

# From Visions to Specification

Using user designed mock-ups for envisioning user requirements for the future e-newspaper

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## ABSTRACT

In this paper we have studied how user designed mock-ups, together with video recordings, can contribute in the process of generating user requirements when designing the future e-newspaper. The mock-ups originate from future workshop carried out within the DigiNews project. By analyzing user designed mock-ups to retrieve user requirements and evaluating the results against a focus group and newspaper designers we gained understanding on how mock-ups can contribute as data input in a user involved design process. The study concludes that mock-ups are an effective tool for making use of users' visions and opinions in a dynamic design process.

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## 1. INTRODUCTION

Traditional newspapers are all part of a user friendly and generally accepted product all over the world (Gurtler, 1984). The newspaper as a phenomenon has a long history; from the first printed daily publication in Germany at the 1700s (Smith, 1979), to the first digital online newspaper in 1994 [1]. The design of today's printed newspaper is the result of centuries of experience and tradition. When the online newspaper was introduced, its design and content resembled the printed edition, but has now evolved in to an own digital genre with own design elements and content, such as the news stream and archives (Ihlström & Lundberg, 2004).

We are now facing a new medium, the e-paper, which is predicted to be the next step in the evolution of newspaper presentation. The DigiNews project (ITEA 03015) aims at proposing an end-to-end solution for the future e-newspaper with partners in Sweden, Great Britain, Belgium, France and Spain. The e-newspaper is a newspaper published on e-paper based on the E-Ink technology [2]. The e-paper gives a visual impression close to print on paper; improving readability, and only consumes power when updating the screen. One example of a product using the technology is the Sony Librié (Graydon, 2004). The e-newspaper is predicted to be presented on a thin device, combining the abilities and overview of the printed newspaper with the possibilities of digital

media. The e-newspaper as a future everyday IT-artifact and being a hybrid between the printed and the online versions, will change the way we traditionally use a newspaper (Ihlström, Åkesson & Nordqvist, 2004).

We argue that the involvement of users in the design process is crucial for envisioning future user requirements, especially when designing the next generation of a widely used universal artifact as the newspaper. One approach supporting user involvement in the design process is participatory design (PD) (Carmel, Whitaker & George, 1993). Within this approach there are several different forms of techniques that can be applied. Such techniques can be; future workshops (Jungk & Müllert, 1996) and mock-ups (Ehn & Kyng, 1991).

Our study continues an already started PD study within the DigiNews project. We received material from several conducted future workshop sessions with newspaper readers and designers. The material consisted of user designed mock-ups of envisioned future e-newspapers and video recordings of the users' presentations of their mock-ups.

Mock-ups have traditionally been used by Information Systems (IS) researchers to, e.g., present concepts and designs for users or as representations of objects during user tests (see for example Iacucci, Kuutti & Ranta, 2000; Kyng, 1988). In IS research

the mock-ups have often been developed by researchers, not by users. In this paper we have studied how user designed mock-ups, together with video recordings, can contribute in the process of generating user requirements when designing a future everyday IT-artifact such as the e-newspaper.

This paper is organized as follows. We start by giving a theoretical framework in which we clarify some of the main concepts within the study. This is followed by a description of our method as well as a presentation of the empirical results. The paper is then concluded with a discussion of the findings.

## 2. USER INVOLVEMENT IN THE DESIGN PROCESS

Löwgren and Stolterman (1998) divide the design process into three abstract levels: vision, operative picture and specification. The *vision* can, e.g., be an idea of a rough technical solution, a new structure or a new function in a design. The next phase in the design process is the visualization of the initial vision, also called the *operative picture* (Löwgren & Stolterman, 1998). The first operative pictures are vague, e.g. simple sketches and pictures or metaphors and comparisons. Since the operative picture interacts with both the design situation and the vision; the picture will be clearer as the work continues. The designer must decide at some point that the operative picture is ready to work as a *specification* for the product (Löwgren & Stolterman, 1998). However, it is important to note that this is not a linear neither an iterative process, it is completely dynamic. For example, figure 1 illustrates how the abstract levels overlap each other.

