions of the context **B** and **C** were therefore created (called **B<sub>2</sub>** and **C<sub>2</sub>**) where the only characteristics induced related to time.

### B<sub>2</sub> - Short episodes and short total time

The chosen context was based on the previous context **B** - **simultaneous tasks**, in which participants conducted an additional task while reading news. This created disruptions, but also required split focus. For **B<sub>2</sub>**, the disruptions were induced by the assistant, telling the participant at irregular intervals to close their eyes and stop reading the news for fifteen seconds. The assistant kept time so that the participants only experienced the disruptions without having to keep an eye on a stopwatch (removing split focus). Further, participants did not conduct an additional task during the disruptions. In addition to the short episodes, the total reading time (without disruptions) was short – two and a half minutes.

### C<sub>2</sub> - Long episode and long total time

In contrast, the context **C<sub>2</sub>** was based on the previous context **C** - **morning in bed**, in which participants sat comfortably and read undisturbed for up to eight minutes and then had a negative anticipation towards an additional task. These aspects were removed and the participants were instead told to read news for eight minutes without disruptions.

## B.5. Procedure

The testing scenario consisted of a **test leader**, an **assistant** and a **participant** (to read more about their roles, see Study II: B.1.7 'Procedure' and Appendix VII).

Since the number of UI variants used in Study III was fewer than in Study II, a new test order was created (Figure 23).

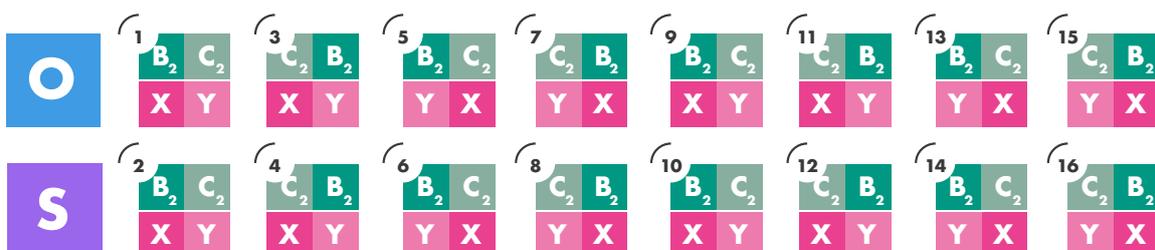


Fig 23. Illustration of test procedure with 16 participants reading a specific news feed - **X**, or **Y** in a specific context - **B<sub>2</sub>** or **C<sub>2</sub>** with a certain UI - **O** or **S**.

As in Study II: B.1.7 'Procedure', each test consisted of three parts:

Firstly, the participant opened the consent form on their computer, where they could choose whether or not to agree to having their voice recorded during the test. They also signed off on having received a cinema ticket as a reward for their participation.

Secondly, the participant opened the prototype link and was told by the test leader what option to choose from the main screen. They then read a news feed (**X** or **Y**) set to their designated UI (**O** or **S**) – while they performed a specific task in a specific contexts (**B<sub>2</sub>** or **C<sub>2</sub>**). After completing the task, the participants filled in a self-assessment questionnaire (see Appendix VIII) that related to their experience of the content and the context. The participants rated their experience on a scale from 1-10 on the items: "How up to date are you on the feed you just read? (**UTD**)", "Was the feed positive / negative? (**POS/NEG**)", "Was the feed interesting? (**INT**)", "Was it stressful? (**STRESS**)", "Were you restless? (**REST**)" and "How many articles did you read? (**ART**)".

The participant was then instructed to restart the prototype and select another option from the main screen. Step 2 was repeated for both contexts **B<sub>2</sub>** and **C<sub>2</sub>**.

Thirdly, an in-depth interview was conducted to elaborate the self-assessment responses and to further understand the experience that the participants had in the different contexts. The interview questions focused on the discrepancy in self-assessment responses between different contexts. These questions can be found in Appendix IX. Further, the participants were asked to elaborate on their experience of the context and could describe it in their own words (as opposed to being constrained to the questions in the self-assessment). As a way of investigating if it was easier to remember the articles from a specific context, the participants were asked to name *all* articles that they could remember. This then served as a reference point for a continued discussion on the topic of remembering in relation to the different contexts. In the last part of the interview, participants were shown the most recently read feed on a UI **with images**. They were then asked if they assumed that they would have had a different experience reading news with images.

## B.6. Setting

As in Study II, the tests were conducted remotely and participants attended the user test via the video chat service Google Hangout ([www.hangouts.google.com](http://www.hangouts.google.com)). Primarily, because on-site testing was still not feasible due to the corona crisis – but it was also

beneficial to keep the remote procedure in order to not introduce unknown variables between the Study II test and the validation test.

## B.7. Validation test

The validation tests were conducted remotely during a one week period with a total of 16 participants. Tests were according to the procedure designed in Study III (Study III: B.5 'Procedure'). During the interview part of the test, the assistant transcribed what the participants said. This material was then used as a basis for the analysis.

## B.8. Analysis

This section describes the methods used to analyze the collected data. Quantitative data was transferred from the self-assessment to an excel document where different operations could be performed with the data – such as calculating the mean values. Qualitative data was retrieved from the transcribed interviews.

### B.8.1. Mean values

The primary measure of the responses from the self-assessments was the mean value of the different variations of UI:s and contexts. Using mean values for comparisons was chosen due to the fact that this could describe an overall experience, and was therefore suitable for comparisons between different UX aspects. The downside with using the mean value is that it does not show if there is a large distribution of responses, hence further analysis was done to determine this.

### B.8.2. Distribution of responses

Due to the larger sample used in the validation test, it was applicable to determine the distribution of responses by calculating the standard deviation (SD) of the data set. By calculating the total sum of the standard deviations of each UX aspect for each UI, it was hypothesized to give a more representative measure of the homogeneity of the experiences (low standard deviation implies more homogenous), in comparison to the pseudo method used in the Study II to describe the distribution of responses.

### B.8.3. Affinity diagram

The categories found in the affinity diagram of Study II was used as a template for categorizing the data collected in the validation test. In addition, two categories were added for the quantitative data measures: **stress** and **restlessness**. To determine which UI was responsible for which data point, the different UI:s kept their designated colors from Study II. Each of the clusters was further divided into responses specific to a particular context or general statements.

Worth noting is that this does not imply that the responses in the self-assessment are normally distributed. Instead, variance is used solely as a measure of describing if the experiences in a specific context using a specific UI are homogenous (or at least more similar than not).

#### B.8.4. Remembering

In the interview, participants were asked to recall as many articles as possible, regardless of context. These responses were then sorted according to the context that the participant read them in and with what UI. This was used to create a visual representation of which context was easiest to remember articles from, as well as where in the news feed and in what context (Figure 26). Combining this data with the number of articles that the participants reported that they had read was used to create a ratio of how many of the read articles that the participants remembered. This was done using the simple ratio of **remembered articles / read articles**.

## C. Results

This section contains the results from the Study III user tests, divided into findings of different measures; quantitative and qualitative findings from both UI:s (**O** and **S**) in both contexts (**B<sub>2</sub>** and **C<sub>2</sub>**). To recapitulate, the contexts were **B<sub>2</sub>** = 'Short episodes and short total time' and **C<sub>2</sub>** = 'Long episode and long total time'. The UI:s are coded as 'Overview without image' = **O** and 'Single view without image' = **S**. A specific UI in a specific context is coded **UI-context** (e.g. "**O-C<sub>2</sub>**" is UI **O** in context **C<sub>2</sub>**).

