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Design Recommendations



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<i>Abstract (for dissemination)</i>	Based on a “Design – experience – value” framework that integrates different User Experience and User Acceptance aspects and relates these to design aspects, design recommendations are formulated for the evaluated testbed applications and future CITIZEN MEDIA User Generated Content applications.

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TERMINOLOGY & ABBREVIATIONS

To assure coherent terminology and abbreviations across all documents inside the project, all important words and abbreviations are explained on the public website www.ist-citizenmedia.org.

The most relevant terms for this document are described in the following:

Co-creation:	is the act of collaborative creation of content or applications by at least two people.
Co-design:	is a user-centred design methodology. Co-design is the process of first obtaining insight in the natural environment of users who then take on an active role in creating ideas and designing/testing new applications in their natural setting, supported by a multidisciplinary research team.
User Acceptance:	is the willingness within a user group to employ technology for the tasks it is designed to support, and the motives why technologies are adopted or rejected.
User Experience:	is the complete experience of a user before, during or after the use of a product or service, directly caused or changed by this product or service.
UGC:	is user-generated content and defines different types of media content including video and audio, created and manipulated by citizens, with the purpose of sharing it with other citizens.
Usability Evaluation:	is any analysis or empirical study of the usability of a prototype or system. The goal of the evaluation is to provide feedback in software development, supporting an iterative development process.
ESM:	The Experience Sampling Method (ESM) is a research method for studying what people do, feel, and think during their daily lives. It consists of asking individuals to provide systematic self-reports at random occasions during the waking hours of a normal week.

List of the most used abbreviations in this deliverable:

EPG:	Electronic Program Guide
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IPTV: Internet Protocol Television
UA: User Acceptance
UGC: User Generated Content
UX: User experience

1 EXECUTIVE SUMMARY

1.1 Link with the objectives of the project

The general objective of the CITIZEN MEDIA project is to enable non-professional users to co-create networked applications and experiences based on their own user-generated content. CITIZEN MEDIA investigates how people can be supported in their everyday life, by innovative use of user generated content. The vision of the project is to provide more knowledge about the citizen himself becoming the major media producer and distributor, and about exploiting this media created by different citizens at different moments of time to generate a co-created CITIZEN MEDIA application. In general, user-centric design methods are used to build successful applications that assure strong user involvement. Different applications and services are thus developed in a co-creative way.

The goal of WP5 is to evaluate the applications that are developed within the project and formulate design recommendations based on these evaluations. The overall evaluation approach including a detailed description of the methodological approach and evaluation framework is provided in Deliverable D5.1.2 (Evaluation Plan). Two major evaluation objectives were defined within CITIZEN MEDIA: user experience on the one hand and user acceptance on the other hand. Both objectives are investigated for each CITIZEN MEDIA application in order to assess and steer the further development of the applications in such way that they meet the specific needs and expectations of the user. This report focuses on the "Design recommendations" task, which contributes to the project by:

1. **Identifying and analyzing design options** (design possibilities / functionality / features that relate to the User Experience or User Acceptance and that can be (re) designed to enhance one or the other). The goal is to analyze and identify the design options that fit best the user needs based on the results from the user experience and user acceptance evaluations (D5.2.1 and D5.3.1).
2. **Formulating future design recommendations** (the needs/interests/topics to design for and functionality appropriate to support these needs/interests/topics) based on an analysis of identified design options and predictions on future societal developments these future design recommendations are formulated.
3. **Highlighting main challenges** for further **design and research** of CITIZEN MEDIA like applications.

1.2 State of the art

1.2.1 At the start of the project

Within this document design recommendations are defined as recommendations to improve the most important design issues of a current product or service, as appears from evaluation. Design recommendations are not an exact science but give an indication of possible design solutions to specific problems as encountered in an application during evaluation, contrary to patterns (see User Experience Patterns in D5.4.1) that formulate or state proven solutions to general, often reoccurring problems. The User Acceptance (UA) and User Experience (UX) evaluations are used as a basis for formulating the design recommendations. To interpret the data from these two theoretical evaluations a framework is introduced that unifies the different viewpoints into an integrated reference window (chapter 2) linking design (options) of a product/service to the UX, UA and aspects from which it consists.

At the start of the project the field of UX and UA research and evaluations was quite broad, covering many different aspects that play a role in user experiences and adoption without clear insight in the relations among these aspects and what these experiences and adoption

results in. Especially theoretical insight in UX was hardly related to design in terms of design guidelines, evaluation and measurement instruments, methods or tools, making it difficult to make valid design choices based on evaluations. For valid design choices on application development level, more detailed design guidelines and aspects are needed than are currently provided (see also D5.2.1 section 1.2 State of the art in UX) (Lai-Chong Law, Hvannberg et al. 2006; Law, Vermeeren et al. 2007).

1.2.2 At the end of the project

At the end of the project different design recommendations for creating user experiences and increasing the user acceptance of UGC applications are formulated, thus adding to the body of knowledge in the area of design for User Acceptance and User Experience. In the last 4 years User Experience and User Acceptance both have gained focus and coherence in the form of additional insights, models and research topics further explored as well as the relationships between the different research topics, elements within models, etc (for an overview see D5.2.1 and D5.3.1). The “Design – experience – value” framework has tried to incorporate these new insights in User Experience (UX) as well as User Acceptance (UA) and link this knowledge to the design elements UGC applications. At the end of the project, there was still little known about UX and UA factors and their role in UGC applications. The results in this and the other deliverables (D5.2.1, D5.3.1 and D5.4.1) therefore are a valuable contribution to this field of research.

1.3 Advancement State of the Art

The formulation of design recommendations for user experience aspects and user acceptance aspects based on the “Design – experience – value” framework is new and additional knowledge in general. Especially the link between UX and UA aspects and design components of services and systems is valuable when considering design recommendations. The “Design – experience – value” framework can contribute in researching and determining the underlying structure and relations within and among UX and UA aspects and design options in a structured way, serving as a reference window for further experiments, evaluations and the design of specific experiences or a certain level of acceptance and adoption itself.

The following contributions to the current state of the art are achieved:

1. First, a relation is established between UX/UA models/aspects and design elements. The proposed framework for “Design – experience – value” presented in this work incorporates the different aspects/findings from the UA and UX evaluations and tries to relate these findings to the design of the applications in a qualitative/subjective and interpretive way. Design recommendations for CITIZEN MEDIA applications are suggested and formulated based on this model and the most important UX and UA evaluation results for each CITIZEN MEDIA application. The relation between design aspects and UX or UA is new and still largely an open area to be explored (Norman 2004; Lai-Chong Law, Hvannberg et al. 2006; Law, Vermeeren et al. 2007; McCarthy and Wright 2007; Desmet and Hekkert 2007; and Pals, Steen et al. 2008).
2. Future design recommendations for CITIZEN MEDIA applications (general) are formulated based on the findings in point 1). These recommendations together with the recommendations made under point 1) prove interesting input for the further development of the patterns approach described in D5.4.1.

1.4 Summary of conclusions

1.4.1 Main research questions

- How can we describe a model in which design elements, UX and UA factors are modeled, indicating the relations among these factors in a coherent manner?
- What effects do design aspects or elements have on the different UX and UA factors described in the “Design – experience – value” framework and the resulting value for the users?
- To study the exact meaning provided by an UGC application in everyday life, field trials or in-situ evaluations are needed over longer periods of time (e.g. ranging from weeks to months of in-situ, everyday life usage)?

1.4.2 Most important conclusions

- Aesthetics play an important role in determining a user’s initial adoption, acceptance and observed meaning of a service and pragmatic aspects such as the usability and ease of use
- Pragmatics effect personal and social meaning and are the result of a balance between the usability and experiences such as fun and enjoyment during interaction
- Meaning consists of two components, the personal and the social meaning of the application in the context of everyday life. Meaning thus mirrors how a user’s higher order goals are addressed. Aesthetics and pragmatics influence and support these higher order goals during interaction with an UGC application
- UX and UA factors can be described in the “Design – experience – value” framework in a coherent manner, to interpret the evaluation results from different studies and translate these into design recommendations
- Classical aesthetics partially relate to usability but the influence of expressive aesthetics on other pragmatic aspects such as fun and enjoyment largely remains unknown

1.4.3 Most important open issues

- Exact relationships between different UX and UA factors are difficult to prove with the qualitative/interpretive methods used to generate the design recommendations. Further research is needed to empirically prove causal relations between the different UX and UA factors
- Classical aesthetics partially relate to usability but the influence of expressive aesthetics on other pragmatic aspects such as fun and enjoyment largely remains unknown
- Most of the formulated design recommendations stem from qualitative/interpretive research and should be proven to work in practice by formulating design based on the recommendations and evaluate the impact of the design on different UX and UA factors

2 UX AND UA DESIGN RECOMMENDATIONS

The goals of the CITIZEN MEDIA project is to **provide users with tools to generate, consume and co-create content which is shared with other/between users** and at the same time **create a good overall user experience and user acceptance (of these tools and the generated content)**.

The design recommendations as described in this report are recommendations for ‘thinking about’ and further developing and enhancing the look and feel, the interaction and the meaning and resulting value of the application for the user. The recommendations are intended to help researchers, developers and designers to further explore and enhance the user experience and user acceptance levels and specific parts or aspects thereof within applications. The design recommendations formulated in this deliverable are based on the CITIZEN MEDIA user experience (UX, Deliverable 5.2.1), user acceptance (UA, Deliverable 5.3.1) evaluations and the interpreted results from the individual evaluations performed within the different testbeds.

The deliverables D5.2.1 and D5.3.1 give an overview of the UX and UA evaluation results and different user evaluation methods used to measure and evaluate the UX and UA aspects. D5.5.1 addresses the specific design recommendations for each testbed based on these evaluations. This deliverable explains the (re)design recommendations in detail based on these evaluation results and their interpretation with the help of the “Design – experience – value” framework as explained further in this chapter. The advantage of using this framework over the UX and UA frameworks are that in the “design – experience – value” framework the ***UX and UA aspects are taken together and linked to design elements***. The framework will be further improved and tries to combine different design features or aspects (the things a designer or developer can design and change) and the resulting user experiences, acceptance levels and created value for end users.

At the beginning of this project there was less insight in UX and UA aspects compared to now, especially in the relationship between different UX and UA aspects and how the gestalt of the resulting UX’s and perceived UA ultimately provide a specific value for the user. This lack of insight at the beginning of the project was due to the limited state of the art in UX and UA in general compared to now, four years later. The “Design – experience - value” framework developed over the last few years has tried to incorporate new insights, therefore indicating possible blank spots in UX and UA aspects that can be addressed further in future evaluations with new methods specifically addressing these aspects, yet currently not available. One example of one of these blank spots is the missing research interest in aesthetics. From recent research, aesthetics seem to have an important influence on the usability of applications or services under certain circumstances as well as on product attachment (Lavie and Tractinsky 2003; Tractinsky 2007; Tractinsky, Katz et al. 2000; Tractinsky and Lavie 2002; and Hekkert 2006). These recently found important aspects in determining the UX and UA simply couldn’t have been incorporated in performed evaluations earlier, still it seems important to know they exist and try to incorporate them in the future.

The framework itself should be viewed as a reference window that helps explore the design space and choices to be made based on the different UX and UA evaluations as best as possible at the given time. The UX/UA evaluation framework developed within WP5 was taken into account in the development of the “Design – experience – value” framework and adapted and extended to incorporate a design perspective. This design perspective is needed to translate the evaluation results into design recommendations.

2.1 Design – experience – value framework

The “Design – experience – value” framework presented here is an effort to better understand, evaluate and influence the product interaction of User Generated Content applications, the interpretation thereof, called sense making, and its resulting value as perceived by the end user. During the last few years it is continuously updated. It’s first version draws heavily on the frameworks as formulated by Norman (Norman 2004), McCarthy & Wright (McCarthy and Wright 2007), and by Desmet and Hekkert (Desmet and Hekkert 2007) as well as on later research by Kort & Vermeeren (Vermeeren and Kort 2006; Kort, Vermeeren et al. 2007; Vermeeren, Kort et al. 2008; Pals, Steen et al. 2008) and Law et al. (Law, Roto et al. 2008; Law, Roto et al. 2009) (see figure 1).