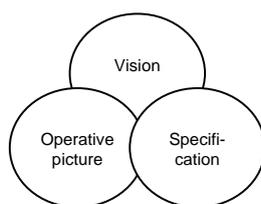


Figure 1. Visualization about the design process (Löwgren & Stolterman, 1998, s. 57)

Understanding the needs and tasks performed by the user is basic when designing a system (Bannon, 1991). To clarify, this paper applies the Scandinavian understanding of the term *user* which means any operational person who is affected by the system (Carmel et al., 1993). A widely discussed truism in the Information System (IS) community is the notion that the success of a system is proportional in the degree to which the users of that IT-artifact are

involved in its design and development (Carmel et al., 1993). Furthermore, the involvement of users in the design of computer applications has received a growing attention over the last decade (Kyng, 1994: Allen, Ballman, Begg, Miller-Jacobs, Muller, Nielsen & Spool, 1993). The participatory design (PD) approach actively involves potential and current users in the design and decision-making processes. PD is often termed as the “Scandinavian approach” to systems development and advocates a strong form of user involvement (Carmel et al., 1993).

*“The technique represents a “second generation” of thinking aimed at developing a methodology based on the principles outlined in the “first generation” of trade union inquires into the effect of information systems on the workplace”* (Carmel et al., 1993, p.42).

However, during the 90’s the PD initiatives moved beyond working contexts to include the technique in consumer product development (Grudin & Pruitt, 2002). The field of PD spans a rich diversity of theories and techniques with the goal of working directly with users or stakeholders in the design of social computer systems (Muller & Kuhn, 1993). In the following sections, techniques that affected this project are further described.

### 2.1 Future workshops

Future Workshops represent a technique that is more user-driven than traditional methods (Kensing & Madsen, 1991), and has been successful in the field of participatory design (Löwgren & Stolterman, 1998). The method emphasizes helping users take part in the design process which is made possible mostly by communicating in everyday language and by focusing on the actual users and their needs.

A future workshop is a technique for bringing out visions about the future by realizing a common problematic situation and to discuss how the visions can be realized (Kensing & Madsen, 1991). The aim is to support users playing an active role in the design process. The participants should share the same problematic situation, they should share a want to change the situation according to their visions, and they should share a set of means for that change (Kensing & Madsen, 1991). A future workshop is divided into three phases; the critique, the fantasy and the implementation phase (Kensing & Madsen, 1991: Jungk & Müllert, 1996). The idea of the critique phase is that the participants should draw out specific issues about current practice; the fantasy phase encourages the participants to imagine “what if” the current situation could be different; and in the

implementation phase the participants focus on what resources that would be needed to make realistic changes.

## 2.2 Mock-ups

Mock-ups are physical dummy representations of future products. Their function is, described easily, to allow simulation of procedure, tasks and layouts (Iacucci et al., 2000). Mock-ups can be built from a large variety of materials, such as paper, matchboxes, plywood, overhead and slide projectors, flip-overs and blackboards (Kyng, 1988). These types of design artifacts can be very useful in the early stages of a design process since mock-ups is a technique for envisioning the future and make good use of participants' experiences and knowledge (Ehn & Kyng, 1991). The reason why mock-ups work, even though their low functionality, is because they are understandable and everybody has the competence to modify them, they are also cheap and encourage "hands-on experience" (Ehn & Kyng, 1991).

The idea of mock-ups was introduced in the PD field as a way of trying to initiate users actively opposed to traditional specification documents (Iacucci et al., 2000). In the UTOPIA project, mock-ups were used to enhance the users' work situation by envisioning technology and allow users to make use of their skills in carrying out work in the application area (Spinuzzi, 2002; Kyng, 1988). The mock-ups were for example workstations, laser printers and scanners made from paper, photos, plywood, etc. (Kyng 1988).