Furthermore, this section elaborates on findings of various UX aspects, such as **UTD** (feeling up to date), **INT** (feeling that the feed is interesting), **POS/NEG** (feeling that the feed is positive/negative) and **REL** (feeling relaxed). These findings are based on the two UI:s **O** and **S**.

Only results where the mean value between variables differs more than  $\pm 0.5$  are considered relevant for further discussion. The number  $\pm 0.5$  was an estimation based on  $\approx 10\%$  common mean values of the data set.

The **most relevant** (e.g. highest and lowest) collected **mean values** (i.e. quantitative data) of UX aspects in context **B** and **C** are presented in table 6 below. These numbers were collected from the self-assessment questionnaire and are elaborated on in text under the table.

Table 6. The most relevant mean values of UX aspects in contexts **B<sub>2</sub>** and **C<sub>2</sub>**.

| <b>B<sub>2</sub></b>       | UTD | INT | POS/NEG | REL | REST | Σ SD |
|----------------------------|-----|-----|---------|-----|------|------|
| <b>O</b>                   | 4.8 | 6.9 | 5.1     | 4.0 | 7.0  | 11.0 |
| <b>S</b>                   | 6.6 | 4.9 | 4.5     | 4.0 | 7.0  | 9.8  |
| <b>B<sub>2</sub> Total</b> | 5.7 | 5.9 | 4.8     | 4.0 | 7.0  | 10.6 |
| <b>C<sub>2</sub></b>       | UTD | INT | POS/NEG | REL | REST | Σ SD |
| <b>O</b>                   | 8.0 | 7.1 | 5.4     | 8.4 | 5.2  | 9.9  |
| <b>S</b>                   | 7.0 | 5.8 | 6.1     | 7.4 | 4.7  | 8.2  |
| <b>C<sub>2</sub> Total</b> | 7.5 | 6.2 | 5.8     | 7.9 | 4.9  | 9.2  |

### c.1. Interesting

The quantitative data from the self-assessment showed that **O-C<sub>2</sub>** had the highest level of **INT** of all UI:s in any context (a mean of INT=7.1) while **S-B<sub>2</sub>** had the lowest level of **INT** (a mean of INT=4.9). UI **O** was consistently rated higher on **INT** regardless of context.

Participants using UI **O** in context **B<sub>2</sub>** also reported that they noticed interesting articles that they felt that they didn't have time to read – resulting in a feeling of missing out on something desirable. This also gave the valuable insight that even though participants using **O** did not read every article, they still perceived articles that they did not read and even had expectations towards how interesting they would be to read.

### c.2. Feeling up to date

Similarly to the results from Study II, participants using UI:s with **single view** (UI **S** in the validation test) claimed they felt more up to date than participants using UI:s with **overview** (UI **O** in the validation test) in context **B<sub>2</sub>** (a mean of UTD=6.6 compared to UTD=4.8), but less up to date in context **C<sub>2</sub>** (a mean of UTD=7.0 compared to UTD=8.0).

Further, a comparison of the contexts **B<sub>2</sub>** and **C<sub>2</sub>** showed that the mean value of **UTD** was higher in context **C<sub>2</sub>** than in context **B<sub>2</sub>**. This was also confirmed by qualitative data reported by both participants using UI:s **O** and **S**, stating that they experience being up to date to a higher degree when reading for an extended period of time.

### c.3. Distribution of responses

Calculating the standard deviations of the dataset based on responses from different UI:s and in different contexts showed that participants using **single view** had a lower total sum of the standard deviations than participants using **overview**. This confirmed the findings from Study II that suggested that participants using **single view** had a more homogenous experience. This was true regardless of context.

### c.4. Positive / negative

The news feed was rated most positive by participants using UI **O** in context **B<sub>2</sub>** (a mean of POS/NEG=5.1 compared to POS/NEG=4.5) and UI **S** in context **C<sub>2</sub>** (a mean of POS/NEG=6.1 compared to POS/NEG=5.4). Hence, the only mean value below neutral was reported by **S-B<sub>2</sub>**.

### c.5. Relaxation

There was no difference in the participants' experience of relaxation between UI:s **O** and **S** in context **B<sub>2</sub>** according to the quantitative data (a mean of REL=4.0). This was partially contradicted by responses from participants using UI **S** who claimed that they did not experience their relaxation level being affected by the context. Still, such responses were few and the mean was close to the neutral position of REL=5.

In context **C<sub>2</sub>**, both participants using UI:s **O** and **S** rated their relaxation higher than in context **B<sub>2</sub>**, and UI **O** rating higher than UI **S** (a mean of REL=8.4 compared to REL=7.4).

### c.6. Not restless

In order to consistently rate increasingly positive experiences higher on a scale, the UX aspect **restlessness** was converted to **not restless**. In context **B<sub>2</sub>**, there was no difference between UI **O** and UI **S** (both having a mean of REST=7.0). In context **C<sub>2</sub>**, UI **O** had a slightly higher mean value than UI **S** (REST=5.2 compared to REST=4.7) – confirming the findings in Study II and suggesting that participants using **single view** became bored and restless to a greater extent in contexts with the characteristic long total time. Still, both UI:s **O** and **S** were considered less restless in context **B<sub>2</sub>** than in context **C<sub>2</sub>**.

### c.7. Time

The number of statements concerning different characteristics of time (episode length and total reading time) was significantly higher in UI **O** than in UI **S** (23 statements compared to 7 statements).

Participants using UI **O** reported that they felt that both the short episodes and short total reading time increased their stress levels. While most participants using UI **S** did not discuss time (and the few that did said that short episodes did not affect the stress level), they still rated their stress levels higher than UI **O** in context **B<sub>2</sub>**. Solely finding fewer statements regarding time does not implicitly mean that participants using UI **S** experienced less stress than they rated. Still, there is a contradiction between the quantitative and qualitative data.

Regarding a longer total time, participants using UI **O** reported that they began to lose focus while participants using **S** reported that they became restless.

### c.8. Manner of consumption

The manner of consumption differed between UI:s and contexts. Participants using UI **O** in context **B<sub>2</sub>** started reading from the top but shifted to scrolling headlines and reading **INT** articles (Figure 24). In contrast, participants using UI **S** in context **B<sub>2</sub>** exclusively read from the top (Figure 25).

In context **C<sub>2</sub>**, participants using UI **O** sampled (i.e looked at the headlines and remembered them) a few interesting articles, ordered them in their mind according to interest and read them in order. They then repeated this process, scrolling app and down through the feed several times. In contrast, participants using UI **S** in context **C<sub>2</sub>** still read from the top of the feed. They did however start skipping articles that they did not find interesting, but never backtracked or scrolled up in the news feed.