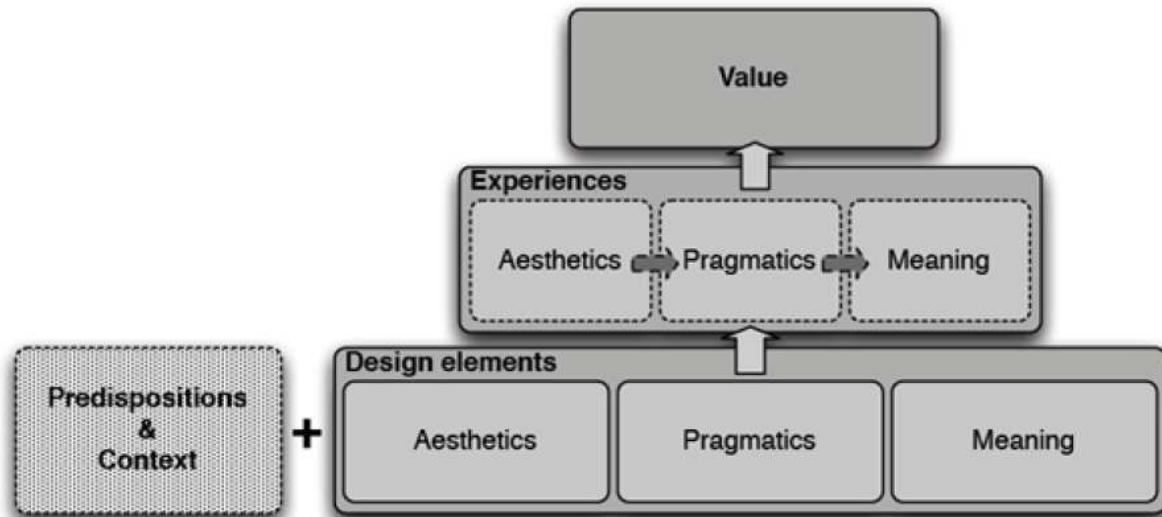


Figure 1: Design – experience – value framework

The framework is meant to place the UX and UA aspects, identified at the start of this project, in a larger context to:

- Study relations between UX and UA aspects and incorporate new UX and UA aspects
- Identify blank spots based on progressing insights in UX and UA aspects
- Connect perceived UX and UA (by the user) with design elements of applications, so design recommendations can be formulated

The framework consists of three layers: Design elements are product features which a designer can manipulate such as form, colour, sound, interaction flow and functionality within for example CITIZEN MEDIA applications. Design elements together convey a certain product character expressed in aesthetic and pragmatic experiences or the experience of the product having meaning. The relation between design elements and these experiences and the resulting value is created via sense making processes such as:

- anticipation (based on prior experiences and expectations);
- connecting (first experiencing without actively giving meaning to it);
- interpreting (relating to goals, desires, hopes and fears);
- reflecting (evaluating experiences in hindsight);
- appropriating (making experiences your own, letting the product become part of your life);

- recounting (reliving experiences and finding new meanings in them).

Some of these sense making processes involve (conscious) cognitive processing (e.g. anticipation, interpreting, reflecting, appropriating and recounting), while others (e.g. connecting) are a direct result of perception and/or sensation. These sense making processes can happen simultaneously or sequentially.

Aesthetic aspects relate to a product's capacity to delight one or more of our sensory modalities and can result in emotions such as thrill, fear, excitement, unease, awkwardness (Desmet and Hekkert 2007). **Pragmatic** aspects are related to usability, pragmatic and behavioural characteristics of an interactive product and can result in emotions or experiences of (mis)understanding of how a product works, (un)predictability of a product and its' behaviour or outcomes, feelings of making progress in a satisfying way but also reaching a state of flow, having fun and enjoying the interaction with the application. Experienced **meaning** is related to a user's higher order goals, the ability to recognize metaphors, assign or assess personality or symbolic significance to an application or provided interaction (with others) and can result in emotions such as satisfaction with oneself or others, fulfilment of ones personal goals such as self realization, maintaining a certain image, living according to what one thinks is important (norms/values), closeness to one's own identity, inspiration, self development, etc.

In the following paragraphs each of these experiences is explained and a description of the process of testing and analysis of the UX and UA variables in CITIZEN MEDIA field trials is given. A full description of these trials can be found in D5.2.1 and D5.3.1. Since design elements result in experiences which lead to the experience of a specific value, UX and UA variables can sometimes be placed on all three levels of the framework (e.g. login features and moderation elements can at first sight look and feel sturdy and trustworthy, etc (aesthetic). They can act predictable and behave according to a user's expectations (pragmatics experience) and finally result in trust in the application and other users enhancing social cohesion (meaning)). In this sense all aspect of Trust (e.g. how it is designed and implemented in the system, how it is experienced and how this leads to a specific value and appreciations) are within the framework connected on all three main aspects (aesthetics, pragmatics and meaning).

2.1.1 Aesthetics

Aesthetic experiences relate to a product's capacity to delight one or more of our sensory modalities and can result in experiences or emotions like thrill, fear, excitement, unease, awkwardness, a warm/cold feeling, etc (Desmet and Hekkert 2007; Visocky O'Grady and Visocky O'Grady 2009). Aesthetic experiences stem from design elements such as:

- Look, colour, form (visual perception)
- Form, structure, temperature (tactile perception)
- Sound (auditory perception)
- Smell, taste (Olfactory perception)

Aesthetic experiences do not get explicit attention within the CITIZEN MEDIA field trials, largely due to the UX and UA aspects identified at the start of this project and the then current state of the art of knowledge in aesthetic research and evaluations (aesthetics was just starting as an emerging area of research then). Still, some evaluation results do indicate the importance of aesthetics in some areas, as described in following chapters. Here we will have a brief look at what kinds of experiences can be called aesthetic, so we can later address aesthetics in the current evaluation results.

According to the model of aesthetic experience by Leder, Belke, Oeberst and Augustin (Leder, Belke et al. 2004), one can recognize the following steps in an aesthetic experience:

- a perceptual analysis of the object,
- comparing this to previous encounters,
- classifying the work into a meaningful category,
- Subsequently interpreting and evaluating the work, resulting in an aesthetic judgement and an aesthetic emotion.

In this framework, as well as according to Hekkert (Hekkert 2006), only the first two or three steps are viewed as an aesthetic experience as long as cognition does not take an active role in the process of forming the experience. The process of the experience consists of mostly automatic stages in which perception is at work in detecting structure and assessing novelty/familiarity through which an affect is generated. At these stages we talk about sensuous delight (or displeasure), whereas at later stages cognitive and emotional processes enter the experience and pragmatic experiences or the experience of meaning emerges.

The by-product hypothesis explains the way aesthetic experiences are formed. The core of the by-product hypothesis is that adaptations have evolved to serve functions beneficial to our survival. It would serve us if things in the world around us that contribute to these functions were reinforced by e.g. being able to automatically recognize certain cues or patterns that serve these adaptive functions. Aesthetic experiences are hypothesized to be these reinforcements.

Based on the by-product hypothesis and the workings of our sensory systems different principles for preferred ways of dealing with things perceived can be formulated. Hekkert (Hekkert 2006) mentions the following:

Principle 1: Maximum effect for minimum means

A visual pattern is pleasing to the eye when relatively simple design features reveal a wealth of information. An example is conjunctive ambiguity (patterns that allow for more than one interpretation), such as demonstrated by the Centre du Monde Arabe from the French architect Jean Nouvel (see figure 2) where the façade refers to weave patterns from Islamic culture, but once closer to the building the weave pattern are actually shutters that can open or close depending on the amount of desired sunlight for insight the building. Conjunctive ambiguity is said to enhance the beauty of a pattern.

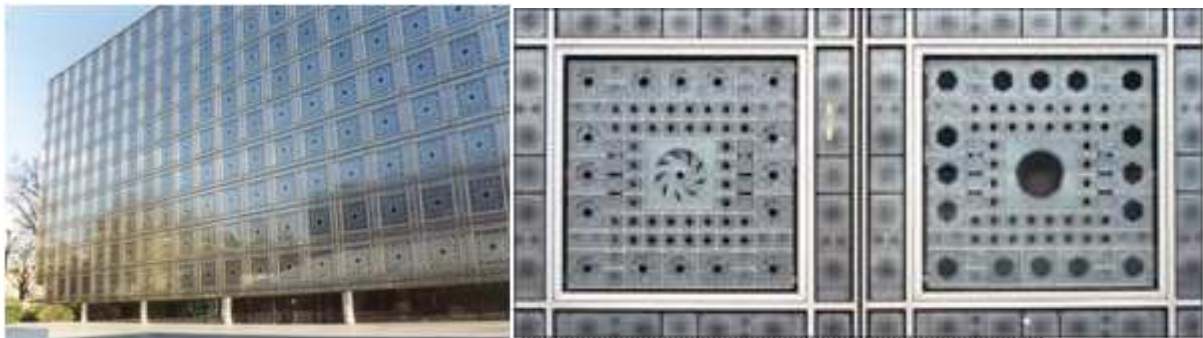


Figure 2: Conjunctive ambiguity: Centre du Monde Arabe, Jean Nouvel

Another way of revealing a wealth of information with minimum means is the use of metaphor. Metaphor has for long been used to say something that is difficult to express in words. However, metaphor is used broader than just that, as an economical and efficient way of expression that is not restricted to language (e.g. (Forceville, Hekkert et al. 2005; Ramachandran and Hirstein 1999)). By referencing something else we can communicate a wealth of meaning and novel perspectives on something. An example is the popular coffeemaker by Philips, the Senseo Crema (see figure 3), that consists of a curved shaped

reservoir 'holding' a little plateau on which the cups must be placed. In an embodied way, the bended shape refers to a servant, courteously serving you the coffee (see (Forceville, Hekkert et al. 2005), for an extensive discussion of this example). As a result, this minimal design feature has a big effect on our experience of the coffee maker.



Figure 3: Senseo Crema by Philips

Principle 2: Unity in variety

Our sensory system is tuned to detect order in chaos or unity in variety. We tend to see things that are close together or look, sound, or feel the same as belonging together. This helps us in discovering meaningful wholes and minimizes the allocation of attentional resources. Some of these mechanisms are known as the Gestalt laws of perceptual organization (e.g. similarity, prägnanz, proximity, good continuation, closure).

These laws also govern the organisation of auditory information. Other mechanisms like peak shift, isolation, contrast, and solving puzzles can be explained on the basis of the same logic. Contrast, for example helps us to detect dissimilarities between features or objects that are close, but do not belong together. Solving puzzles is an interesting special case. Because we like to see connections, we also consider it aesthetically pleasing to invest effort in finding them. This not only explains why we like crosswords and other puzzles, it may also explain why we are attracted to designs that do not give everything away at once, such as complex buildings and products that make use of translucent materials to partly conceal the internal components from human eyes, like the famous Apple I-mac (Hekkert 2006).

Principle 3: Most advanced, yet acceptable

Whitfield and Slatter's (Whitfield and Slatter 1979) preference-for-prototype theory states that we prefer the most typical example of a category, the one with which we are familiar and are exposed to repeatedly, the safest choice. At the same time we are attracted to new, unfamiliar, original things, partly to overcome boredom and saturation effects. Both theories seem incompatible, but balanced they result in the principle of "Most Advanced, Yet Acceptable" (MAYA) formulated by Raymond Loewy (Loewy 1951). The principle states that to some extent it is possible to increase the novelty of a design while preserving its typicality. We tend to prefer products with an optimal combination of both aspects. The principle has only been tested in the visual domain but the preference for familiar music, proven in different studies might indicate the same principles might apply to a broader range of perceptual aesthetics (Hekkert 2006).

Principle 4: Congruency/appropriateness

The final principle is concerned with the relationship between the various sensory impressions. We tend to prefer products that convey similar messages to all our senses. Whereas attaching a particular theme or association to a sensory aspect is a non-aesthetic process, assessing whether these themes or associations are congruent is regarded an aesthetic attribution process. It is pleasing to the mind that themes match (in form and intensity) and displeasing when they are incongruent. It is furthermore proposed that congruency of sensory impressions not only holds for the internal consistency, but is also

important in relation to the particular product and its utilitarian function, intended meaning and emotion (Hekkert 2006).

2.1.2 Pragmatics

Pragmatic and compositional experiences relate to the product's compositional and behavioural characteristics and the understanding and interpretations of these characteristics by the user in terms of task or goal realization which is directly related to product usage. This in contrast to experiencing meaning (explained in detail in paragraph 2.1.3) in which the experience indirectly relates to the interactive product, instead of directly. Pragmatic experiences can result in emotions such as (mis)understanding of a product's workings, (un)predictability and (dis)trust of a product's behaviour or outcomes, feelings of (not) making progress in a satisfying way and fun and enjoyment. In general pragmatic aspects apply to 2 different categories of design elements that together form the system: the **interface** and the **interaction mechanisms or rules**. Through these elements pragmatic **experiences** and resulting **emotions** come to life.