## 3. NEWSPAPER DESIGN

Viewing the e-newspaper, with its portability and improved readability as a hybrid of the printed and online format, it is important to consider design factors from the previous formats. Today's newspaper has evolved into two different media: the printed and the online newspaper. The online newspaper initially resembled the printed version but has now established itself as an own product with a different layout and has moved beyond the sequential navigation of the printed form. Furthermore the e-newspaper's portability and size demands new interaction solutions since digital media possess functional capabilities which are not possible with the printed newspaper. Therefore, there are reasons to consider the aspects: layout, navigation, interaction and functions.

### 3.1 Layout

Printed newspapers have two internationally recognized formats - broadsheet and tabloid - which are familiar to readers all over the world (Ihlström et al., 2004). However, the trend is that the formats are

getting smaller, e.g. since 2004 the tabloid format has gained increased popularity in Scandinavia [3] and many of the Swedish newspapers have changed their broadsheet formats to tabloid. Moreover, research shows that the trend is heading towards an even smaller format, i.e. the A4 format, which has been a success among young readers in Europe [3].

An important factor to consider is the front page design of the newspaper. The printed newspaper has gone through a long tradition of design and much research has been performed on making the online newspaper as familiar and user friendly as the printed one (Ihlström & Lundberg, 2004). Familiarity and recognition are strongly related to the front page design, making positioning of objects and visual patterns important (Ihlström & Åkesson, 2004). On the front page on online newspapers, headlines are often the representation of stories that are valued most interesting (Ihlström & Åkesson, 2004), resembling the printed format that also presents the top stories on the front page.

### 3.2 Navigation

In the field of navigation design, Dix, Finlay, Abowd and Beale (2004) consider two main issues: local structure (the one screen) and global structure (the movement between screens). A lot of navigational interaction involves goal-seeking behavior, thus making it important that the user can make some assessment at each point in the interaction of whether they are getting closer to their goal (Dix et al., 2004). Furthermore, the user also needs some sort of confirmation when performing an action making the user feel that he or she is in control.

A newspaper is commonly divided into sections in a hierarchical global structure. Newspaper sections enable a reader easy access, make sense of information and give a sense of orientation. It is easy to find a particular section, e.g., the sport section or the culture section, inside a newspaper. "*The newspaper indexing is the most effective 'navigational' tool in newspapers and headlines are the main entry points to text*" (Ihlström et al., 2004, p.253). The reader brows and flip through the printed newspaper while the online reader scroll the front page to get an overview of the contents (Ihlström et al., 2004). Also many readers of online newspapers return to the front page to "start over" instead of navigating (Ihlström & Lundberg, 2004).

### 3.3 Interaction and functions

There is a huge difference in the way readers interact with the printed newspaper and the online newspaper. Interacting with printed newspaper the reader simply turns over the pages opposed to the online newspaper where the reader points and clicks. The Sony Librie (Graydon, 2004) uses the e-ink technology and has a plastic frame. The reader interacts with the product through physical buttons on the frame. Moreover, computer technology contributes with additional functionality not possible in the printed newspaper, e.g., saving functions, sounds, moving objects, frequent updates, etc.

### 4. METHOD

We have analyzed mock-ups, and videotapes of the presentations of mock-ups, designed by users in future workshop sessions in the DigiNews project to obtain common views and design suggestions for generating user requirements for the future e-newspaper. The requirements were then visualized through a rapid prototype: which was tested and evaluated by newspaper readers. Finally, the requirements were validated by newspaper designers. We divided our approach into Löwgren and Stolterman's (1998) three abstract levels of the design process: vision, operative picture and specification. Advocating for user participation, we involved users both in the initial and the last phase.

Researchers in the DigiNews project carried out ten different future workshop sessions, five of them with users/readers and five with newspaper staff from different newspapers. The future workshops were held during a three hours session. The sessions were divided into three phases: a visioning phase, a scenario building phase and a mock-up phase. In the visioning phase the workshop leader introduced the technology to the group and identified the problems from stakeholders. In the scenario phase the group was divided into two subgroups where each group built scenarios, which presented different use situations, out of following phrases: "Who?", "When?", "Where?", "What?", "How?" and "Idea?". In the last phase, the mock-up phase, the participants were provided with, e.g.; paper, overhead film, pencils, traditional newspaper and printouts of the online newspaper, to individually create a mock-up of the future e-newspaper (see figure 2). The participants presented their mock-ups for the rest of the group and were videotaped by the researchers.