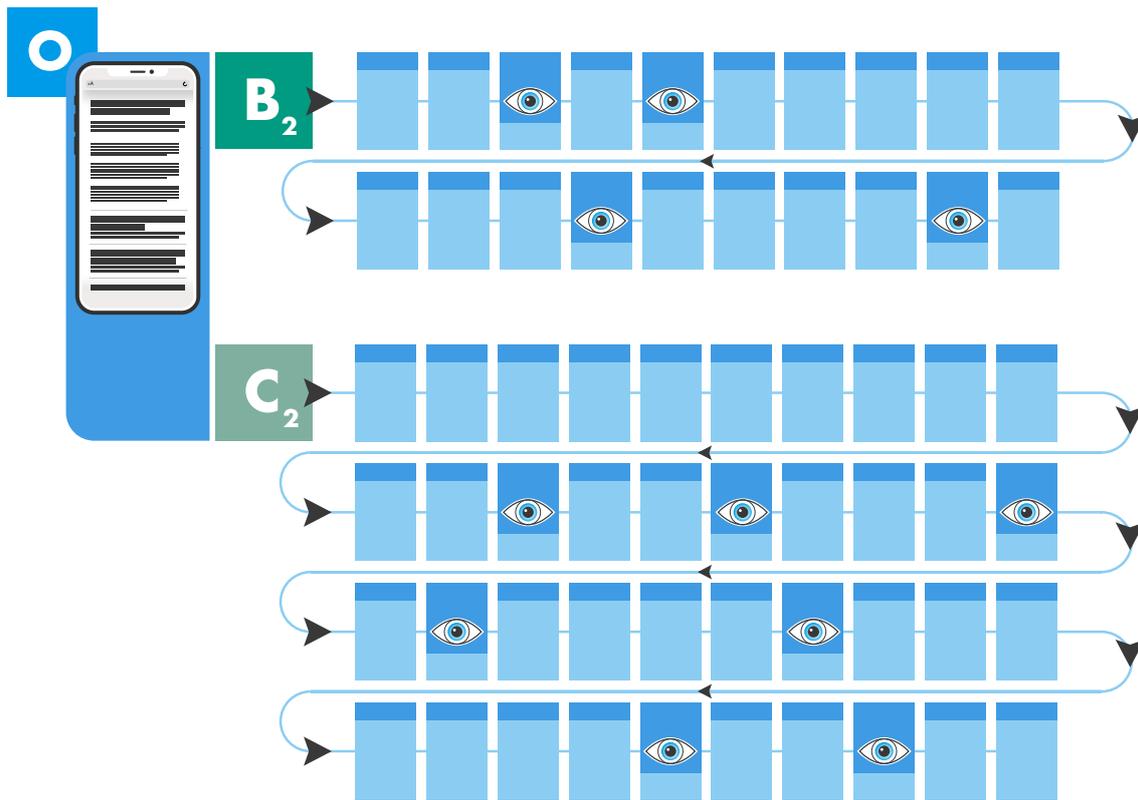


Fig 24. Illustration of the manner of consumption of participants using the UI **O** in contexts **B<sub>2</sub>** and **C<sub>2</sub>**. Note: Light blue represents un-read part of an article, while dark blue represents read part of an article. The eye-symbol represents an article that participants state that they have read. Each row (left to right) represents how far the participants reached in the feed. Arrows represent scrolling direction and return to top of feed.

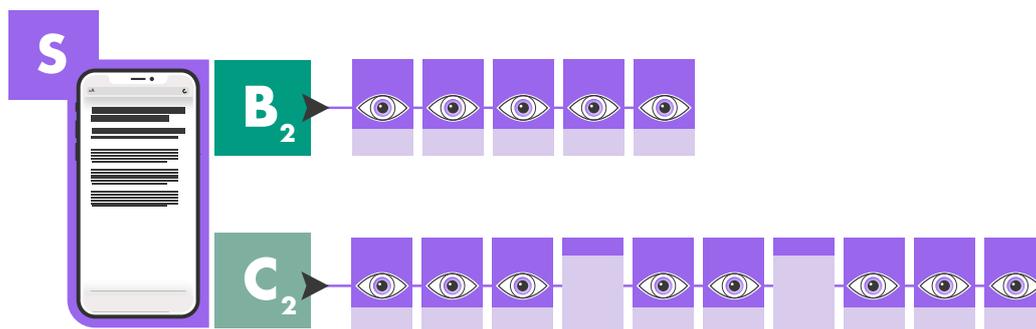


Fig 25. Illustration of the manner of consumption of participants using the UI **S** in contexts **B<sub>2</sub>** and **C<sub>2</sub>**. Note: Light purple represents un-read part of an article, while deep purple represents read part of an article. The eye-symbol represents an article that participants state that they have read. Each row (left to right) represents how far the participants reached in the feed.

### c.9. Remembering

Counting the remembered articles from different contexts revealed that participants using the UI **S** remembered slightly more articles (on average) than participants using UI **O** in context **B<sub>2</sub>** (2 compared to 1.6), while participants using the UI **O** remembered significantly more (on average) than participants using the UI **S** in context **C<sub>2</sub>** (4.75 compared to 3.25) This is presented in figure 26.

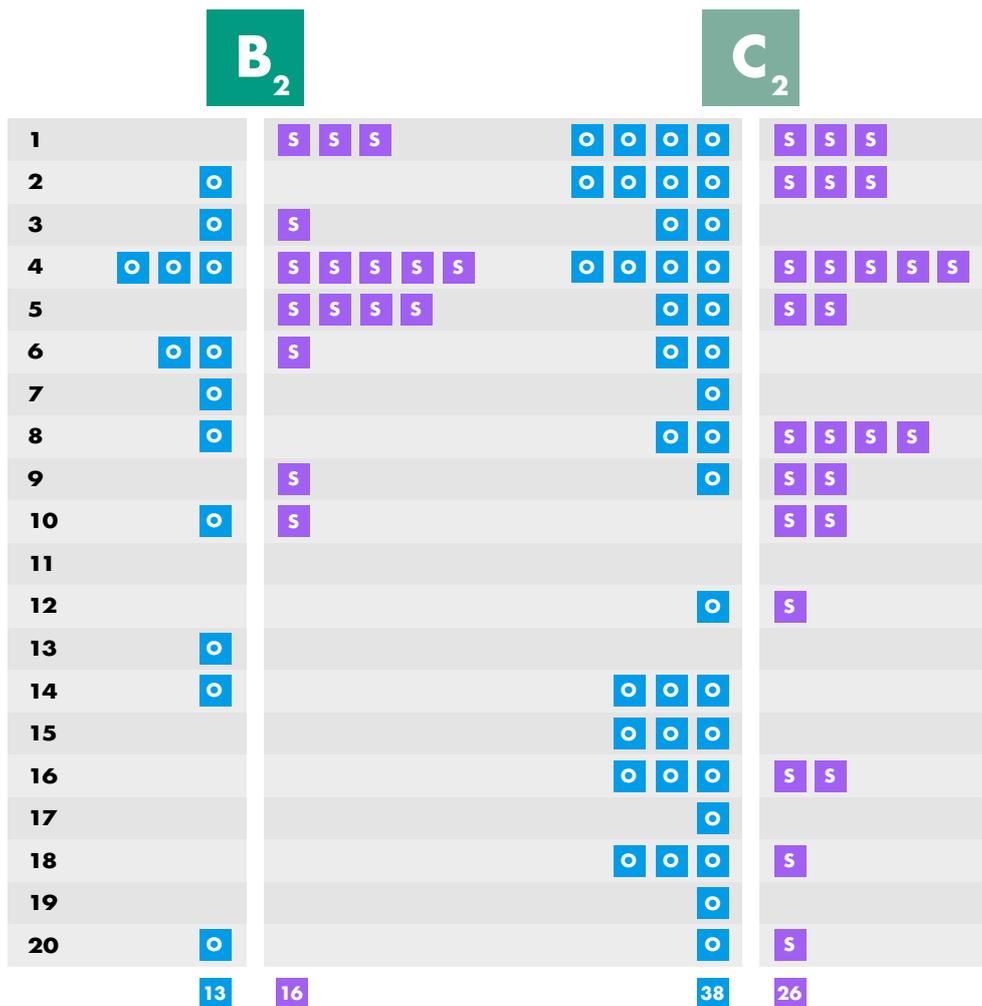


Fig 26. Illustration of the number of participants using the UI:s **O** and **S** in contexts **B<sub>2</sub>** and **C<sub>2</sub>** stated that they remembered. The bottom of the illustration shows the total sum of remembered articles by each UI in each context