The system can be described as a group of interacting, interrelated, or interdependent elements (the interface (elements)) forming a complex whole. Within the system the boundaries, restrictions and possibilities for the user to interact are described (the interaction mechanisms or rules).

Interface

The interface includes whatever is used to physically control the system, such as a controller, joystick, mouse, remote control or keyboard. Also, it is the visual representation of software controls that users use to interact with a software application, engage in a tutorial, move through a game, obtain the system status, save information, and exit applications.

Interfaces for software applications (used for example to perform work) as well as games and entertainment applications should both be optimized for pragmatic use and understanding/interpretation. Software applications for task performance do however differ from entertainment software in that the task performance should be supported as best as possible through interaction mechanics in software applications (reaching one's goal effective, efficiently, without errors, etc.). - User goals are external to the application; they use the application to 'get something done'. The goal of entertainment software, often fun and enjoyment, is found in the interaction with the system itself and other users and interaction mechanisms often prevent users from reaching goals easily (this is to what users agree to when using the system and what gives them joy and fun, overcoming the obstacles) - the user's goal is internal to the application, application usage is the main goal. Poorly constructed interfaces in both types of use will obstruct the user from having optimal experiences.

Within the interface we can recognize 3 different types of elements which each have their own unique qualities to create experiences:

- **Physical controls** (the earlier mentioned input devices such as a keyboard, joystick, remote control, etc);
- **Software controls** (buttons, scrollbars, characters, board pieces, etc);
- **Status indicators or information** (life bar or hearts, downloading time left, blinking cursor to indicate position, sound, text, etc). Status indicators or information together are sometimes called the context in which the interaction is shaped and taking place.

Status indicators and information shape interpretations and meaning and via this determine the interaction with specific objects. Status indicators and information are sometimes the software controls themselves (e.g. the position of chess pieces in a digital game of chess representing different possibilities for good and bad actions) or completely inactive interface elements, just telling the user what the current status is (e.g. the virtual environment in an

adventure game giving hints for possible interaction by setting a certain theme such as a table, set for eating indicating the possible action of eating). In each case they help the user to interpret and determine how to proceed best (these examples are from gaming but the same goes for other software applications). Physical controls finally make it possible to interact with the software controls and transform the application from one status to the next.

In the following a summary of the different heuristics found in usability and gaming literature is given according to the three above mentioned categories of interface elements.

Physical control heuristics:

1. Consistency and standards: Users should not have to wonder whether different actions give the same or different results. Follow platform conventions (Nielsen 1994).
2. Minimize control options in game design (Federoff 2002).
3. Input mappings: Provide intuitive and customizable input mappings (Salen and Zimmerman 2003). Controls should be intuitive and mapped in a natural way (Federoff 2002).
4. Controls: Provide controls that are easy to manage, and that have an appropriate level of sensitivity and responsiveness (Salen and Zimmerman 2003) and controls should be customizable and default to industry standard settings (Federoff 2002).

Software control heuristics:

1. Consistency and standards: User should not have to wonder whether different words, situations, or symbols mean the same thing. Follow platform conventions (Nielsen 1994). Consistency and standards shorten the learning curve as well (Federoff 2002).
2. Minimize the menu layers of an interface (Nielsen 1994).
3. Help users to recover from errors easily (undo possibilities) (Nielsen 1994).
4. Input mappings: Provide intuitive and customizable input mappings (Pinelle, Wong et al. 2008)
5. Controls: Provide controls that are easy to manage, and that have an appropriate level of sensitivity and responsiveness (Pinelle, Wong et al. 2008).
6. User control and freedom: Users often choose system functions by mistake and will need a clearly marked 'emergency exit' to leave the unwanted state without having to go through an extended dialogue. Support undo and redo (Norman 1988).
7. Flexibility and efficiency of use: Accelerators – unseen by the novice user – may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions, or choose difficulty levels. Provide means to adjust the speed and difficulty levels (Pinelle, Wong et al. 2008).
8. Controls: Controls should be customizable and default to industry standard settings (Federoff 2002).

Status indicators and information:

1. Match between system and the real world: The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order (Nielsen 1994). Consistency and the use of standards shorten the learning curve as well (Federoff 2002).
2. Aesthetic and minimalist design: Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information is a dialogue competes

with the relevant units of information and diminishes their relative visibility (Nielsen 1994).

3. Help users recognize and diagnose errors: Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution (Nielsen 1994).
4. Game status: Provide users with information on game status (Pinelle, Wong et al. 2008). A player should always be able to identify their score/status in the game (Federoff 2002). Use sound to provide meaningful feedback (Federoff 2002)
5. Visual representations: Provide visual representations that are easy to interpret and that minimize the need for micromanagement (Salen and Zimmerman 2003). Proper views: Provide unobstructed views that are appropriate for the user's current actions (Pinelle, Wong et al. 2008).
6. Visibility of system status: The system should always keep users informed about what is going on, through appropriate feedback within reasonable time. Federoff (Federoff 2002) mentions in her game heuristics that the feedback should be immediately given to present the system status accurately to the user during interaction.
7. Recognition rather than recall: Minimize the user's memory load by making objects, actions and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate (Nielsen 1994).
8. Game status: Provide users with information on game status (Pinelle, Wong et al. 2008).

Interaction mechanisms and rules

Interaction mechanisms or rules state how a user is allowed to interact with or move through the system. They state how the transformations from one status to another are specified in terms of changes in status and information within the system and in the user interaction. Interaction mechanisms in software applications used to support reaching goals as a part of task performance need to support efficient and effective product interaction. Contrary to games, in which the interaction mechanisms should create obstacles that need to be overcome (e.g. goals are challenging to reach because of the obstacles such as bombs or traps you encounter throughout the game and which you need to overcome to reach your goal). Here the mechanisms should provide challenge, because this challenge is the basis of the fun and enjoyment experienced during interaction. Entertainment software is therefore often called intrinsically motivated (use itself is the goal, the thing that provides pleasure), while task performance related software is often called extrinsically motivated (the software is used to realize an external goal, a goal outside of the application use such as creating a report as a deliverable for a project) (Salen and Zimmerman 2003).

In short interaction mechanisms describe:

- How a user interacts with the system: Based on the current status of the system specific interaction is supported or not in a specific way (virtual and physical controls are available according to what the interaction mechanisms specify). The design of interaction mechanisms and rules are often also tied to the platform and the context of use. Developing applications for mobile devices or stationary devices will result in a different set of interaction mechanisms and rules. The former will be less complex and often provide limited focussed functionality, while the latter can offer a very broad range of possibilities and functionalities. E.g. options for changing formats of pictures taken on a mobile phone before uploading it to a moblog differ to a large extent from picture editing on a PC. In games we find the same, arcade games are meant to be played in a short amount of time and cannot be saved, trying to lure the user into

spending as much money as possible, while PC games can be played for hours, saved during play, etc. resulting in a completely different game genre.

- How system status and information interacts: Based on user actions the system changes from one status to another. The interaction mechanisms specify how these changes within the system take place due to the user actions. Sometimes these changes are directly observable to the user (e.g. you have saved a document) and sometimes the status information is indirectly shown to the user or later discovered by the user (e.g. slaying a dragon in a game gives you points for reaching a higher level and more experience with which you can eventually buy new abilities). These kinds of changes in the internal status and information structure often relate to the relation between the micro and macro levels of interaction. Smaller goals (micro level goals) within an application or game lead to completion or progress on a higher level (macro level goals) of abstraction. A game example is solving small puzzles during a larger quest to make progress towards solving this larger quest. An example of task related software is selecting text in a word editor and making changes to this text (e.g. bold, cursive, delete characters, type, print the document or send it so someone else) to work towards finishing the document. In well designed applications and games there is a smooth transition between micro and macro level choices and interactions.

Interaction mechanisms and rules heuristics:

- Mechanics should feel natural and have correct weight and momentum (Federoff 2002).
- Allow users to skip non interactive (non playable) and frequently repeated content (Pinelle, Wong et al. 2008).

Training and help: Provide instructions training and help (Pinelle, Wong et al. 2008). Help and documentation: Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

Pragmatic experiences

Pragmatic and compositional experiences come to life through user – system interaction. The definition of interaction is that there are at least two elements in the system that have a reciprocal relationship with each other, meaning two actors in turn have to listen, think and speak to each other (Crawford 1982; Norman 1988). The observed quality of the interaction depends on the quality of each of the actors and their performance on these subtasks (listening, thinking and speaking).

Some experiences resulting from good interaction between the two actors are immersion and fun. Immersion is defined as the illusion of non-mediation and occurs when a person fails to perceive or acknowledge the existence of a medium in his or her communication environment and responds as he or she would if the medium were not there (Lombard, Ditton et al. 2000). A good example of immersion sometimes occurs in games, in which users reach a state of flow, completely 'being in the game'. Interaction via the controls is not noticed until something is not working on the controls as expected, activity is completely fluent and tuned to what one sees and anticipates on in the game. To create immersion in an interactive environment one must make the user actually forget they are participating through a medium. The interface of the system and it's response to the user must be invisible and natural or at least unnoticed by the user, which can be reached by unobtrusiveness of the system or through interaction that is so natural and without obstacles that a user reaches a state of flow, completely concentrating on the goals or task performance.

Fun relates to (unexpected) opportunities of growth such as mastery of a tool to reach a desired goal and the willingness to invest a great deal of time in doing so. Offering challenge and opportunity to master a skill seems to provide sufficient motivation for people to engage in for example games and other software applications (Myers 1990). An example of this is "Guitar Hero" a game where the player plays a simplified guitar along with the visual instructions given on the screen and is rewarded in different ways (sound, virtual money, virtual fame). Goal is to experience a kind of stardom only the big rock stars of the world can achieve. In applications other than games such as for example Photoshop, we find the same. This software package is very hard to master but once skills are developed incredible art can be created.

Pragmatic experience heuristics

Heuristics that create and support immersion and fun are the following:

- Get the user involved quickly and easily by immediately providing something that creates (the promise of) challenge through a well designed interface and interaction (unobtrusive) (Federoff 2002). A means to realize this is to provide interesting and absorbing tutorials (which teach users skills they need later on), presenting the user with a great story line and using visuals and audio that arouse the user's interest.
- Present goals within the system clearly and early in the interaction (Federoff 2002) and make sure the micro and macro level goals are in line.
- Present various levels of difficulty to create challenge but not too much (Federoff 2002). A good game is for example said to be easy to learn but hard to master. Games should be well balanced in this respect, so that there is no definite way to win (the results remain partially uncertain, providing challenge) but there is always the illusion of being able to win. Games and applications should give hints to create straightforward challenges (in games not too many though). Another mechanism to provide challenge is to pace the game, apply pressure, but be careful not to frustrate the user.
- Implement micro and macro goals throughout the system (mechanisms) and support the processes of performance through an unobtrusive interface (Federoff 2002). The underlying interaction mechanism should be consistent and resulting play should be fair and comprehensible and rewards should be given when goals are obtained. Also there should be not a single optimal winning strategy but multiple possibilities to explore a story line or obtain goals.
- Implement surprises, unexpected outcomes and lots of interaction possibilities which are in line with the systems goal but not expected by the user (which are still appropriate) (Federoff 2002). In games the artificial intelligence should for example be reasonable yet unpredictable and games should be re-playable once the user has reached the end.
- When systems are multi-user systems, pay special attention to aspects such as group awareness, session management and communication functionality.

Pragmatic user experience and user acceptance aspects

Pragmatic experiences that can be identified in the CITIZEN MEDIA evaluations are:

- User acceptance aspects (for a detailed overview see Deliverable 5.3.1):
 - Perceived ease of use: To which degree do the participants believe that using the developed application is free of effort (UA 1)
 - Perceived value/usefulness (in a functional way, task or goal realization) (UA 2)

- Perceived ease of adoption: To which extent will the applications be used (actively or passively) (UA 3)
- Trust (in relation to functional product interaction, trust in the interaction and the system during this interaction, e.g. in terms of predictability, understandability, security, etc.) (UA 4)
- User experience aspects (for a detailed overview see Deliverable 5.2.1):
 - Fun and enjoyment (UX 1) (viewed as experiences here, ultimately result in or add to the final experienced value “being attracted to a product or service, avoiding a product or service”). Fun and enjoyment are inherent to the direct interaction with the product.
 - User engagement: User engagement is influenced by observed difficulty (can be positive when viewed as overcoming personal resistance or negative when the observed difficulty is too high). It is more positive when the value and the appropriateness of the end result are viewed as more positive (UX 4).
 - User involvement: is related to one’s salient needs and one’s perception about the need-satisfying potentialities. Involvement is created by the meaning and relevance of a stimulus (e.g. it matters to me) and the emotional and value related interest (e.g. it was exciting) (UX 5)
 - Usability: how is the effectiveness, efficiency and satisfaction in a specified context of use experienced by the user. Usability partially overlaps with UA factors such as “Perceived ease of use” and “Perceived value”. Other usability aspects mentioned are speed of learning, productivity, retention and errors (UX 8).