Figure 2. Example of user designed mock-ups

### 4.1 Visions – mock-up analysis

We have analyzed twenty-seven mock-ups created by users during six future workshop sessions within the DigiNews project together with video recordings of the users presenting their mock-ups. We analyzed mock-ups from six out of ten future workshops due to the reason that the remaining four had not been video recorded and we wanted consistency in our research. The analysis focused on common views and design suggestions concerning the four categories: layout, interaction, navigation and functions and our aim was to find similarities among the mock-ups within those categories. The categories were broken down into more concrete subcategories, e.g.: size, placements and different interaction objects. Figure 3 below shows on how we initially broke down the layout category. All sub categories were compiled in a table where we put in the results from the mock-up analysis.

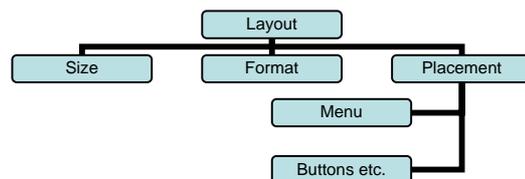


Figure 3. Example of the category break-down of layout.

### 4.2 Operative picture – the prototype

On the basis of the user requirements generated during the mock-up analysis, we developed a *rapid prototype*. A rapid prototype is usually thrown away, in the sense that it is not developed into a final product. Furthermore, rapid prototyping is mainly used to collect information on requirements and on the adequacy of possible designs (Preece, Rogers & Sharp, 1994). We used material from one of the newspapers in Sweden, Norrköpings tidningar, giving the prototype an authentic content. The purpose of the prototype was to visualize our generated user requirements as a hands-on experience for further testing.

### 4.3 Specification – evaluation tests

To evaluate the generated requirements we wanted to involve users and newspaper designers again. At first, test sessions were held with one of DigiNews' existing focus groups that had been involved in the future workshops. The focus group consisted of five users/readers, two females and three males, their ages were spanning from 29 to 82 years. The group members had different educations and not all of them were subscribers of newspapers. Initially, the different participants were introduced to the prototype via a touch screen. The participant was given five minutes to get familiar with the prototype and had the possibility to ask questions. In the next step the participant was given two assignments both focusing on *interaction* and *navigation* with the prototype. The assignments could, e.g., be to find a certain article or page. During these assignments the participant was asked to *think aloud*. Think-aloud is an observation technique in which the user is asked to talk through what she is doing as she is being observed (Dix et al., 2004). Think-aloud is also suggested as a good technique for designers carrying out their own evaluations (Wright & Monk, 1991). The benefit of using think-aloud is because of its simplicity, it does not require a wide range of expertise to perform and meanwhile it can provide useful and effective information in the design process (Wright & Monk, 1991). However, the information provided is often subjective and may be selective, depending on the tasks provided. When the testing session was completed, a semi-structured interview was held, partly to give the participant a chance to give us comments on his or her general impression but it was also a chance for us to get answers to aspects within the *layout* and *functions* categories, which did not appear during the assignment tests. The participants were asked questions about their opinion of the size and layout of the prototype, overall impressions, and functionality. We also asked about their thoughts and impressions about participating in a focus group, etc.

The results from the evaluations were used to revise the user requirements for a final test with news paper designers. The results from this test contributed as a validation of the requirements, to see if they would function as usable input for a future e-newspaper. The test group consisted of four newspaper designers, all from different newspapers. They were asked questions regarding user requirements and user participation in a design process.

## 5. RESULTS

The following chapter presents the results from the mock-up analysis, the rapid prototyping and the evaluation and validation tests.

### 5.1 Mock-up analysis

The aim of the mock-up analysis was to obtain common views within our four categories: layout, navigation, interaction and functions, for generating user requirements. However, the participants made their mock-ups out of their own experience which was the reason why not everybody had implemented aspects of all subcategories. For this reason, we have studied the similarities in the twenty-seven mock-ups to gain the most wanted subcategories.