The distribution of the remembered articles also differed between the UI:s. **Overview** in context **C<sub>2</sub>** resulted in a more even distribution throughout the feed than **single view**. In contrast, **single view** users remembered more articles in the beginning of the feed – possibly due to them reading from the top of the feed. In context **B<sub>2</sub>**, the

distribution between UI:s **O** and **S** generally looked identical, with a few exceptions of participants using UI **O** reaching further down in the feed.

Additionally, since the participants stated in the self-assessment the number of articles they read, it was possible to calculate the ratio between read and remembered news. This showed that participants using UI **O** remembered a higher percentage of the news they had read compared to UI **S** regardless of context (51% compared to 36% in context **B<sub>2</sub>** and 53% compared to 25 % in context **C<sub>2</sub>**). The ratio also showed that participants using UI **O** both read more and remembered a higher percentage of the articles in context **C<sub>2</sub>**, while participants using UI **S** read more articles but remembered a smaller percentage.

### c.10. Images

When asking participants whether or not they would have had a different experience using a UI **with images**, almost everyone stated that the experience would be different.

The main sentiment expressed was that the process of choosing or disregarding an article would be much faster – resulting in faster navigation. Participants also believed that they would feel more **UTD** and experience the feed as more **INT**. Another common response was that images make it easier to remember and retell articles. Images were also assumed to increase the readers' empathy for people in articles by creating a more vivid and accurate mental image of events.

In combination with all the factors that were assumed to be affected by having images, it was further stated that the combination of images and text created a richer experience – a whole greater than the sum of its parts.

In addition, 90% of participants responded that if they were allowed to choose, they would use the UI **with images**.

## D. Final analysis and conclusion of result

This section includes conclusions from the results of Study III and thus, the final conclusion for the entire thesis regarding the results.

To recapitulate, UI **O** scored higher in **INT** than UI **S**, both in context **B<sub>2</sub>** and in context **C<sub>2</sub>**, whereas UI **O** scored higher in **UTD** than UI **S** in context **C<sub>2</sub>** but not in context **B<sub>2</sub>**. This means that there evidently is a difference in what causes **UTD** and **INT**. This is

hypothesized to do with what is dubbed FOMO (*fear of missing out*). This was directly apparent when measuring **INT** and can also be applied to further explain **UTD**.

With **O-B<sub>2</sub>**, participants had the possibility to see more headlines than with **S-B<sub>2</sub>**, therefore detecting more interesting articles. This is proved by results saying participants saw interesting articles which they did not have the time to read – stating that they experienced FOMO. Based on these statements combined with the quantitative data, it is therefore suggested that the experienced level of **INT** of the feed was determined by the **number of interesting articles observed in the feed**. However, the fact that they saw articles they did not read, did *not* result in them feeling up to date. In conclusion, scrolling past headlines with **O-B<sub>2</sub>** was enough to detect interesting articles, but *not* enough to feel up to date.

With **S-B<sub>2</sub>** however, since the participants read from the top, not reaching further than the five articles they fully read, they did not see that the feed extended further. With this logic, they read every article they saw (which made them free of FOMO), making them feel more **UTD** than in the case of **O-B<sub>2</sub>**.

This leads to a hypothesized definition of feeling **UTD** where **UTD is the ratio of (number of read articles) / (number of articles observed in the feed)**. This is further discussed in General Discussions & Conclusion: A.1.2 'Defining UTD' and A.1.4 'Defining INT: Why is it different from UTD?'

With **O-C<sub>2</sub>**, participants still looked for interesting articles, moving up and down and back and forth in the feed. The difference to **O-B<sub>2</sub>** however, is that the participants had more time, felt less stress and saw the headlines of articles several times when scrolling up and down. This made it possible for them to assimilate the news in a way that they could not in context **B<sub>2</sub>**, which resulted in them feeling more up to date in context **C<sub>2</sub>** than in context **B<sub>2</sub>**. Participants with **O-C<sub>2</sub>**, also always scrolled to the bottom, which made them discover all of the articles in the feed. In addition, the ability to judge/choose headlines with the overview style UI, made the participants pay even more attention to the articles, even if they ended up not reading all of them.

Instances where certain participants with **S-C<sub>2</sub>**, reached the bottom, naturally entailed the participants first having scrolled through the feed. In turn, this means those participants never attained the feeling of "having read everything you have seen" (as in **S-B<sub>2</sub>**). With the same logic as above, this resulted in using **S-C<sub>2</sub>** participants did not feel up to date. There is some evidence that points to the fact that participants with **S-C<sub>2</sub>** who scrolled to the bottom of the feed felt less up to date than participants with **S-C<sub>2</sub>** who did not scroll to the bottom. However, this cannot be fully established.

## E. Discussion

This section includes discussion about the methods and results of Study III.

### E.1. Images

As stated in the result part of Study III: C.10 Images, images were desired in a news feed. Participants believed they e.g. would feel more up to date and perceive the news feed as more interesting.

These results contradict the data gathered in Study II, where all results indicate that a news feed with images makes the user feel less up to date, find the content less interesting and more negative, regardless of context. Therefore, it is desired to discuss the contradiction between what the participants expressed in Study III (qualitative data) of what they *thought* that their experience would have been like using a UI with images and their ratings in Study II (quantitative data) of their *actual* interaction. Granted, there is may be a difference between what one assumes the interaction will be like and what it will actually be like. Also, the participants were not the same in Study II and Study III, but they came from the same sample and they were a large enough group (16 participants in each study) to generate valid insights.

The reasons for this contradiction could potentially stem from the tradition of journalistic images in news, and that many participants are simply used to see images in news. Therefore, when intellectualizing around UI:s with and without images they choose what they are familiar with, and claim that images makes them feel more up to date.

**However**, there are some methodic flaws which makes it fair to question the validity of the data on images from Study III. As opposed to the data from Study II, the method in Study III was qualitative and data was based on interview questions. Since the interviewees had a relatively narrow time frame to assimilate the experience of the actual images in the news feed in front of them, they gravitated towards talking about images in general, and not the specific images in the news feed.

Therefore, the assumed experience that the interviewees described could still be compatible with the results found in Study II, even though they contradict. The interviewees alluded to the fact that images had to be suitable for that specific article, otherwise they would not enhance the experience. Due to fact that the images selected for the news feeds were chosen with the aim of creating a value neutral news feed, it

would suggest that the experience would not be enhanced. In that case, the data regarding images from Study III may be invalid, since the interviewees mainly talked about a potential experience with other images than the ones that were used in the news feeds in Study II.