All UA aspects fall under pragmatic experiences, while not all UX’s can be placed here. The following explanation is offered for the other UX’s:

- UX 2: Emotion is found in all UX categories defined in the “Design – experience - value” framework, depending on the experience from which the emotion stems.
- UX 3: Motivation is viewed as a predisposition of a person as part of the product interaction and reasons therefore as well as being part of the value (being or not being attracted to a certain product or service). It is absolutely of influence on the sense making processes of experiences the users experience themselves and the value resulting from product interaction and sense making. Though it’s not directly a design element or an experience resulting from product interaction and therefore not explicitly part of the “Design – experience – value” framework, it is still very important in evaluating the UX. Other predispositions of influence on the UX are for example mood and emotion (e.g. fatigue, happiness), previous experience with similar or the same system(s), gender and age or a user’s attitude towards technology in general, etc.
- UX 6: Co-experience. Co-experiences are shared experiences with other people/users. They are the experiences one talks about with others; they are created together with others. These faculties are inherent to human behavior and not to technology. They do not stem from product interaction but from human-human interaction that can be mediated, but not necessarily so, by ICT. Co-experiences therefore within this model fall within the experience category “Meaning”.

For a detailed overview of these UX components see deliverable D5.2.1.

2.1.3 Meaning

With respect to the attachment of meaning, many cognitive processes play a role, such as interpretation, retrieval from memory, and associations (Hekkert 2006). These processes

allow us to recognize metaphors, attribute personality or other expressive characteristics, and assess the personal or symbolic significance of products (e.g. Csikszentmihalyi and Halton 1981; Norman 2004). Meaning emerges from the interaction between users and the system, as well as from the context in which the system is used. Meaning therefore goes beyond simple user – system interaction and incorporates higher order goals that are important and encountered in the context of everyday life. Some examples of these higher order goals are being social (in different kinds of social relations or interests), being able to act according to one's own norms and values systems, being able to explore and develop interests, skills, experiences, emotions, memories, knowledge, being able to express oneself.

Heuristics for meaning

Some heuristics for creating experiences of meaning found in literature are:

- Think about the different kinds of social relations that the system is designed for to support (e.g. camaraderie, rivalry, animosity, flirtation, friendship, love, etc). People, especially males, communicate little for social purposes although these are the types of communication they value most (Salen and Zimmerman 2003). Connectedness describes in a medium-independent way the feelings of being in touch with someone, being aware of what happens in their lives, feeling they think and care about you as this results from a phone call, a mail, or any form of communication. It also pertains to the need to be informed about them that grows with the frequency of communication and it brings about some costs, e.g., the feeling of being monitored or of having to communicate. In trying to assess the added value of a novel communication medium, especially with respect to its fit into every day life and patterns of communication, connectedness is a valuable concept.
- Some important aspects in connectedness that should be considered in service and application development are explicitly mentioned in the Affective Benefits and Costs of communication Questionnaire (ABC-Q) (Romero, Markopoulos et al. 2007). Being connected gives benefits but there is also a cost consideration:
 - Obligations (social obligations felt or created as a result of the communication activity)
 - Expectations (raised expectations or unmet expectations for communication)
 - Threats to privacy (the extent to which communication threatens one's privacy)
 - Need to be informed (knowledge of other people's activities)
 - Staying in touch (the feeling of being connected)
 - Sharing experiences: how much one feels other people are involved in his/her life, sharing experiences)
 - Recognition (the extent to which each other's feelings are understood)
 - Group attraction (the feeling of being part of a group)
- Think about the user's role and the interaction functionality supporting relationships with others fit to the user's value system. The type of social relations supported and the user's value system and goals (what am I trying to achieve) in the interaction determine what is 'fair', 'honest', 'appropriate' and what is not.
- Implement mechanisms that support a sense of community when groups are playing an important role within the system, by for example provide shared goals.
- Consider cultural and ideological aspects (social class, status, power, gender influences) relevant for the user and thus system, and create a system accordingly.

For example what social and cultural rhetoric is reflected or transformed by system interaction.

Think about a user's personal goals such as self identification, memories, experiences, emotions, knowledge and skills and what a user would like to further explore, communicate, share, reflect on, etc.

Meaning and the user experience and user acceptance aspects

Experiences of meaning recognized in the CITIZEN MEDIA research topics for the user acceptance are the following:

- Perceived ease of adoption: To which degree do the participants believe that they create a personal value by using the developed applications in terms of the product having meaning beyond mere product interaction and task realization (e.g. social significance value, emotional value) (UA 2).
- Trust: To which degree do the developed applications create trust beyond the trust in the product interaction? For example trust in other people/users (UA 4).

For a detailed description of the UA aspects see deliverable D5.3.1.

Experiences of meaning related to the UX factors used during evaluation of CITIZEN MEDIA applications are:

- Sociability: The thing that provides a reason for individual members to belong to the community beyond the direct product interaction (belonging to a group, self realization, etc). (UX 7).
- Co-experience: Co-experiences are shared experiences with other people/users. They are the experiences one talks about with others; they are created together with others. These faculties are inherent to human behavior and not technology. They do not stem from product interaction but from human-human interaction that can be mediated, but not necessarily so, by ICT (UX 6).

For a detailed overview of the UX aspects see deliverable D5.2.1.

2.1.4 Sense making

The sense making processes described earlier (anticipation, connecting, interpretation, reflecting and appropriating) (McCarthy and Wright 2007) are explored in more detail in this paragraph per user experience component.

Sense making in aesthetics

As discussed earlier cognitive processes are hardly or not involved in aesthetic experiences. These are often a direct result of perception and our sensory system in which patterns are recognized and appreciated immediately. One of the sense making processes that is involved in aesthetics experiences is connecting: the user's first experience with the product and product interaction from which aesthetic experiences arise.

Sense making in pragmatics

Sense making in pragmatics stems from direct product interaction. Product interaction in this sense is viewed as non-physical (e.g. commercial, marketing flyers, product information, a friend having 'the thing' and showing it to you, etc.) and instrumental usage (functional usage). Sense making processes that are important in pragmatics:

- Anticipation: what does the user expect from the system or product interaction, what kinds of usage are anticipated based on current knowledge and previous experiences in realizing one's functional or entertainment goals.

- Interpreting: the user – system interaction is interpreted in terms of it's relation to the user's goals, desires, hopes and fears. An example is the interpretation of a system's current state and the understanding of the action that led to this state. An understanding of the choices available in a specific context. An understanding of how these choices and their context are presented and how these relate to micro and macro goals of oneself and the system. Observing these changes in the system and understanding how these changes affect future choices.
- Reflecting: the user evaluates the experiences of the product interaction in hindsight. What was for example the observed usability of the system? Did one enjoy the product interaction? Did one have fun?
- Appropriating: the user makes the product his or her own. The product has been domesticated and plays a crucial part in functional goal realization, enjoyment, etc.
- Recounting: by talking about experiences with the product/system and telling others about one's experiences, experiences are relived, discussed and a different value and meaning can be given to them. One can learn for example from others and the usability might be observed more positive, etc.

Sense making in creating meaning

Sense making in the sense of attributing meaning to a product is based on how the user perceives the product, to the product related experiences and the place and importance of these experiences for everyday life. It goes beyond mere product interaction and is about the meaning the product has for the user in everyday life.

Sense making processes that are important in attributing meaning are:

- Anticipation: Based on prior experiences a product is observed as (not) having meaning for a person in the sense that it might contribute to one's image, value system, self expression, social relations and position, personal growth, memories, etc. (for example is a product cool, nerdy).
- Interpreting: Experience with the product and product interaction are interpreted on their meaning in everyday life how does it contribute to the user's higher order goals as mentioned in the point above. Does one enjoy the interaction with others and does it contribute to the social relationship during product interaction? Does the product trigger a 'wow, how cool' statement from a friend? Do people acknowledge your norms and values and are they expressed during product interaction or usage? Does it support the user in immediate personal growth? What psychological and cultural associations are experienced during product interaction?
- Reflecting: Experiences of the product interaction are evaluated by looking back at the product interaction. Did the product interaction result in better relationships and/or more frequent and intensive contact with loved ones, does one have a greater feeling of connecting to others and of being a part of a group?
- Appropriating: The product has become an integrated part of someone's everyday life in the sense that it's hard to miss in striving to fulfill one's higher order goals, such as maintaining social relations, personal growth, etc.
- Recounting: Experiences are relived and a deeper meaning is found in them. One connects good memories and cherishes the product because of this. It symbolizes ideas, deep interests, a feeling of belonging, etc. An example of the result of recounting product experiences is the fan cultures surrounding some games and television programs such as star trek.

Sense making and user experience and user acceptance aspects

Sense making processes recognized within the CITIZEN MEDIA field trials are:

Part of the co-experience processes, especially the part in which we reflect on our product interaction with others and in which we create meaning together.

2.1.5 Value

We think that product value is ultimately the result of the complete construct of different experiences and emotional responses towards a product at a specific moment in time. Experiences change over time and thus the value resulting from product interaction and the sense making processes will change as well. The process underlying the value of products can most accurately be described by an appraisal model (e.g. Arnold 1960; Frijda 1986; Ortony, Clore et al. 1988; Hekkert 2006). According to these appraisal theorists, an emotion is elicited by an evaluation (appraisal or what we call sense making) of an event or situation as potentially beneficial or harmful to a person's concerns (goals and higher order goals). For example, when seeing an iPod a person may experience desire because (s)he expects that possessing it will fulfill his/her concern of being admired. An important implication of appraisal theory is that each distinct emotion has a distinctive pattern of appraisal (or sense making), but there are few if any one-to-one relationships between product interaction in a specific context and an emotional response. It is the interpretation of the event or situation, the sense making of the product interaction in a specific context, rather than the product interaction itself, which causes the emotion and ultimately the product value in these terms. Since our emotional experience and the perceived value of products can also very well be explained by such an appraisal process (see Desmet and Hekkert 2007), understanding this process holds a key to understanding product value and designing for value. For CITIZEN MEDIA applications it is of utmost importance to know beforehand what kinds of value we want to create and how these values relate to the different experiences described in this chapter.

Value in user experience and user acceptance aspects

Value in terms of the "Design – experience – value" framework is defined as emotion in deliverable 5.2.1, experiencing something as having a positive or negative value (being attracted towards and object or moving away from it/avoiding it) (Frijda 1986). Emotions are a motivating force in action, expectations and future evaluations. Emotions are thus playing an important part of the sense making processes resulting in a certain positive or negative value as well.

Emotions mentioned as UX aspects are the following (for a detailed overview of these UX aspects see deliverable 5.2.1):

- Emotion (UX 2)
- Motivation (UX 3)

3 DESIGN RECOMMENDATIONS ENGERWITZDORF

In the Engerwitzdorf field test, in which an IPTV platform is used to share and watch photos and videos with or from other users, different evaluations were performed. In the following the most important **results of these evaluations** are briefly addressed together with design recommendations for future application development of this type of platforms. The design recommendations are formulated to enhance the UX and UA within this type of testbeds. For a complete overview of the evaluation methods, user groups used during evaluations and the general evaluation results we refer to the documents D5.1.1, D5.2.1 and D5.3.1.

The Engerwitzdorf testbed participants are mainly households with at least two members. The participants are part of a local community and represent different age groups (i.e. children as well as elderly). A special focus is put on the domain of IPTV in the home context. The evaluated application involves different target groups and technical devices as well as real life events on-site. In total, about 60 test households have access to the CITIZEN MEDIA IPTV platform and have been involved in different community hosting and user evaluation activities.