In the layout category (table 1) we studied the format on the future e-newspaper and where on the screen different objects, such as function buttons and headlines, should be positioned. The majority of the participants made use of the possibility to combine features from online newspaper (e.g. menus of the sections to the left) and printed newspapers (e.g. headlines on the front page for good overview).

Future workshops	1	2	3	4	5	6	<b>Total</b>
Numbers of mock-ups	3	3	4	2	5	10	<b>27</b>
<b>Size</b>							
A3			1		1		<b>2</b>
A4	3	3	3	2	4	8	<b>23</b>
A5						2	<b>2</b>
<b>Format</b>							
Portrait	3		2		1	6	<b>12</b>
Landscape		3	2	2	4	4	<b>15</b>
<b>Placement</b>							
Menu right		1		1	2		<b>4</b>
Menu left		1	2		1	6	<b>10</b>
Menu top	1				1	1	<b>3</b>
Menu bottom						2	<b>2</b>
Function buttons left	1	1			2	1	<b>5</b>
FB right		2					<b>2</b>
FB top							
FB bottom					1	2	<b>3</b>
Headlines left		2	1	1		1	<b>5</b>
H middle		1				1	<b>2</b>
H half page	1	3	2	2	3	4	<b>15</b>
H whole page					2	4	<b>6</b>
Ads half first page	2						<b>2</b>
Ads bottom		1	1		1		<b>3</b>
Scattered ads		1		2	1	3	<b>6</b>
Ads on own page					3		<b>3</b>

Flip Page Button left		1	1		1		<b>3</b>
FPB in right comer	2		1	1	1	5	<b>10</b>
FPB bottom		1					<b>1</b>
FPB top		1					<b>1</b>
Article in whole page	1				1		<b>2</b>
Article in half page		2	3	2	4	4	<b>15</b>

Table 1. Mock-up analysis of the layout category.

In the navigation category (table 2) we studied both how the participants wanted to navigate between articles and what factors they wanted to feel orientated. The majority of the participants wanted to have page numbers or a timeline to get an overview of the newspaper regarding where in the newspaper they were and how much they had left to read. This was clearly an aspect that most of them felt were a lacking feature in today's online newspaper which was seen as an endless medium. However, navigational aspects from the online newspaper such as clickable headlines and menus were something that had been taken in consideration in the majority of the mock-ups.

Future workshops	1	2	3	4	5	6	<b>Total</b>
Numbers of mock-ups	3	3	4	2	5	10	<b>27</b>
<b>Navigation</b>							
Back/forward buttons	2	1	3	2	2	3	<b>13</b>
By sections or headlines	1	2	2	2	5	9	<b>21</b>
<b>Orientation</b>							
Timeline	3				1	1	<b>5</b>
Page numbers	3	1	2	1	2	5	<b>14</b>
Color-coded sections	1				1	1	<b>3</b>

Table 2. Mock-up analysis of the navigation category.

In the interaction category (table 3) the majority of the participants wanted to use touch screen when interacting with the e-newspaper which is a way of interaction that could be found in neither the online version nor the printed one. There were also a few suggestions to use soft buttons or voice control, although, touch screen was the most obvious choice according to the participants.

Future workshops	1	2	3	4	5	6	<b>Total</b>
Numbers of mock-ups	3	3	4	2	5	10	<b>27</b>
Touch screen		2	3	1	3	1	<b>10</b>
Soft Buttons	2			1			<b>3</b>
Voice control			2				<b>2</b>

Table 3. Mock-up analysis of the interaction category.

In the functions category (see table 4) the participants came up with ideas of functions inspired from both online newspaper (e.g. larger text) and newspaper on print (e.g. cutting out and saving articles). New functions, such as e-mail and a possibility for personal settings, were also brought up.

Future workshops	1	2	3	4	5	6	<b>Total</b>
Numbers of mock-ups	3	3	4	2	5	10	<b>27</b>
Save button		1				2	<b>3</b>
Print						1	<b>1</b>
Text size settings					2	1	<b>3</b>
Personal settings		1	2		2	2	<b>7</b>
Read e-mail	1	1	3		1		<b>6</b>
Archive		1	1			1	<b>3</b>

Table 4. Mock-up analysis of the functions category.