## E.2. Methodology

A concern regarding the method used to determine if it was easier to remember articles from a specific context or with a specific UI was that it is not certain that the articles stated by the participants were the only ones they remembered. During the interview, there was no specific time limit during which they had to respond. Differences may then be due to individual differences in how fast one can recall memories. Further, some participants recalled a certain number of articles when asked, but later mentioned other articles in response to other questions – signifying that they remembered more articles than they previously stated.

A significant downside with conducting the user tests remotely was that it was not possible to record the screen of the smart phone that the participants were using. This would have meant that determining the manner of consumption would have been easier to determine. Instead, the descriptions of the manner of consumption are anecdotal – i.e. described by the participants – with additional support from the self-assessment questionnaire where participants answered whether or not they scrolled to the bottom of the feed and how many articles they read. However, the participants appeared to understand these questions and could explain in detail how they navigated and consumed the content.

An issue found with the UX aspect of **relaxed** is that it can be defined as the opposite of two different UX aspects – both **stress** and **restlessness**. Though, in the self assessment, participants were only asked to rate their levels of **stress** and **restlessness**, resulting in the word **relax** not appearing until the data was analyzed and inverted to be fitted on a positive axis. Still, these two UX aspects seemed to correlate to each other, suggesting that there was not enough difference between them.

## F. Implications

The hypothesis regarding how **UTD** could be defined was a major finding that was further evaluated against the aim of the entire thesis projected and elaborated on in the general discussion. This theory, in turn, builds upon a similar assumption regarding how **INT** could be defined. The difference between these two definitions and why they

matter in relation to the UX aspects of *perception and response* is further discussed in the general discussion.

Regarding UI:s with images, no more conclusions can be drawn at this point. Instead, further research on the subject would be required in order to get to the bottom of the effects of images in news..

# **General Discussions & Conclusion**

## A. Discussion: findings and conclusions

This section contains a summary of findings and conclusions drawn from all of the three studies. Firstly, UI elements, experience and context are discussed and then how these components, together with content, interplay.

### A.1. Connection between UI and context

This section describes the findings of being able to predict the UX aspects of being up to date (UTD) and finding the news feed interesting (INT) when the UI elements and context characteristics are known. Further, it proposes an explanation for why this occurs in this specific case and the definitions required to understand it.

#### A.1.1. *Context + UI + Content = UX*

The table below presents a summary of how the three components context, UI and content interplay to form specific UX aspects (Table 7).

| Context variables                        | UI element  | Content | UX aspects                          |
|--|-------------|---------|-------------------------------------|
| <b>Short total time + short episodes</b> | Overview    | News    | Low <b>UTD</b> and High <b>INT</b>  |
|  | Single view | News    | High <b>UTD</b> and Low <b>INT</b>  |
| <b>Long total time + long episode</b>    | Overview    | News    | High <b>UTD</b> and High <b>INT</b> |
|  | Single view | News    | Low <b>UTD</b> and Low <b>INT</b>   |

Table 7. Summary of how the components context, UI and content interplay to form specific UX aspects.

This concludes that the aim to “... *investigate if consuming content using a specific UI in different contexts affects both the experience of the consumed content (news) and the experience of consuming that content (news).*” has been achieved.

#### A.1.2. *Defining UTD*

The Cambridge international dictionary of English (2020) defines up to date (**UTD**) as “modern, recent or containing the latest information” – which implies a relationship between information that one already knows and new available information. This thesis proposes a definition of what it means to *experience being up to date (UTD)* – a definition more in line with what participants was actually found to experience. The proposed definition consists of two parts and states that the experience of being **UTD**

is the ratio between the **number of articles read** (first part) and the **number of articles observed in a feed** (second part). A discussion regarding the two parts of this definition follows below.

**The first part** is related to an assumption that the experience of feeling **UTD** was directly connected to how many articles that participants read. This was determined to not be true, supported by quantitative data showing that a higher number of articles read did not translate into a higher **UTD**. Still, the number of articles read did matter in relation to the second part.

**The second part** of the definition relates to the number of articles seen in the feed (i.e. available information). That the participants saw articles that they did not read was found when interviewing participants regarding the level of **INT** of the news feed. Participants stated that they could assume how interesting an article was from simply reading the headline, which indicates that they saw articles that they did not have time to read. This would entail that scrolling through a feed – as participants using the UI **O** did – and seeing multiple headlines would increase the perceived volume of the feed.

**Combining the two parts** suggests an explanation for the experience of feeling **UTD**. Reading no articles would result in a very low **UTD**, while reading all of them would result in a high **UTD**. However between those extremes, the suggestion – as stated in the proposed definition – is that the experience of being **UTD** is based on how many articles you have read out of how many you have seen. It is a question of how much information you assume to have missed out on. Since there is an almost infinite amount of information available in the world, this appears to highlight the subjective nature of experiences (Turner, 2017). To be able to experience being **UTD**, individuals are required to determine what information is deemed unnecessary – for every piece of known information, there is a piece of unknown information. This further supports the idea that number of articles seen in the feed determines how **UTD** participants experience themselves to be.

#### *A.1.3. Seen number of articles: Why does it differ between UI:s and contexts?*

The context characteristics determine the constraints and boundaries of the consumption, which then leads to anticipation from the participants of what they are required to do in order to complete the task of becoming **UTD** on the news. In Study III, the context characteristics focused on time. These characteristics created distinct manners of consumption within different UI. For instance, with short total time in combination with short episodes, the participants anticipated that they would not be able to choose what they wanted to read. For participants using the UI **S**, this was not an issue since the UI did not require them to choose in order to read and they behaved

accordingly – reading from the top of the feed without scrolling. This resulted in these participants reading almost complete texts in every article they saw. In their view, they have seen very few articles, but read all of them – hence experiencing a higher level of **UTD**.

On the other hand, participants using UI **O** have the same anticipation as participants using UI **S**, but they were due to the design of the UI forced to make choices of what to read. This choice was between articles that were visible simultaneously on the screen – articles that they admittedly registered and were aware of. This resulted in them perceiving the news feed to be more extensive and knew that they had not read everything that was available to read – hence experiencing a lower level of **UTD**.

In the context **C<sub>2</sub>**, the characteristics are a longer total time and one episode without interruptions. The increase affects the anticipation towards the context. Participants now believe that they have enough time to read what they want. This results in the manner of consumption to differ for participants using the UI **S** – they scroll past articles, reading from the top of the feed without scrolling back up. The increase in total time results in more articles read, but since they have now started to scroll past articles, they are aware of them not reading every article in the feed.

Participants using the UI **O** repeat their manner of consumption from the context **B<sub>2</sub>**, i.e. scrolling and only reading interesting articles, but with a key difference. They pass through the feed multiple times. This not only means that they read more articles in context **C<sub>2</sub>** than in context **B<sub>2</sub>**, they are exposed to the headlines of the feed multiple times. This is presupposed to eventually lead to them being sufficiently acquainted with these headlines to be counted in the *articles read* part of the definition of **UTD**. Therefore, participants using the UI **O** receive a bonus of articles due to mere exposure in context **C<sub>2</sub>**. This is speculated to be the cause of them stating higher levels of **UTD** interacting with UI **O** than with UI **S** in context **C<sub>2</sub>**.