The IPTV platform is intended to support the local community in Engerwitzdorf in creating, uploading and sharing user-generated audiovisual content. Therefore, functions for creating and sharing videos and pictures with other community members are provided by the platform. On the television screen, the user can watch the uploaded audiovisual content (either their own or of other users) and also rate the content (e.g. rate the quality of a picture or video). Another feature is the possibility to search for certain other users and add them as a friend. Moreover, users can take an active role by using their PC or mobile phone. Through the PC people can upload videos, pictures and edit their profile. People can also use their mobile phone to take pictures and display them on the IPTV platform in real time.

3.1 Recommendations for the Engerwitzdorf evaluation

Television as a medium has in the past always been based on the principle of broadcasting information, which is received and consumed at the other end without any further interaction except for maybe changing the channel. The IPTV platform concept changes this view on television and its surrounding consuming culture dramatically by giving former consumers an active role and a chance to participate in creating their own content, sharing this with others and by that changing television as a broadcast medium from “1 to many” to “many to many”. But how successful will such a change be? And what aspects should be considered when making this transformation from one medium to another? In the following we briefly summarize the main conclusions from evaluations and formulate recommendations for this kind of systems according to the three experience categories identified in the “Design – experience – value” framework and the in literature identified design heuristics and guidelines.

3.1.1 Recommendations for aesthetics

Historically, television is viewed as a 1 to many broadcasting medium. This is the concept people who are watching television, are familiar with and this perception will influence their view on a new system like the IPTV platform. Furthermore there are different competing services and technology available with which part of the targeted users of the IPTV platform are familiar (e.g. internet and youtube, flickr like services, etc). These competing services run on a personal computer of which the setting often differs from the setting in which a television is used (a television often has a central place in the living room and people are used to watching television together, in a social setting, while computers are often individually used).

All these factors influence the function and value one can provide with a platform like IPTV as well as how function and value are perceived by its users.

Most aesthetic theory as addressed in chapter 2 of this report related to what the user is familiar with, what his or her predispositions and mental models are related to television in general, the internet, etc. This 'familiarity' will have an effect on the interpretation and emergence of specific experiences when using the IPTV platform. The main effects we observed as aesthetics influences are the following:

Finding 1 User's familiarity with UGC concepts

According to the MAYA (most advanced, yet acceptable) principle people prefer things they are familiar with and are repeatedly exposed to, these are the safest choice. At the same time people are attracted to new, unfamiliar, original things partly to overcome boredom and saturation effects, so up to a certain degree people are open for new innovative services but the levels of acceptance of innovative services clearly has limitations (Loewy 1951; Hekkert 2006).

In the Engerwitzdorf testbed people in the beginning had difficulties understanding the IPTV platform and all the devices and applications that come with it. A quite complex system was introduced in one's living room and not only that, different services (website for account management and uploading videos, Flickr) are used by the system with which not all users are thoroughly familiar. At the beginning of the project this looked a little bit like a drawback but soon people started to accept and understand the workings of the IPTV platform (mainly through good help during live events, from other people also using the system, and help through the helpdesk supporting the pilot). During the project gradually new services were introduced as well (such as the Magic Media Fair), which are more easily and gratefully accepted due to a step by step introduction of additional complexity.

On the other hand experienced Internet users indicated that the IPTV platform had little new to offer compared to what is already available on the Internet. This user group was familiar with services like Youtube and Flickr and compared to these services television offers limited possibilities for interaction.

Also the setting in which television and the personal computer are used is often different. Televisions are often found in the living room, computers to a much lesser extent. Besides, both ask for a different kind of usage and the social culture surrounding both differs accordingly. Watching television is for example often done together with others; personal computer usage is often an individual activity.

What we conclude from these findings is that the predispositions of users (among which are what the users are familiar with) will influence the perception of a newly introduced application or platform. Furthermore the predispositions of the user, especially 'what the user is familiar with' will also influence factors such as UA1 (the perceived ease of use) and UX8 (the perceived usability). Based on these findings we've formulated the following design recommendations:

- ***Design Recommendation 1 (DR1) Introduce new technology gradually.*** By gradually introducing new technology through iterative design cycles users have time to get acquainted with the product or service and can cope with changes in the perception of the medium (e.g. from 1 to many broadcasting to many to many broadcasting). This was proven by the easy uptake of the Magic Media Fair competition and the enthusiasm with which people participated in organized events once they were getting used to the IPTV platform.
- ***Design Recommendation 2 (DR2) Refer to what people are familiar with and used to but balance it with added value.*** As addressed above, some people were already quite familiar with the internet and services like Youtube and Flickr others only with watching television. Though these former people remarked that they didn't

see the direct added value of the IPTV platform compared to other services provided on the internet during earlier evaluations, their familiarity with specific internet service was addressed and used to enhance the design of the IPTV platform. For example the possibility was provided to change personal settings and upload videos via a webpage and Flickr accounts were integrated and could be used via the personal computer for uploading pictures to the IPTV platform. This way functionality with which users are already familiar is reused in a completely new service. The same goes for watching television, the content in the IPTV platform is made available via through this medium. Once the familiarity is addressed additional features can be introduced that will change the perception of the user (such as additional interaction means for using the service via television such as games, rating systems, etc). However, one should also always clearly state the added value of the complete service, so as to make clear in what the service differs from other services already available. This was largely done through the live events organized around the introduction of the platform in the Engerwitzdorf community.

Finding 2 Modular designs

Many current applications and services are modular in design, meaning that they consist of already available, existing components and new components added to the application or service. The IPTV platform is such a platform that consists of modules combined into a new service. Some of these modules are new, others such as Flickr already existing and integrated. Combining different modules is very efficient but can give problems, often related to interface possibilities between modules, as well. In the IPTV platform we observed during evaluations that one of the reasons why people perceived the service as somewhat complex was related to combining different modules, especially the integration of Flickr. Users had to use different user names and passwords to use all modules within the IPTV platform and complexity was further increased by each external service having it's own design, making the perception of the IPTV platform as one whole more difficult. This finding relates to aesthetic aspects such as the unity in variety principle and the congruency/appropriateness principle and can enhance the perceived ease of use (UA1) and perceived usability (UX8) as well.

- ***Design recommendation 3 (DR3) Maintain unity in variety and congruency /appropriateness:*** Unity in variety and congruency / appropriateness is about creating a look and feel and an interaction that is consistent throughout the application. By giving all modules the same look and feel and by having good interfaces between different modules a user will observe the service as one whole, which are easily accessed and used through one username and password.

Finding 3 Gestalt principles and the interface

From the first usability evaluations it was found that some usability problems relate to aesthetics principles such as colour usage and form/structure. One should keep in mind that usability evaluations often use first time users or people with little experience with the system to obtain insight in problems encountered during first time usage. These problems are not necessarily representative for normal everyday pragmatic usage after the user is accommodated to the system. However, problems encountered during first time usage will affect the initial aesthetic experiences and addressing these issues will enhance automatic and intuitive understanding of the interface and interaction with the system. Most of the problems addressed below have been solved in new releases of the IPTV platform or are going to be solved during further development.

From the early usability evaluations it was found that people had initial difficulties to understand interface and interaction elements such as Meine Alben, Bunte Zone, the instruction videos and the Smiley game (represented on the same page) and interaction elements such as "home button" and scroll bars. These indicated issues are about immediate and intuitive recognition and understanding of interface and interaction elements and when

implemented can influence the usability of the system (UX8) and the perceived ease of use (UA1).

- **Design recommendation 4 (DR4) Use colours and Gestalt principles to order, and provide information about interface and interaction elements:** Gestalt principles and colour theory can be used to enhance the visual separation of different interface-, interaction elements and grouping of these, by introducing clearly perceived borders and differences in look and feel of status indicators/information and interaction elements. Using changes in colours during interaction (e.g. selecting or “clicking” a button) can also enhance the interaction itself by providing direct feedback to users. For example, when a user pushes a button on the remote control, some interface element could change colour, acknowledging that an action was registered. This kind of colour usage can also help the user to accept longer response times until the action is actually performed by the system because the user knows because of the feedback that the action has been taken, it just needs some time to execute.

Summary of aesthetic design recommendations:

- **Design Recommendation 1 (DR1) Introduce new technology gradually:** By gradually introducing new technology through iterative design cycles users have time to get acquainted with the product or service and can cope with changes in the perception of the medium. Organizing additional activities surrounding the medium or platform such as live events, competitions, etc. can further enhance acceptance and a feel of familiarity, skills and knowledge.
- **Design Recommendation 2 (DR2) Refer to what people are familiar with and used to but balance it with added value:** Address familiarity by reusing the mental models users have about different media, applications and interaction features and add additional features step by step (DR1). Furthermore state clearly what the intended added value of the medium or platform is from the beginning.
- **Design recommendation 3 (DR3) Maintain unity in variety and congruency /appropriateness:** Give different modules throughout the medium or platform the same look and feel and an interaction that is consistent throughout the application by integrating the different modules in visual and interaction design (e.g. same usernames and passwords throughout the platform).
- **Design recommendation 4 (DR4) Use colours and Gestalt principles to order, and provide information about interface and interaction elements:** Use Gestalt principles to structure the interface (interface and interaction elements) into sub-parts that are intuitively and clearly perceived as separate. Use colour theory to enhance the attractiveness of interfaces and further structure the interface elements and interaction.

3.1.2 Recommendations for pragmatics

Pragmatic experiences are related to design elements such as the usability, pragmatic and behavioural characteristics of an interactive product and can result in emotions or experiences of (mis)understanding of a product’s workings, (un)predictability of a product and its’ behaviour or outcomes, feelings of making progress in a satisfying way but also to subjective aspects and feelings such as engagement during interaction like reaching a state of flow, having fun and enjoying the interaction with the application.

Pragmatic experiences identified in D5.2.1 and summarized in chapter 2 of this report are **UX1: Fun and enjoyment, UX 4: User engagement, UX 5: User involvement, UX 8: Usability**. Pragmatic experiences identified in D5.3.3.1 and summarized in chapter 2 of this report are **UA1: Perceived ease of use, UA2: Perceived value/usefulness, UA3: Perceived ease of adoption, and UA4: Trust**.

In old fashioned television watching fun and enjoyment, a sense of engagement and involvement is mainly provided by the content one is viewing. The IPTV platform changes the way of having fun and enjoying the experience strongly by providing interaction that could trigger these experiences. From the evaluations this fact became more apparent and raises some interesting questions such as “what is the role of content in interactive television”? “How can we provide fun and enjoyment through interaction”? “How can we make explicit use of the differences in setting between IPTV like platforms and systems with competing content and interaction such as the PC”?

In the following section we summarize the main conclusions and design recommendations for pragmatics, found within the evaluations of the IPTV platform.

Finding 1 Content consumption and content creation

In general the IPTV platform was not mostly appreciated because of its content but because of the interaction and connection it provided to others and daily life in the real world, or the Engerwitzdorf community (the provided meaning). Still, the content provided by the system in the beginning of the field trial was an important factor in attracting users and stimulating usage, but this reason for using the system became less apparent over time when people found that content was not updated fast enough according to their preferences. Instead interaction organized and related to the IPTV platform became more important over the time period of the field trial and events such as the organized life events and the embeddings of these events in the Engerwitzdorf community played a very important role as did the introduction of the Magic Media Fair which created a lot of interaction, engagement (UX4), involvement (UX5) and enjoyment (UX1) for different users of the IPTV platform. During the field trial one could observe a gradual change in interest from mainly watching content at the introduction towards also being motivated to contribute and actually contribute content in later stages. Emotions were scored somewhat differently during the usability evaluations and the field trial with ESM. Result from the ESM study indicated positive emotions during the use of IPTV, while these same emotions were more negatively scored during the usability evaluations. We think the main reason for these difference lies in the focus of testing. During ESM studies people are asked how they experience an emotion while using the system based on their own motivation (self defined usage), while during usability testing the focus of activities is on executing specific tasks and the errors one encounters during this task execution. The differences in focus could very well declare the differences in results obtained with both testing methods and we advice to trust the field trial results.

Initially the perceived ease of use (UA1), usability (UX8) and therefore the user engagement (UX 4) and involvement (UX 5) were a concern due to the complexity of the system as perceived by the users and as addressed in the last paragraph aesthetics of this chapter. This perceived complexity however seemed not directly related to the consumption of content as also visible in the logging data which showed a peak in the beginning and thereafter gradually stabilized indicating less intensive content consumption. The perceived complexity seems mainly related to the content production (taking pictures, uploading these to Flickr, connecting Flickr to the IPTV platform account and creating videos and uploading these via the website). Once people got more familiar with producing content, contributions took flight and motivation and engagement to participate was stimulated by the promise of self expression via television. Further stimulation and motivation was created by the organized life events and the Magic Media Fair competition. Nevertheless the self reported engagement (UX4) concerning the consumption of the content and creating the content was during interviews observed to be quite low. Even among the interviewed participants that were most active within the community. One of the reasons given was that to consume and much more so, to produce content, takes a considerable amount of time (e.g. editing videos and uploading these to the IPTV platform). This issue prohibiting people from especially producing content is a very difficult one to solve and is partially inherent to the current state of technology. Video editing software is quite complex to master and creating videos takes a lot of time. Uploading speeds are limited by bandwidth and depending on the video format

and size can take considerable amounts of time as well. The key issue here is to make the perceived cost – benefit relationship in producing content a positive one and the IPTV platform evaluations indicate different possibilities to do so.