By studying common views and design suggestions the analysis resulted in the following user requirements:

- The size of the e-newspaper should be A4.
- The format of the e-newspaper should be a landscape format.
- A menu containing, for example, the sections of the newspaper should be positioned to the left.
- Headlines should be presented on the left half of the newspaper. The headlines on the front are today's top stories and each section also has its own headlines.
- Chosen articles should be presented on the right half of the paper.
- Scattered advertisements everywhere in the paper.
- Sequential back and forward buttons in the right corner allowing the reader to turn pages.
- The reader should navigate by clickable sections, headlines and the flip-page-buttons.
- Use of page numbers to see where in the news-paper the user is.
- Touch-screen interaction.

- Extra functions should be: the possibility to save information in the newspaper and to enlarge/reduce the text size, a personal archive with saved material, personal settings and e-mail.

## 5.2 The prototype

The user requirements were visualized with a rapid prototype. Two of the sections in the menu could be used for interaction and all headlines were clickable. The user could navigate the paper in two ways: (1) through clickable sections and headlines on the left half on the paper or (2) flipping articles sequential through the back and forward buttons in the right corner on the paper. Buttons with functions were also placed at the bottom of the screen and they included: *archive*, *e-mail*, *settings*, *adapt text size* and *save article*. Moreover, the prototype contained moving pictures and advertisements. See figure 4 for a screenshot.



Figure 4 – The e-newspaper prototype

## 5.3 Evaluation with users

In this section we present the results from the evaluation based on the four categories and we also present the respondents views on user participation.

### 5.3.1 Layout

All of the respondents were pleased with the format and size of the prototype but argued that the artifact had to be foldable or able to roll up; otherwise A5 would have been a better solution. One of the respondents said “A4 encourages a good readability [...] there is a risk that A5 would have been too small [...] but at the same time it should not be clumsy”. The majority of the respondents liked the menu as it was, on the left side, since they recognized this layout from the web, while the rest of them thought it would be better to have it on the bottom of the page.

Everyone thought that headlines on the front page created a good overview of the newspaper.

### 5.3.2 Navigation

Navigating by the back and forward buttons were satisfying for all of the participants. For those who were in favor of the traditional newspaper on print, this way of navigation was recognizable and the rest of the respondents had been lacking this function in the online newspapers. The majority of the participants were pleased with navigating by the sections in the menu since it made it easier to find what they really wanted. One participant said “I thought it was good with a menu so I could quickly get where I want [...] in a newspaper on print one has to turn over the pages, in this prototype I can get what I want right away”. The participants were also given assignments, e.g.; to find a local article about a bathhouse or navigate to page seven. All the participants navigated in a logical way by using the sections and headlines or with the sequential back and forward buttons. The participants performed their assignments within seconds indicating that the two navigational aids complemented each other and were found easy to use by the reader.

According to the participants, the most positive aspect was that the section bound headlines stayed in place even when they read an article. One respondent said “I think it is nice to read the article in a separate window, and at the same time still see the headlines [...] otherwise it would have been a lot of back-clicking [...] it is nice to go on with the reading like this instead”.

### 5.3.3 Interaction

All respondents liked to interact via touch screen; they were pleased with the idea that, e.g., headlines and advertisements were, or were supposed to be, clickable. However, some of them thought it was difficult to scroll when using the touch screen.

### 5.3.4 Functions

The majority of the respondents liked all of the proposed functions and especially the saving function and the archive. One respondent said “If I see an article or an advertisement that is interesting, I can save it and read it another day”. Everyone thought it was important to be able to enlarge the text for a better readability, especially for persons with impaired visions. Moreover, besides the functions proposed in the prototype some respondents wanted a function for voice recitation of text and also an archive containing old newspaper issues.