#### A.1.4. *Defining INT: Why is it different from UTD?*

The finding that the participants saw articles without reading them led to an explanation for the experience of being **UTD**. Though this is constantly present in the consumption, the definition of **UTD** as a ratio of read compared to the seen articles does not translate to a definition of **INT**. Arguably, this is due to **UTD** and **INT** arguably being inherently different. **INT** concerns an attribute of the feed, such that the articles of which it consists are or are not (according to the participant) interesting, similar to the *perception* aspect of the definition of UX stated in Framework: B.1 'UX'. In contrast, **UTD** concerns the *response* from consuming the news feed and does not state an attribute of the news feed in of itself.

Therefore, perceiving many interesting articles lets the participant state that the feed is **INT**, whether or not they have read them. Hence, **INT** is determined by **the observed number of interesting articles**.

*A.1.5. What is an experience?*

Proposing a definition for the experience of feeling **UTD** does not answer what an experience actually is – which in itself is a highly debated subject (e.g. Rossman & Duerden, 2019) that this thesis does not attempt to answer. However, it is important to attempt to describe what the *experience* in "experience of feeling **UTD**" actually means.

This thesis concluded some level of predictability of experiences. According to Desmet and Hekkert (2002), emotions cannot be described in a stimulus-response fashion – which would entail that predictable experiences (such as feeling **UTD** and experiencing interest) are predominantly not emotional experiences. What participants denote as 'experiences' may instead be statements referring to their subjective opinion or definition. Such measures (different definitions) of what the experience of feeling **UTD** entails was described by participants and ranged from requiring in depth reading to quantity being the only relevant factor. Assuming that these individual preferences are evenly distributed across the sample of participants in Study III, the expectation would be to find an even distribution of participants with varied definitions using each UI.

The fact that the findings state that there is a difference in reported experience between participants using different UI:s in different contexts would suggest that the experience of feeling **UTD** may not be as subjective as the participants state in the interviews. The '*experience*' aspect of the *experience* of feeling **UTD** would instead be something that you can state that you are (being up to date) or are not – but that you cannot state why that is.

*A.1.6. Did they experience the context?*

It is essential to discuss the legitimacy of the participants' claims of experiencing a particular context.

Some participants claimed that context **A<sub>0</sub>** did not actually feel like sitting on the bus, but they could still correctly guess that the simulated context was public transport. This, it would be fair to question if they experienced the context in the desired way. However, it is argued that the data is indeed valid, and this argument is based on the following. That the participants should experience the actual full contexts was never really the end goal, but rather that they should experience the key characteristics of the context and in turn, the yielded emotions of the contexts. These emotions were induced and perceived correctly, even in the participants who did not associate these

emotions with the contexts in the tests (**A<sub>0</sub> B<sub>0</sub> C<sub>0</sub> / B, C**). Therefore, it is fair to argue that the participants did experience the characteristics and the corresponding emotions of the context in the intended manner, even though they never fully experienced the actual context.

To wrap up the discussion about inducing context from Study II: B.2 'Pilot test (on site)' and Study II: D.3.1 'Inducing context', the aims regarding contexts are stated below:

*Aim 3: To investigate if (UI:s,) contexts (and experiences) can be defined by analyzing the variables of which they consist.*

and

*Aim 4: To investigate the possibility of inducing contexts through introducing relevant context characteristics.*

There is enough evidence to state that it is possible to induce contexts through introducing relevant context characteristics. The contexts were broken down into characteristics, which were perceived by the test participants in the intended way. In addition, the three contexts were perceived and experienced in different ways – further suggesting that introducing different context characteristics results in the experience of different contexts.

Regarding the second aim, taking the discussion of not experiencing the actual contexts in consideration, the possibility of inducing context through introducing relevant contextual characteristics is also confirmed.

## **A.2. How the components interplay**

After having expanded on **UTD/INT**, **experiences** and **contexts** - it is possible to understand the relationship between them, and how they interplay. Granted, it is difficult to map out every possible way these UX aspects can relate, but this thesis shines a light on *one* evident link. This relates to:

*Aim 2: To understand how the UI, context and content (news) interplay to form the resulting user experience.*

As stated earlier, a prerequisite for the study was to fixate the **content**, which means this study cannot plot the influence of different types of content. As suggested in the UX profiles, the perceived **context** creates a behavior through anticipation and

execution of a task. This behavior is applied on the task of reading a news feed through a **UI**. Depending on how well the design of the **UI** fit the characteristics of the **context**, the user gets a different **experience**, i.e. feels more or less **UTD** and defines the news feed as more or less **INT**.

The studies show that by changing only the UI, the user *will* get a different experience. On the other hand, by changing the UI *and* the context, the user *might* get the same experience, if the change in context potentially would compensate for the change in UI. However, in order to further investigate how the components interplay, a whole new set of characteristics and emotions is needed.

Therefore, the aim is partly achieved, by at least proving *one* relationship between UI, context and content, which explains how the factors interplay. However, this thesis cannot conclude a general, all-covering framework of how the factors interplay at any time with any UI, any context and any content.

## B. Research questions revisited

To summarize the discussion, this section addresses if the research questions were in fact answered.

*RQ: Can a specific UX aspect be predicted by finding and combining a specific UI element and context characteristic?*

The studies provide enough conclusive evidence to suggest that certain user experiences (feeling up to date and experiencing interest) of consuming digital content (news) can in fact be predicted if the UI elements and context characteristics are known.

*RQ: In what way – if any – does context and UI design interplay in the UX of digital content (specifically news)?*

According to the findings the interplay between context, content and UI design influence the experience of digital content (news). However, a general, all-covering framework of the relationship was not found.

*RQ: Is it possible to subconsciously induce certain contexts through introducing relevant context characteristics?*

According to the findings in Studies I, II and III it appears possible to induce contexts through introducing relevant context characteristics. This is supported by the fact that when performing tasks based on relevant characteristics, the participants stated that they perceived the context from which the characteristics were derived.

## C. Reflection

This section addresses what this means for the industry. Also, it includes ethical, societal and ecological aspects of this thesis.

### c.1. Future Work

In this thesis, the number of variations of UI:s and contexts was relatively few. In order to determine if the connection between these components creates predictable UX, further research has to be conducted with a larger sample size and with more variables. This is due to the fact that actual UI:s often contains more features and functionalities than the ones used in this thesis project. By understanding more variables, a responsive UI using the context characteristics as breaking points for when to change UI elements.

This thesis focused on varying context and UI:s by locking the content and attempting to create a value neutral news feed. By using the findings from this study regarding how context and UI interplay, it is possibly to lock these components and study how varying the content affects the UX aspects.

While one of the aims of this study was to determine if contexts could be induced through characteristics, the extent to which the induced contexts were actually experienced as the real life counterpart of that experience could not be determined. This could be investigated through inducing contexts and asking participants focused (more than in this thesis) questions regarding the contexts.

### c.2. Reflections on Process and Research

Becoming **UTD** (or experiencing feeling **UTD**) was found in both the diary study and online survey to be the most common motivation for consuming news, which made **UTD** a relevant UX aspect to use in the thesis. Other UX aspects included in this thesis was solely *argued* to be relevant aspects. For instance, it is not controversial to assume that individuals would have an opinion regarding how interesting a news feed is – hence making it relevant to measure **INT**. The UX aspects were generally associated with the

attributes of the content. While associating UX aspects with the content arguably makes them more relevant, the findings must be viewed with this in mind. The thesis does therefore not suggest that the findings are generalizable across all types of content.