- **Design Recommendation 5 (DR5), provide usable tools that work efficient.** Video and picture editing and uploading tools are sometimes quite difficult to master. Though the software for video and picture editing are not part of the IPTV platform application users have to use these to produce the content. Easy to use tools will help in stimulating the creation of this kind of content in less time.
- **Design Recommendation 6 (DR6), help people to learn to create content.** During different live events people could ask for help and learn how to create their own content and set up the system. This was appreciated very much by many participants.
- **Design Recommendation 7 (DR7), the promise of self expression.** As mentioned the possibility for self expression via television was rewarding for some people. One of the main reasons for contributing pictures and videos is to share thoughts, moments and events that are important to the person publishing the content. In this way it is the promise of expressing oneself and the things that are important to oneself to the world that is important as is shown in the evaluations of the IPTV platform.
- **Design Recommendation 8 (DR8), make the process of content creation itself rewarding.** You can make the content creation and sharing itself an intrinsically motivated and rewarding process through the introduction of cooperation, co-creation, challenge and elements of competition as was done with the Magic Media Fairs which people enjoyed very much as was proven by the evaluations.
- **Design Recommendation 9 (DR9), make the process of content sharing rewarding.** By providing feedback mechanisms for content shared, such as rating mechanisms and comment possibilities the motivation to produce content can be enhanced because contributions are acknowledged. This recommendation is also important in relation to DR7. When self expression one would like to have a reaction on the content to acknowledge the self expression.
- **Design Recommendation 10 (DR10), establish a critical mass of users.** Besides the means to stimulate content production, one always needs a critical mass of users to realize a certain amount of contributions. The remark from some participants that new content was not published often enough is related to the lack of a critical mass and especially of people contributing. Still the results obtained from evaluations indicate a very positive balance of consumption and contribution compared to virtual communities. In virtual communities the ration of consuming – contributing is on average about 90% versus 10% (Figallo 1998). In the IPTV platform the percentage for visiting the upload page for videos was 14% of the top 4 activities while 39% of the top 4 activities consisted of visiting the overview page of videos, indicating a more positive ratio.

A last common concern people had related to the content was the fact that with a larger user base and more contributions of videos and pictures people might have a difficult time in finding the content that is of interest to them, they might lose oversight. During the field trials this problem was only observed towards the end and it is therefore recommended to provide different mechanisms that can filter content based on interest, personal preferences and the like.

- **Design Recommendation 11 (DR 11), apply filter mechanisms.** General filter mechanisms and filter mechanisms based on users' interests should enable users to: gain a comprehensive overview of "what is there" (e.g. categories, topics, self created groups, etc.) and to personalize the feed of (new) content tuned to one's own

interests (rating systems that compare rating of one user with others, personal profiles indicating interests that can be mapped on pre-set categories of pictures/videos (e.g. based on genre), etc). Filter mechanisms will enhance the perceived ease of use and usability when applied in systems where content is continuously in development.

Finding 2 The experience of fun and enjoyment

The real life social interactions and awareness and sense of community created through live events related to the IPTV platform were appreciated very much and enjoyed very much, however this social sense of meaning, fun and enjoyment is to some extent lost in the interaction on the IPTV platform itself due to the impossibility to provide good communication means (mainly technical limitations of IPTV platforms and television). In evaluations of a study performed by the UOL on an existing Alcatel-Lucent application called 'participation TV' with which people can host their own TV show and invite others to participate, we found that social awareness and communication means in Participation TV could enhance fun and enjoyment. Fun in Participation TV was especially experienced during interaction depending on the behaviour of the quizmaster. Some quizmasters actively engaged and entertained the user which made the whole more fun to play whereas other were passive and let the users read the on screen questions themselves. The more interaction, the more the participants enjoyed playing. The social awareness and communication staged in Participation TV might be valuable to the IPTV platform as well. Specifically the underlying concepts of social awareness (getting real time information about others, their status, activity, etc) and communication (communicating together on a topic provided by the platform) could be valuable additions as long as they are technically feasible and provide synchronous communication.

- ***Design Recommendation 12 (DR 12), designing fun and enjoyment.*** The IPTV platform has a clear social component to its usage. People share content that is relevant to them and others consume this content. Furthermore the IPTV platform has proven to be meaningful due to its embeddings in everyday life and the community of Engerwitzdorf. Synchronous social awareness and communication means (e.g. awareness information on someone's status, (current) interests, etc. and audio interaction) could further enhance the clear social component of the IPTV platform and provided additional means for the users to experience fun and enjoyment.

Finding 3 Usability of the IPTV platform

After the first usability evaluations of the IPTV platform many different usability problems were found, which is natural due to the early phase of development of the platform in which the evaluations took place. In a second usability evaluation was found that some of the earlier problems were addressed and solved however most participants experienced the platform as neutral when asked to rate the usability. Comparable evaluations taking place in the field trial (e.g. experience sampling) yielded more positive results as stated earlier. The differences in results can be ascribed to 'users giving socially desirable answers' or the earlier mentioned reason that usability testing focuses on different aspects of usage and is task performance oriented, while ESM is applied during real life usage and therefore respondents are focused on other elements than task performance. In the following we address all the usability results because the earlier found problems, after being solved, are still relevant for formulating the design recommendations for these kinds of systems.

The design recommendations in the area of usability focus on the structure and navigation; mapping of interface elements and input devices; and feedback and response times.

Structure and navigation

In the context of structure and navigation we already addressed some issues in aesthetics that help structure and navigating as well. Gestalt principles and colour theory can be used to differentiate between groupings or categories of information and the indication of interactive

elements. Part of this issue is however also related to the user's expectations of what to find within the system and the labels and naming of interaction elements and content. People had for example difficulties with the terms "Bunte Zone" and "Media Smileys" and did not know what to expect behind these terms.

- **Design Recommendation 13 (DR 13), labelling interaction elements.** Label or give names to interaction elements and categories of content according to a user's mental model. Labels or names used for categories of information or interaction elements should clearly state to what they give access and should be easily interpreted by most users (e.g. Bunte Zone → Browse videos).

Furthermore people preferred to have a good overview of all the content on the start page (main menu), with pop-up sub menu's on the right side of the screen. Clearly structured content is important to them but also hard to implement due to limitation in screen size. However a clear structure will provide a clear and direct navigation, as was shown in later versions of the IPTV platform in which a pop-up Menu in the IPTV application itself, which is used to get to the main areas of the application or back to the start page quickly, was very much appreciated by the test participants.

- **Design Recommendation 14 (DR 14), structure in limited screen sizes.** To keep everything offered by the IPTV platform well structured and readily accessible for users apply the 20 – 80 percent rule and make sure content and functionality that is often used (mostly only 20 percent of the application) is offered at the top level of the application (access level). Other functionality and content can be presented or accessed via sub-menus.

Mappings of input devices and interaction elements

Some navigation elements such as the colour keys corresponding to the buttons on the remote control and scrollbars and the home button on some screens were not recognized as navigation elements. In the eye tracking study people hardly seemed to notice them while they were essential for task execution.

- **Design Recommendation 15 (DR 15), mapping input devices and interaction elements.** Make interaction elements such as scrollbars and soft keys mapped to buttons on the remote control clearly visible on the screen and relate these interaction elements/functions directly to the content on which they apply. A user can for example select a video file and on the screen appear the actions such as "Bewerten", "Nachste", and "Aktualisieren" on the screen as colour coded interaction elements that can be pushed on the remote control. Use these kinds of mapping consistently throughout the design.

Feedback and response times

During the expert evaluation the error status "Failure" was assigned to a video but is remained unclear what was wrong exactly and what one could do to solve the problem. Furthermore response times were reported to be experienced as too long.

- **Design Recommendation 16 (DR 16), Feedback and response times.** During usage a user should always get a good error message when errors occur, explaining what went wrong and what the user can do to solve the problem. When the system will take a longer time to perform an action clear feedback about how long the action will take should be given to the user. Of course response times should be as fast as possible, but this is simply not always possible due to technical limitations. In these cases one could consider to give the user the opportunity to continue with other activities until the activity initially chosen has finished and can be performed or ended (e.g. browsing through more video files, while the one clicked is loaded in the background until it is ready). Next to good feedback users should always have the possibility to undo their last action (multiple times) when desirable.

Summary of pragmatic design recommendations:

- **Design Recommendation 5 (DR5), provide usable tools that work efficient.** Video and picture editing and uploading tools are sometimes quite difficult to master. Easy to use tools will help in stimulating the creation of content in less time.
- **Design Recommendation 6 (DR6), help people to learn to create content.** Support users in creating content by organizing live events and helping them through other means to get started and learn to produce their own content.
- **Design Recommendation 7 (DR7), the promise of self expression.** The possibility for self expression is rewarding for some people (share thoughts, moments and events that are important to the person).
- **Design Recommendation 8 (DR8), make the process of content creation itself rewarding.** You can make the content creation and sharing itself an intrinsically motivated and rewarding process through the introduction of cooperation, co-creation, challenge and elements of competition.
- **Design Recommendation 9 (DR9), make the process of content sharing rewarding.** By providing feedback mechanisms for content shared, such as rating mechanisms and comment possibilities the motivation to produce content can be enhanced because contributions are acknowledged. This recommendation is also important in relation to DR7. When self expression one would like to have a reaction on the content to acknowledge the self expression.
- **Design Recommendation 10 (DR10), establish a critical mass of users.** Besides the means to stimulate content production, one always needs a critical mass of users to realize a certain amount of contributions and keep the community alive and going.
- **Design Recommendation 11 (DR 11), apply filter mechanisms.** General filter mechanisms and filter mechanisms based on users' interests should enable users to: gain a comprehensive overview of "what is there" (e.g. categories, topics, self created groups, etc.) and to personalize the feed of (new) content tuned to one's own interests (rating systems that compare rating of one user with others, personal profiles indicating interests that can be mapped on pre-set categories of pictures/videos (e.g. based on genre), etc). Filter mechanisms will enhance the perceived ease of use and usability when applied in systems where content is continuously added.
- **Design Recommendation 12 (DR 12), designing fun and enjoyment.** Most UGC applications have a clear social component to their usage. People share content that is relevant to them and others consume this content. The meaningfulness of UGC applications is further enhanced when embedded in everyday (social) life. Synchronous social awareness and communication means (e.g. awareness information on someone's status, (current) interests, etc. and audio interaction) could further enhance the clear social component of UGC platforms and provide additional means for users to experience fun and enjoyment.
- **Design Recommendation 13 (DR 13), labelling interaction elements.** Label or give names to interaction elements and categories of content according to a user's mental model. Labels or names used for categories of information or interaction elements should clearly state to what they give access and should be easily interpreted by most users.
- **Design Recommendation 14 (DR 14), structure in limited screen sizes.** To keep content and interaction offered well structured and readily accessible for users apply the 20 – 80 percent rule and make sure content and functionality that is often used (about 20 percent of the application) is offered at the top level of the application

(access level or menu). Other functionality and content can be presented or accessed via sub-menus.

- **Design Recommendation 15 (DR 15), mapping input devices and interaction elements.** Make interaction elements such as scrollbars and soft keys mapped to buttons on external devices visible on the screen and relate these interaction elements/functions directly to the content on which they apply. A user can for example select content on the screen and the actions applicable to that content can pop up or become visible. Use these kinds of mapping consistently throughout the design.
- **Design Recommendation 16 (DR 16), Feedback and response times.** During usage a user should always get a good error message when errors occur, explaining what went wrong and what the user can do to solve the problem. When the system will take a longer time to perform an action clear feedback about how long the action will take should be given to the user. Of course response times should be as fast as possible, but this is simply not always possible due to technical limitations. In these cases one could consider to give the user the opportunity to continue with other activities until the activity initially chosen has finished and can be performed or ended (e.g. browsing through more video files, while the one clicked is loaded in the background until it is ready). Next to good feedback users should always have the possibility to undo their last action (multiple times) when desirable.