### 5.3.5 User participation

Everyone thought it had been exciting and interesting to contribute to the new newspaper medium and they also liked the fact that they were informed of new details continuously. One respondent said *“one has more and more opinions the more prototypes one sees [...] now it is easier to form an opinion. In the beginning it was more brainstorming and it was hard to come up with ideas [...] it is good that we are aloud to continue participating in projects”*. All respondents said that their initial vision of the e-newspaper had changed during the process. They were all curious about future results and one respondent found it *“good for the self-esteem to keep tabs in something new and special”*.

### 5.3.6 Revision of requirements

The test sessions went smoothly and we received a lot of positive feedback. No one of the participants had any problems handling or navigating our prototype and there were no mayor concerns that arose. However, some small changes on the requirements were made which is shown below.

- The size of the E-Newspaper should be A4 provided that it is reducible when unused.
- A new function concerning voice recitation of text.
- A new function concerning an archive for old newspaper issues.

## 5.4 Validation with newspaper designers

The revised user requirements were tested towards newspaper designers as a validation of the process.

### 5.4.1 The user requirements

All in all, the designers agree with the user requirements apart from some layout aspects. Some of the designers were not fond of the idea of a landscape format. One of them said *“the e-newspaper should, as much as possible, look like a traditional newspaper on print. It should be a portrait format, be read from the top to the bottom”*. The reason for making the e-newspaper as similar as possible to a traditional newspaper on print was, according to some of the designers, to make a more gentle transition for the reader to the new medium. To have headlines on the left half of the screen was not in line with the designers' thoughts, one of them said *“it is better to have one whole index page and than use all of the screen to read the article”* and another one thought *“it was a waste of space”*. However, one designer thought that it felt logical to imitate the online newspaper, at least in the beginning, since the first version of e-newspaper probably will attract more online readers than those of the printed version. All designers agreed in using touch screen when

interacting, they also liked the navigational aspects, one of them said *“I absolutely agree with the navigational requirements”*. The designers were pleased with the chosen functions and one especially emphasized the voice recitation of text.

### 5.4.2 User involvement in the design process

Involving users in a design process were appreciated by all the designers. Some of them liked the idea more than others; one of them said *“it is good in condition that the user requirement do not block, warp or gets unnecessarily limited”*. Another one argued *“one should absolutely involve the user in the design process, both in design and functionalities and they absolutely do contribute in the process”*. However, some of the designers mentioned that it is important to sort out views based on the wrong picture. Some users are too focused on either newspaper on print or online newspaper; it could be difficult to get the users to think in new directions. The designers agreed on the fact that user participation is a good method in getting new lines of approach.

## 6. DISCUSSION

According to the newspaper designers user involvement is commonly used in their field of work. Especially one designer advocated this method as he said that his newspaper often comes up with *“dummy”* ideas which they test with focus groups and the results generates new ideas. User participation benefits the design since users contributes with important issues such as needs, and in this specific case, their everyday newspaper reading habits. The users participating in the process also get benefits in, e.g., gained knowledge. Some of the participants said that they felt proud of their contribution and that they felt important.

Mock-ups are a great source of information. It is an easy and cheap technique for users to realize their visions and opinions (emerged e.g. during a future workshop) in to a physical object. A mock-up gives a rough picture of a possible future design of the e-newspaper. Together with video recordings we were not only able to extract visions about the layout of the e-newspaper, but we could study how the user interacted with the imagined e-newspaper and how he or she wanted to navigate. We could even define additional functions preferred by the users. If a picture says more than a thousand words mock-ups probably says ten times as much. However, it is easy to get lost in the jungle of information and innovation that mock-ups provide, but a well-structured analysis facilitates the process. Categorizing our findings in layout, navigation, interaction and function with sub

categories, were a good approach for structuring the analysis.

When analyzing material, such as user-designed mock-ups, there will of course be a degree of interpretability. Analyzing the mock-ups in our case without the video recordings would have been difficult, forcing us to guess the functionalities of, e.g., a yellow button or an arrow. The video recordings strongly reduced the degree of interpretability and were a crucial part of the analyzing process. However, there will always be a certain degree of interpretability. We did not carry out the initial future workshop sessions ourselves, thus we could interpret the material objectively, but also we might have lacked the knowledge to interpret the material in an accurate way. However, our results were based on aspects clarified in the video recordings, thus reducing the risk of misinterpretation.