Also, the approach of using both Study I and Study II to find and determine the UX aspects that would be investigated in the validation test introduced a lot of uncertainty into the process. The thesis assumed that there were relevant aspects of UX, but which they were was unclear until late in the project. Also, the UX aspects that were found may only have been a sample of the most relevant ones. In hindsight, additional variables of both the contexts and the content would have been interesting to investigate – for instance time spent on each article and time spent scrolling.

The general process of dividing the thesis into different studies (I, II and III) was found to be beneficial for structuring the different parts of the thesis. Still, since each study concluded with an *implication* section where it was decided what to investigate in the next study, subjective decisions had to be made. This may have disregarded findings that would have been interesting to validate further in the study, but that at the time was not showing any promise.

In general, the sample size used was quite small, especially in the main test of Study II where only 4 participants used each UI. The validation test in Study III improved upon this by limiting the number of UI:s investigated, but the number of participants would ideally have been higher.

Regarding the choice of using mean value to compare quantitative measures, it would in hindsight have been more suitable to use the median value due to the skewness (a consequence of the self-assessment questionnaire only capturing subjective data) of the data (cf. Frost, 2018). Since the data was not bell shaped, the mean value arguably should not have been used. However, attempts to correct the data using median instead of mean suggested that the values are not far off (due to few data points) and in no instances did the ranking of the UI:s or contexts differ from the results using the mean value.

The fact that contexts **B** and **B<sub>2</sub>** (as well as contexts **C** and **C<sub>2</sub>**) are based on the same context, but contain different characteristics, make comparisons between these difficult. This is clearly shown by the fact that almost all participants stated that they experienced context **B** as public transport, while no participants stated that they experienced context **B<sub>2</sub>** as public transport. The two versions of the contexts are different, even though they originate from the same context.

A final, and very important note, regarding the methods used is if the method of inducing contexts actually works. If not, many of the conclusions in this thesis are invalid. Still, even though there may be a difference between being able to state that a context appears to be "public transport" and actually experiencing being on public transport, the study found reported differences between contexts – supporting the assumption that participants were at least affected by the context. Then, if the context they experienced is not identical with a real life context, it is merely a question of how relevant the results are. Admittedly, it is more interesting to investigate contexts that occur in real life, but it does not necessarily affect the validity of the results found.

### c.3. Impact

The impact of this thesis can be divided in two; impact originating from the **results** of the three studies and impact originating from the actual **methods and research** phase of the thesis.

#### c.3.1. *Impact from results*

Firstly, it is proved that UI elements in combination with the context actually affect news consumption. Potentially, this could have an impact on how news rooms and department heads within news groups approach how news is presented. If the primary motivation is to satisfy their reader's conscious needs and wishes, a certain UI is optimal. This UI perhaps generates more traffic to the website or gives a higher satisfaction in readers. On the other hand, if the primary motivation is to enhance the reader's feeling of UTD (which is proved in this thesis is the reader's main motivation for consuming news), another UI might be optimal.

Depending on the UI, the publishers of the news outlets may or may not be given a greater responsibility. This is discussed below in C.4.1 'Ethical sustainability'.

Though, the context must be taken in consideration when discussing influence of UI. Thus, realistically, more than two contexts must be investigated and established before this could have any real impact on the news world.

#### c.3.2. *Impact from research*

Arguably, this thesis has more impact based on the methods and research, than from empirical results. A new approach to defining the mechanisms behind the user experience has been considered. Evidence points to the fact that it is possible to predict a UX aspect by defining and breaking down the UI into elements and the use (or consumption) context into characteristics. This could impact other UX research fields,

where the resulting end user experience potentially can be predicted similarly. Arguably, this would especially be of interest in interaction design, where much focus usually lies on fine-tuning the human machine interface in order to create the desired user experience.

Furthermore, the method of inducing contexts in a user testing scenario could potentially be adapted and used when testing user experience or in market research. Since global brands often work cross-culturally, the quality of remote testing carries high significance. As the evidence of this thesis suggests, there are advantages with inducing context subconsciously, and this should be considered for many research projects in various of fields.

#### **c.4. Sustainability**

This section addresses some of the sustainability aspects considered in the thesis. They are categorized as ethical, societal and ecological sustainability.

##### *c.4.1. Ethical sustainability*

There are a few interesting points to bring up regarding ethical sustainability. The main discussion point, which was considered in the beginning of the thesis project, is what the results could actually be used for. For instance, since a hypothesis of how a reader's feeling UTD actually can be achieved was found, whoever could potentially use it - for good and for bad. The authors' desire was not to generate thesis results that, if combined with non-democratic purposes, could potentially harm journalism. It is debatable if that desire was achieved, since it might be possible to e.g. use the hypothesis of feeling UTD to influence readers and what/how much news they consume.

In addition, the results of the thesis could potentially put more responsibility on the publisher of the news outlet. It can be argued that a change of UI e.g. entails focusing more on linear news consumption, so the importance of the order in which the news stories are presented increases. On the other hand, a change of UI could also enhance the possibility of choosing which articles to read, which would put a larger responsibility of the reader itself.

Lastly, it is worth discussing certain methods used in the user tests. The participants in the Study II user tests were subjected to a scenario where they thought they had to count (Study II: B.1.5 'Context and task'), which they, as it turned out, did not. However, this was considered a minor lie in order to correctly induce the particular context. It was also a lie with arguably very low consequences.

*C.4.2. Societal sustainability*

Some societal aspects are also essential to discuss. As stated in the introduction, the societal responsibility to keep its citizens informed about current events is of great importance in a democratic culture. The act of encouraging people to consume news, in this case through a better user experience, would therefore be beneficial for the society.

However, it is fair to question the inclusivity of delimiting the target group and the participant samples to university students and professionals at design consultancies in Gothenburg. Admittedly, the reached groups of people did not include many different cultures, ethnicities and class/social affiliations, which not only could have affected the results, but also did not take a stand for the inclusivity of socially vulnerable groups. The impact of this may entail these groups not benefiting from the user experience as much as the citizens in the target group, since the design improvements were created with the target group in mind.

*C.4.3. Ecological sustainability*

In all fairness, this thesis project's main focus is not ecological sustainability. However, one aspect that does carry importance was introduced as a result of the corona crisis.

Since the crisis forced the authors of this thesis to adapt to the requirements of physical distance, focus was shifted towards inducing contexts remotely. This would not have been the case if the user tests in Study II and III had been taking place on site as initially intended. However, to induce context worked as well remotely as on site, which might impact future user tests in various research studies. Working remotely reduces the demands of travel which naturally reduces the ecological impact on the environment. Granted, this impact might be far fetched, but every step towards a greener tomorrow is welcomed.

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# **Appendix**

## **Appendix I** - questionnaire for the diary study

This appendix presents which questions the questionnaire contained. The study participants had to answer all questions every time they consumed news.

Which day is it?

What time is it?

In what situation consume news? (e.g. on the bus to work)

What topic did you spend most time on?

Mark your frame of mind from 1. "sleepy" to 5. "agitated"

Mark your frame of mind from 1. "pleasant feelings" to 5. "unpleasant feelings"

Lastly, how did you consume news - "read text", "listened to audio", or "watched video"?