3.1.3 Recommendations for meaning

From an earlier evaluation by UOL of a platform called Participation TV it has become clear that IPTV a-like platforms can provide a sense of meaning and value in everyday life (in this case mainly a social meaning). From the evaluation results of the IPTV platform we do observe the same potential for meaning and value for the IPTV platform. Aspects that create meaning in the IPTV platform already and which are identified in the semiotic content analysis are summarized below on a high level:

- The need to inform people (users and potential users) indicated to be interested in the IPTV platform to share performances of for example an amateur theatre group, a local soccer match, one's new born child, or information or something about oneself.
- The need to be informed or 'stay in touch' (with local events/gatherings/performances, culture, norms and values, tradition, oneself and loved ones).
- The need to experience the feelings, sharing, belonging, appreciation, etc. that goes with the two kinds of meaning mentioned above.

We will elaborate on these results in the following.

Finding 1 Meaning in as social sense

The results of the evaluations show that the majority of the participants had fun and enjoyed using the platform (UX1). The interesting finding from evaluations is that the experience of fun and enjoyment seems not to be mainly related to the direct interaction with the platform and its content (e.g. watching videos, creating and uploading videos, etc), though this was of influence, especially in the beginning of the field trial and it was also reflected in the appreciation of local news and information about their surroundings. Fun and enjoyment as experienced on the IPTV platform in terms of a user's higher order goals and the perceived meaning in terms of being part of something social and the social awareness the platform provides seems to be the stronger influence. People enjoyed for example very much the live events organized around the platform and the social interaction created by the introduction of the Magic Media Fair, in which people work together in groups and realize small projects (e.g. video) within a team. However these social events, interactions and awareness are not a direct part of the provided interaction by the platform, they are provided within the context

in which the platform is placed and used, thus building or at least contributing to a sense of community, based on the community basis and feelings already present but formerly differently or not expressed through these means. Still participants do associate these experiences with the IPTV platform itself which results in an overall positive perception of the platform which leads to the following design recommendations.

- ***Design Recommendation 17 (DR 17), embedding UGC applications in real life.*** Embedding UGC applications such as the IPTV platform in real life (an existing community) seems to have a positive influence on the attractiveness of such an application expressed in for example a sense of community emerging through sharing and viewing local news and information about one's surroundings.
- ***Design Recommendation 18 (DR 18), social embeddings in the community.*** Organizing live events and events such as the Magic Media Fair, around UGC applications such as the IPTV platform generate fun and enjoyment through social interaction in the context of the applications which could be further supported within the application itself through social communication and awareness means.

Meaning in the sense of self expression and development

In the beginning of the project, fun was stimulated directly by the interaction with the platform. Elderly people enjoyed being challenged and learning something new such as using the internet and uploading pictures and videos. Younger people liked to edit videos. Fun in this sense is associated with being challenged and developing skills. The fun and enjoyment didn't stem from watching the content itself.

The ways in which people express themselves can be described as different predispositions people have. These are often related to a person's interests, knowledge and skills. Elderly tend to create content that has traditional value or value in relation to the past (anniversaries, collective rites, group meetings, special occasions) and they often do this in a reportage, journalistic news provisioning and documentary way. Youngsters tend to express themselves related to the present and address controversies, individuality, unconventional experiences, etc. in sometimes quite extreme ways and often fictional. These kinds of self expressions only have meaning though when they are acknowledged and recognized or appreciated. This might very well be why the organized live events are appreciated so much because cooperation, competition, etc. are all elements or means to get recognition for self or group expressions. Means to acknowledge the expressions of others, their ideas, interests, news, happenings, etc. are however difficult to implemented in the IPTV platform due to technical limitations. Still, for the future these 'social' means providing possibilities for more interaction and recognition of the contributions of others are interesting to consider for implementation.

- ***Design recommendation 19 (DR 19), self expression and its recognition.*** People do like to self express by contributing to the IPTV platform and sharing something of interest to them or something personal. Self expressions are really rewarding when they are recognized and appreciated as well. Recognition and appreciations of contributed self expressions such as pictures and videos can be further stimulated by social communication and awareness tools such as being able to post or discuss a contribution or to see how others rated your contribution (the last is implemented in the IPTV platform).

Summary of design recommendations related to meaning:

- ***Design Recommendation 17 (DR 17), embedding UGC applications in real life.*** Embedding UGC applications such as the IPTV platform in real life (an existing community) seems to have a positive influence on the attractiveness of such an application expressed in for example a sense of community emerging through sharing and viewing local news and information about one's surroundings and surrounding people.

- **Design Recommendation 18 (DR 18), social embeddings in the community.** Organizing live events and competitions in and around UGC applications generate fun and enjoyment through social interaction which could be further enhanced within the application itself through social communication and awareness means.
- **Design recommendation 19 (DR 19), self expression and its recognition.** People do like to self express by contributing to UGC communities by sharing something of interest to them or something personal. Self expressions are really rewarding when they are recognized and appreciated within the community as well. Recognition and appreciations of contributed self expressions can be further stimulated by social communication and awareness tools such as being able to post or discuss a contribution or to see how others rated your contribution.

3.2 Summary of conclusions

Evaluations performed on the IPTV platform and the design recommendations formulated based on these evaluation results show there are some points of interest for designing and building UGC applications that are relevant for future development of these kinds of systems.

With the IPTV platform, television as a mere broadcasting medium is changed from a one to many broadcasts to a many to many broadcasting medium. This change brings about new design considerations that need to be made compared to normal television as a medium.

Firstly, the many to many relation of creating and consuming content brings about a different perspective on television which the user has to adopt for this medium. Furthermore there are additional services already available that deliver the same functionality through different devices (e.g. internet services like Youtube, Flickr, cd and dvd players for video files and pictures, etc). For some users it is hard to observe what the IPTV platform adds to these other means, though the evaluation results show there is a clear social value the platform delivers, the personal value it delivers still can be addressed in more detail to make the platform more successful. Furthermore, one of the largest differences between the television and other comparable means such as the Internet is that the television set often has a central place in the living room and people are used to watch things together in a social setting. The use of the IPTV platform in a social setting such as the living room is not really found in the evaluations; however it does provide potential to add personal value in use besides social value as well. When the interaction is created or based upon interaction with multiple users located in the same room or cooperating this might enhance the use of the IPTV platform and the observation of using something that provides unique value in the sense of personal value as well as an enhanced social value. Participation TV for example provided this personal value more elaborately.

Secondly, with the platform, different media and devices are introduced in the household. Though most people are familiar with most devices introduced, the connections between devices and services and their differences in look and feel, separate accounts, etc. makes first time usage quite complex (D5.3.1, UA1). In the worst case it will withhold people from using the system. The aesthetic design recommendations DR1 to DR4 describe possibilities to address and solve these issues.

Thirdly, though a clear social value was delivered through the platform, real personal value is still somewhat unclear. The personal value of the platform might be enhanced by paying special attention to social means and tools that can be used during the interaction itself, which will also enhance fun and enjoyment (UX1). At the moment the social value mainly stems from the live events, competition (Magic Media Fair), the local news, information about one's surroundings, and possibility to observe the content of others one already knows or doesn't know but is interested in. Providing social communication means during the interaction itself might enhance the social context in which television and IPTV is used (watching and enjoying together) as well as enhance the fun and enjoyment through games such as provided by for example Participation TV (DR 8 and DR 12).

Fourthly, though the social value of the IPTV application is acknowledged and appreciated by participants, they also indicated that producing and viewing the content was not one of the main attractions to use IPTV. Reasons were not seeing much new content and different aspects related to the usability that made easy access to the content more difficult than expected. Every UGC community or platform therefore needs a critical mass of users so the number of people actually producing content is high enough (DR 10) and additional means to stimulate content production and sharing (DR 5, 6, 7, 8 and 9). Usability issues mainly focus on areas of aesthetics to apply more structure to pages (DR 4), using the mental model and vocabulary of users (DR 2 and 13), presenting most important content on the top levels of the application and other less requested content deeper in the menu structure (DR 14) (people really appreciated the presentation of the pop-up menu with the main functionality, this was a great solution), good search, filter and content selection mechanisms (DR 11), good and consistent mappings between soft keys on the screen and buttons on the remote control (DR 15), and lastly clear and concise error messages and feedback about progress (DR 16).

Lastly, embedding UGC applications in real life communities has been proven to work very well, contributing to the success of the UGC application itself. Implemented UGC applications like the IPTV platform support a sense of community that is already there and can be further exploited, explored and enhanced through such an application (DR 17). Live events and challenges or competitions also embedded in the community furthermore stimulate the use of the UGC application (DR 18) and social communication and awareness means will enhance the acknowledgement and appreciation of contributions made (DR 19), stimulating self expression further.

4 DESIGN RECOMMENDATIONS COLOGNE

For the Cologne testbed the Kabadada/Kabadu platform and Unort Kataster have been used to create design recommendations. Kabadada/Kabadu enable professional cabaret artists, agents, cabaret hosts (cabaret houses), and amateur cabaret artists and cabaret audience (i.e. cabaret-interested people) to present themselves to the world, upload and watch videos, comment and discuss these videos and cabaret at large and give and read information about upcoming performances.

Unort Kataster is an online application that virtually facilitates controversial thinking about critical places in a real urban environment (the area of the city of Cologne). The application is intended to publicly collect knowledge of the citizens about architectural or social deficiencies of their local environment, to motivate textual and audiovisual discussions on these topics and to organize and visualize them by temporal and spatial aspects.

In this chapter the most important **results for the different evaluations** performed on these applications are addressed. Design solutions are formulated that could improve the applications in terms of the UX and UA. For a complete overview of the evaluation methods, user groups and the general results we refer to the documents D5.1.1; D5.2.1 and D5.3.1.

4.1 Recommendations from the Kabadada/Kabadu evaluation

Initially the goal for Kabadada/Kabadu was formulated as creating a platform for cabaret artists, hosts, audience and other interested parties that work together to co-create cabaret as a discipline, its content and its language. This is a very ambitious goal, especially in the context of the different and diverse involved user groups that are attracted by these platforms (each having their own unique goals), and the current/common practice of cabaret as an art form in which you generally have performers and an audience.

From the beginning Kabadada/Kabadu – two spaces on one platform – used the same technology with some minor differences relevant for the evaluation (see more details for example in D5.2.1/D5.3.1). Kabadu is a platform for amateur cabaret artists that can present themselves to others that are interested in watching their performances, stay informed about the amateur artist, view the artist's profile and discuss the content within the platform. Kabadada is a platform for professional cabaret on which artists can present themselves and their work, cabaret theatre hosts can present events, cabaret agents can scout talent and the general cabaret public can browse through the content and enjoy themselves or search for information about performances, cabaret artist profiles or cabaret itself and discuss their views on performances or cabaret in general. Both platforms are embedded in the Cologne city/community and have therefore in the first place a somewhat local focus. The embeddings in a local community can have, as we have observed with the IPTV platform in Engerwitzdorf, an advantage because the 'virtual UGC community' is based on a real life community and thus makes use of the already existing culture, social environment and existing relations.

In the following paragraphs we will go into more detail what the evaluations results of both communities presented and which design recommendations can be formulated based on them.

4.1.1 Recommendations for aesthetics

As addressed in the introduction of this chapter the Kabadada/Kabadu platform has a very ambitious goal: To create platforms for co-creating cabaret as a discipline, its content and its language. This goal is ambitious in three different ways.

Firstly, common cabaret is often viewed as a performer performing and an audience being entertained by the performance. This view in itself has no direct element of co-creation. A performer can only observe how the audience reacts and learn from this experience. Kabadada/Kabadu actively wants to change this view into one that is based on co-creation. The audience as well as the theatre hosts, agents, and the performers or artists co-create cabaret as a discipline, its contents and its language. Kabadada/Kabadu wants to create an environment in which discussion, learning from each other, skill development, etc. are key elements in transforming cabaret to the next stage, and this ambition is far from current practice.

Secondly, the current ICT knowledge and skills within the general public is often limited. During a first workshop in Cologne the concern of users (from different target groups) dealing with UGC concepts and features and the difficulties they would encounter was expressed explicitly. People are often not familiar with UGC applications and it is hard for them to understand some of the concepts of creating and sharing content simply because it is new.

Thirdly, people reason from what they know about ICT, what they are familiar with (see also the MAYA principle) and most people are familiar with watching websites in search for specific information (e.g. about performances, theatres, artists), watching videos at Youtube, etc. This type of usage is often still based on consumption and not on active participation or contribution. Most people for example watch Youtube videos and only few will actually upload videos and more strongly put, have the knowledge and skills to do so. This third point also emphasizes the first, people using internet are often and at large still used to consuming information and not to actively contribute their own.