Our analysis clearly showed a demand for an A4 format, almost all of the mock-ups consisted of A4 formats. This strengthens the trend against a smaller format and previous research, provided that the participants were not influenced by the material for designing the mock-ups that was available during the future workshop sessions. User requirements such as color-coded sections, page numbers and the importance of headlines can all be related to prior design theories and were appreciated by both users and designers during evaluation and validation.

An interesting fact was that the mock-up analysis resulted in a solution of the back-clicking issue of online newspapers, where readers often return to the first page when navigating. The fact that the section based headlines always were visible when reading an article reduced back-clicking. However, according to the newspaper designers, the solution resulted in a disadvantage of the utilization of space because the headlines were taking up so much of it. This was quite a surprisingly result, since the most positive feedback from the user tests regarded the navigational structure of the prototype. Another big concern of the newspaper designers was the format since most designers advocated a standing format resembling the tabloid format. The reason of a standing format was that the future e-newspaper should resemble the traditional newspaper making the transition easier for the user. Furthermore, some of the senior participant also expressed wishes concerning a more traditional layout. Although, this study's user requirements originated from users envisioning the future e-newspaper confirming that most users are not troubled by a none traditional layout.

The contradictions between the newspaper designers and the users might be based on the reason that the newspaper designers see the e-newspaper as a possible future substitute for the printed newspaper, which is one initial value for the Diginews project. The results show that newspaper designers had preferences based on the printed newspaper while some of the users preferred aspects from the online newspaper, thus resulting in contradictions.

Another reason might be that the mock-ups originated from sessions based on envisioning future technology by users, focusing on innovation and not on limitations while newspaper designers might have another focus based on their contextual requirements in their work situation. Although the newspaper designers concurred with many of the user requirements, there was some controversy between users' visions and designers' knowledge. However, a design process is not linear but a dynamic process (Löwgren & Stolterman, 1998). This design process was not intended to result in final requirements – it was a part in a larger dynamic process generating input to the process of designing the e-newspaper.

Some user participants said that it was hard to express opinions about the e-newspaper in the initial phase of the project. Based on the richness of the mock-ups, we believe that the mock-up technique was a good tool for the users to express themselves. However, as the users' involvement in the Diginews project proceeded they felt that it was easier to express opinions the more prototypes they saw, which is a reason to keep involving the same users in a further process. Furthermore, a newspaper designer expressed that users relate what they see to what they already know therefore relating the future e-newspaper to already existing mediums. As mentioned, users in this study expressed that they had more opinions the more prototypes they could relate to. Therefore a variety of design solutions based on the mock-up analysis, instead of just one prototype, might have resulted in a richer result because the user could relate and compare the prototypes. Another reason for making more than one prototype is because there was no clear majority concerning the users' opinions of a standing or a landscape format of the newspaper during the mock-up analysis.

This article took place in the middle of a larger project. Instead of collecting our own empirical grounds from scratch, we used already existing material from the Diginews project which has affected our study in both positive and negative ways. Since we did not attend the future workshops we have

not been able to influence the participants which made us more objective in analyzing the mock-ups. However, there were a lot of questions that came up during the analysis that we were not able to ask the participants about.

## 7. CONCLUSION

The mock-up analysis resulted in user requirements that were acknowledged by both newspaper designers and design theory. The design process also resulted in a new way of navigating a newspaper that was appreciated by users during tests. However the navigational design did not concur with newspaper designers' vision of the future e-newspaper thus providing a new possible design approach that could be taken in consideration.

After this study we believe that mock-ups are an effective tool for making use of users' visions and opinions in a practical way. The mock-ups together with video recordings of the participants presenting their ideas created a rich empirical base for analysis containing a great amount of information being a valuable contribution in a dynamic design process.

Using this mock-up technique has been a rewarding process when generating user requirements for the future e-newspaper. For further research it would be interesting to study this technique's usefulness implemented in the development of other future or existing products.

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