## Appendix II - written instructions for context B<sub>0</sub>

# INSTRUCTIONS

- 1.** Build a LEGO tower according to the image.



- 2.** Start the timer. Immediately start step 3.



- 3.** Read news with the goal of feeling up to date. When the timer reads between **2 min** and **2 min 30 s**, stop reading, stop the timer and reset it. **This means that you will have to keep track of time during the reading.** Continue with step 4.

- 4.** Build another LEGO tower according to the image, and place it next to the first tower.



- 5.** Start the timer. Immediately start step 6.



- 6.** Read news with the goal of feeling up to date. When the timer reads between **1 min 45 s** and **2 min**, stop reading, stop the timer and reset it. **This means that you will have to keep track of time during the reading.** Continue with step 7.

- 7.** Build another LEGO tower according to the image, and place it next to the first and second tower.



- 8.** Done! Your towers should look like this.



## Appendix III - manuscript for user test in Study II

The following texts were read to the participant (translated from Swedish):

”Today, you will read two news feeds as you carry out certain tasks. After each feed, you will self assess your experience via the survey, as well as mention an article that especially caught your eye. Afterwards we will have an interview to dive into your collected experience of the test.

When you read the news feeds in the test, we want you to read as naturally as possible. For us, this means that choose completely which articles you want to read, how much of those articles you want to read and how much time you spend on each article. Your goal is to afterwards feel up to date on the particular news feed. We don’t want you to speak during the reading. Instead, imagine that you’re reading by yourself, as you would do when reading news on your phone alone. To comment on the current state of the world, there aren’t any articles regarding the corona virus in the feeds, so ideally, imagine this test situation taking place in a ”normal” state of the world.

We want to make it clear that we’re not testing you in any way, and not really even our prototype specifically, but rather our thoughts and ideas around this subject. Since you opened the prototype in your phone’s web browser, the only navigational move you can do is to scroll up and down (*and in the case of O and OI, open and close the news articles*). ”

### CONTEXT B

”In this part of the test, you will perform a task as you are reading. The instructions of the task are written (*and can be found in Appendix II of this report*). When you are ready, open the instruction sheet and begin.”

### CONTEXT C

”For this part of the test, we want you to lie down in your bed or on your couch. If you have the possibility, please turn off the lights and shut the curtains. Your task is to read the news feed as described before. Afterwards you will get a new task. Another part of our thesis is to create a voice assistant who reads news. Therefore, we will need an average on how fast people count and you will have to count out loud, into the microphone. You can decide for how long you want to do this *\*shows the participants the time model\**. You will read the feed for at least four minutes and you will count for at least four minutes. In between, there are four minutes where you can choose when to stop reading and start counting. It can be eight minutes counting if you want to maximize counting or vice versa, or something in between. Start reading when you are ready”

## Appendix IV

- written instructions for context B

# INSTRUCTIONS

- 1.** Place the cutlery according to the image.



- 2.** Start the timer. Immediately start step 3.



- 3.** Read news with the goal of feeling up to date. When the timer reads between **1 min** and **1 min 30 s**, stop reading, stop the timer and reset it. **This means that you will have to keep track of time during the reading.** Continue with step 4.

- 4.** Place the cutlery according to the image.



- 5.** Start the timer. Immediately start step 6.



- 6.** Continue to read news with the goal of feeling up to date. When the timer reads between **1 min** and **1 min 30 s**, stop reading, stop the timer and reset it. **This means that you will have to keep track of time during the reading.** Continue with step 7.

- 7.** Place the cutlery according to the image.



## DONE!

## **Appendix V**

– self-assessment questionnaire for user test in Study II

This appendix presents the self assessment questions the participants answered after each part of the user test in Study II.

How up to date are you on the news feed you just read? Scale 1-10, where 10 is most UTD.

Was the news feed generally positive or negative? Scale 1-10, where 10 is most POS.

How interesting was the news feed? Scale 1-10, where 10 is most INT.

Mention an article that caught your eye.

## **Appendix VI**

- interview questions for user test in Study II

This appendix presents the questions that the participants were asked after both parts of the test (translated from Swedish to English).

Apart from the article you mentioned in the self assessment, can you mention two more?

Was it easier to remember articles from a particular news feed?

Describe the difference between how up to date you felt after the first and the second feed.

Describe the difference between how positive or negative you felt the first and the second feed was.

Describe the difference between how interesting you felt the first and the second feed was.

How did you experience the first context?

How did you experience the second context?

Did both feeds have an equal number of news articles?

How many articles did the two news feed contain?

Do you think it was real or fake news?

Did that differ between the two news feeds?

## Appendix VII

- manuscript for user test in Study III

The following texts were read to the participant (translated from Swedish):

"Today, you will read two news feeds as you carry out certain tasks. After each feed, you will self assess your experience via the survey, as well as mention an article that especially caught your eye. Afterwards we will have an interview to dive into your collected experience of the test.

When you read the news feeds in the test, we want you to read as naturally as possible. For us, this means that choose completely which articles you want to read, how much of those articles you want to read and how much time you spend on each article. Your goal is to afterwards feel up to date on the particular news feed. We don't want you to speak during the reading. Instead, imagine that you're reading by yourself, as you would do when reading news on your phone alone. To comment on the current state of the world, there aren't any articles regarding the corona virus in the feeds, so ideally, imagine this test situation taking place in a "normal" state of the world.

We want to make it clear that we're not testing you in any way, and not really even our prototype specifically, but rather our thoughts and ideas around this subject. Since you opened the prototype in your phone's web browser, the only navigational move you can do is to scroll up and down (*and in the case of O and OI, open and close the news articles*). "

### CONTEXT B<sub>2</sub>

"In this part of the test, you will be interrupted a number of times while you read the news feed. When you get interrupted, we want you to close your eyes for 15 seconds before you open your eyes again and continue reading the news feed. We keep track of the time and instruct you in every step along the way. In total, you will read the feed for two minutes and you won't get to know how many times you will get interrupted. Let's start."

### CONTEXT C<sub>2</sub>

"In this part of the test you will simply read the news feed for eight minutes. We will let you know when the time is up."

## **Appendix VIII**

- self-assessment questionnaire for user test in Study III

This appendix presents the self assessment questions the participants answered after each part of the user test in Study III.

How up to date are you on the news feed you just read? Scale 1-10, where 10 is most UTD.

Was the news feed generally positive or negative? Scale 1-10, where 10 is most POS.

How interesting was the news feed? Scale 1-10, where 10 is most INT.

How stressed out did you feel during this part of the test? Scale 1-10, where 10 is the most stressed.

How restless did you feel during this part of the test? Scale 1-10, where 10 is the most restless.

How many articles did you read?

Did you reach the bottom of the feed?

## Appendix IX

- interview questions for user test in Study III

This appendix presents the questions that the participants were asked after both parts of the test (translated from Swedish to English).

Mention every article you remember.

Describe the difference between how up to date you felt after the first and the second feed.

Describe the difference between how positive or negative you felt the first and the second feed was.

Describe the difference between how interesting you felt the first and the second feeds was.

Describe the difference between how stressed you felt after the first and the second feed.

Describe the difference between how restless you felt after the first and the second feed.

How did you experience the first context?

How did you experience the second context?

Would you have a different experience if the news feed contained images? (*Here, the participants opened another news feed with the only difference that this one contained images.*)

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