The evaluations in relation to the ambitious goal of Kabadada/Kabadu and the implementation of the platform itself have indicated some very interesting points related to aesthetic experiences that are based on familiarity such as expressed in the MAYA principle. Other parts of evaluations indicate aspects in aesthetics related to the design and the automatic and intuitive understanding of the design by the users. We will formulate the design recommendations for both (the goal of Kabadada/Kabadu in relation to what the user is familiar with and other aesthetic design aspects which are related to usability aspects as well) in the following.

Finding 1 Familiarity and the goal of Kabadada/Kabadu

When realizing the goal of co-creating cabaret as a discipline, firstly the common view on cabaret needs to be changed from having an audience consuming content and having an artist performing, towards a network of people that can simultaneously enjoy themselves with the content, learn from each other, discuss their views on what is created and shared, be educated, develop skills and reflect on all these activities. A change as such cannot be brought about overnight but needs to develop over time. To create an environment like the one just described people should be able to trust each other, feel comfortable to give and receive feedback, feel secure in sharing thoughts and ideas, etc. All these aspects can only develop over time and need to gradually grow towards a level that makes co-creation possible.

Kabadada/Kabadu has not been very clear on the exact goal of the site on their homepage from the beginning. This on the one hand helps visitors to feel free and explore for themselves what they can gain from using the website without being put down by a goal that does not live up to their interests and expectations. On the other hand it can make it somewhat unclear what the intention of the website actually is and can give visitors too much freedom to interpret the site's goal based on their own interests and familiarity with other sites aiming at cabaret at large (e.g. their familiarity with for example YouTube or sites only providing information about cabaret).

Virtual communities which can be viewed as the first UGC applications are often built on the principle that the visitors ultimately define how the community develops and what it will be

about. Especially members actively contributing define the goal of such a community. This has proven to be one of the strongest forces for long lasting virtual communities (people bringing their own focus to the community and thus steering the community into a particular direction). Still, a clearly communicated goal at the start of a community is important to steer focus and activity after which it often further develops on its own, based on how the users interpret and further explore the possibilities of the community (Preece 2000).

What we have observed from the evaluations of Kabadada/Kabadu is that users have started out using the platforms motivated by their own personal goals based on what they are familiar with. The audience visits the platforms to be entertained and enjoyed by watching the content (videos of cabaret artists performing). Cabaret artists in the first place use the community to promote themselves and their work. Co-creation of cabaret as a discipline was not a direct interest of both types of users of the platforms. However, towards the end of the evaluation period we have observed some changes in the personal goals of the users of especially the Kabadu platform. Here the goal of presenting oneself to an audience and consuming content gradually is changing into a need and desire to use interactive means to get feedback and discuss performances, to learn and exchange ideas. These needs and desires are expressed by the responses on a questionnaire indicating members would like to have a guestbook and/or a pin board on their profile page and would like to connect their profile to profiles of others, changing individual pages into a network of profiles and thus people.

- **Design recommendation 1 (DR1), developing a UGC community network.** At the start of every UGC community the goal should not be formulated too ambitious, should address aspects that users are familiar with and should be clearly communicated on the home page to focus initial user activity. Gradually the UGC community will develop and new, additional needs and desires will emerge. Developers should be attentive to these needs and support them with further development of the platform (as is done within Kabadada/Kabadu through iterative participatory design).

Finding 2 Familiarity and the use of metaphors

Since the Kabadada/Kabadu users are familiar with internet technology and applications such as YouTube, websites to search or obtain information, etc. Furthermore they are used to cabaret as being a performance that you watch to be entertained and enjoyed. They will start using Kabadada/Kabadu from this point of view. Mostly information consumption is a key activity and resulting behaviour due to the familiarity with consumption is sometimes difficult to change. The most common use of Kabadada/Kabadu is watching videos and consuming information (for the audience) and providing videos and information (for performers), though of late participants in Kabadu indicated to have a need and desire for more social communication means as well, as stated earlier. The familiarity with consumption of information (theatre, tv and Youtube) and performances was partially stimulated by the design of Kabadada/Kabadu as well. Videos are presented as a metaphor of a small television screen or podium setup centrally presented on the screen, inviting the audience to watch, instead of inviting to actively participate, thus stimulating consumption. On the other hand one could ask oneself if more communicative means would have worked from the start. There should be a need for communication and from the point of reference of the users one could question if this need actually existed at the beginning of the platform development.

- **Design recommendation 2 (DR2), the use of metaphors for addressing familiarity and steering behaviour.** Metaphors can be used to address familiarity of users with certain concepts or activities such as a podium or television screen to address activities related to watching and enjoying what you are watching, thus indirectly steering behaviour.

Another target group of Kabadada/Kabadu, the cabaret artists (amateur and professionals) have goals that are related to spending free time in developing cabaret skills (amateur

artists) and work (professionals). The goals especially professional cabaret artists have are: promote oneself, show and perfect one's performances, develop skills even further and differentiate oneself from the competition, etc. These goals are from what artists reason when using Kabadada/Kabadu, resulting in mainly providing information. This use very well suits the consumption attitude of the audience and in that way is a great match between goals of different target groups.

- **Design recommendation 3 (DR3), match goals by addressing familiarity with relations between different target groups.** Match goals from different target groups by addressing the familiarity the groups have with their relation towards each other.

Finding 3 Aesthetic interface aspects

The third observation from evaluations concerns more mundane aesthetic aspects that will effect the usability of the applications by providing a more intuitive, automatic and immediate understanding of the interfaces of both platforms. From the usability testing results we found that intuitive interpretation of the interaction was sometimes difficult. For as far as related to aesthetics we will address them briefly here. Otherwise they are explained in detail in the coming about pragmatics.

The following design aspects related to aesthetics were found that when changed will enhance the automatic and intuitive understanding of the interface and provided interaction. The labelling of functionality such as the link "videos" leading users back to the "home page" and the term "video" indicating upload functionality, do not agree with a user's mental model of what should be behind these terms and thus can cause confusion ("videos" is expected to lead to an overview of videos of performances and "video" is expected to lead to a specific (one) video). Font sizes are not used in a consistent manner (sometimes quite small to easily read, sometimes different sizes are used for items that are evenly important). Gestalt principles state that things should look the same when they have the same significance or are grouped together but differently form things that do not belong to the specific group of items. A third result from usability testing shows the application of standards is not always consistent and could help users finding their way more easily. Some examples are the search function not being directly recognized as such due to its visual design (a green bar with white text in it with too little contrast to be clearly readable); The RSS feed icon is not a standard icon and as such more difficult to recognize for users. It furthermore is placed in the middle of the site which makes it more easy to overlook (while users appreciate new content and easy updates to this new content very much); Some hyperlinks change colour after being clicked and some are not making it hard for users to observe which pages they have already visited; and navigation means are placed below (sometimes long) pages of content, making it more difficult for users to reach them when needed directly.

- **Design recommendation 4 (DR4), use labels that are conform to a user's mental model.** An interface will become more easily and intuitively understandable if the vocabulary of the user is supported in the sense of what the user can expect from for example links, buttons, etc. (e.g. change "video" into "upload video" or just "upload" if a user is on a video page and change "videos" to for example "Home").
- **Design recommendation 5 (DR5), use Gestalt principles to structure an interface.** Gestalt principles can be used to group aspect that belong together or are equally important together.
- **Design recommendation 6 (DR6), apply standards where possible.** Easy recognition of functional elements can be realized by addressing a user's familiarity with their placement and workings (visual design and layout mainly). The recognition of functional elements could be enhanced by for example place the search bar at the top or top right of the page, clearly visible with good contrast and for example an hour glass to further immediate understanding of its function; use standard icons for RSS feed functionality and place these at the top or bottom of the page were they are often

found; place the main navigation means somewhere they are always visible and directly accessible and use hyperlink colour changes to further enhance the navigation so users can easily identify pages they have already visited.

Summary of aesthetic design recommendations:

- **Design recommendation 1 (DR1), developing a UGC community network.** At the start of every UGC community the goal should not be formulated too ambitious, should address aspects that users are familiar with and should be clearly communicated on the home page to focus initial user activity. Gradually the UGC community will develop and new, additional needs and desires will emerge. Developers should be attentive to these needs and support them with further development of the platform (as is done within Kabadada/Kabadu through iterative participatory design).
- **Design recommendation 2 (DR2), the use of metaphors for addressing familiarity and steering behaviour.** Metaphors can be used to address familiarity of users with certain concepts or activities such as a podium or television screen to address activities related to watching and enjoying what you are watching, thus indirectly steering behaviour.
- **Design recommendation 3 (DR3), match goals by addressing familiarity with relations between different target groups.** Match goals from different target groups by addressing the familiarity the groups have with their relation towards each other.
- **Design recommendation 4 (DR4), use labels that are conform to a user's mental model.** An interface will become more easily and intuitively understandable if the vocabulary of the user is supported in the sense of what the user can expect from for example links, buttons, etc. (e.g. change "video" into "upload video" or just "upload" if a user is on a video page and change "videos" to for example "Home").
- **Design recommendation 5 (DR5), use Gestalt principles to structure an interface.** Gestalt principles can be used to group aspect that belong together or are equally important together.
- **Design recommendation 6 (DR6), apply standards where possible.** Easy recognition of functional elements can be realized by addressing a user's familiarity with their placement and workings (visual design and layout mainly). The recognition of functional elements could be enhanced by for example place the search bar at the top or top right of the page, clearly visible with good contrast and for example an hour glass to further immediate understanding of its function; Use standard icons for RSS feed functionality and place these at the top or bottom of the page were they are often found; Place the main navigation means somewhere they are always visible and directly accessible and use hyperlink colour changes to further enhance the navigation so users can easily identify pages they have already visited.

4.1.2 Recommendations for pragmatics

Pragmatic experiences are related to design elements such as the usability, pragmatic and behavioural characteristics of an interactive product and can result in emotions or experiences of (mis)understanding of a product's workings, (un)predictability of a product and its' behaviour or outcomes, feelings of making progress in a satisfying way but also to subjective aspects and feelings such as engagement during interaction like reaching a state of flow, having fun and enjoying the interaction with the application.

Pragmatic experiences identified in D5.2.1 and summarized in chapter 2 of this report are **UX1: Fun and enjoyment**; **UX 4: User engagement**; **UX 5: User involvement**; **UX 8: Usability**. Pragmatic experiences identified in D5.3.3.1 and summarized in chapter 2 of this

report are **UA1: Perceived ease of use; UA2: Perceived value/usefulness; UA3: Perceived ease of adoption;** and **UA4: Trust.**

In the evaluation results we've identified different interesting issues related to the ease of adoption, fun and enjoyment and related aspects such as engagement, involvement and trust. In this paragraph we will address these issues one by one. Other findings indicate there were some issues related to usability as well. These will be addressed at the end of this paragraph.

Finding 1 Familiarity and ease of adoption

A concern expressed during the first workshop in Cologne was the needed knowledge and skills to participate in Kabadada/Kabadu. Most people were familiar with the internet and different services available there (watching movies at for example Youtube, reading and commenting on blogs, visiting websites for information about performances, theatre calendars and the like). In the end most of these concerns were not really valid and more related to the newness of concepts and ideas about co-creation instead of based on facts. During the field trial we can observe that most people do not have problems browsing Kabadada/Kabadu and can use most functionality (though we did observe some usability problems). What was found during evaluations was that video editing and uploading was for some participants difficult, stated in their explicit request for guides on how to create and upload videos. Most people are not or hardly familiar with video editing and publishing on the web and the tools available to do so are often hard to use and request some level of expertise. The observed complexity of creating videos can prevent people from taking the effort to learn. Kabadada/Kabadu therefore offered a video service which people could use to get videos from their performances. Within Kabadu about half of the people stated to be interested in such a service and were willing to pay for it. Within Kabadada people were not very interested. In the Engerwitzdorf evaluations we encountered the same problem with creating videos and similar design recommendations apply here.

This finding, related to difficulties in creating one's own content were stressed in the evaluations analyzing fun and enjoyment. For artists fun was important, however not the main reason to visit the platforms. This conclusion naturally follows from the goals this kind of users have. Professional artists are mainly looking for opportunities to promote themselves and to see what other artists are doing. Amateur artists are looking for recognition and appreciation of their performance and hope to learn from others by seeing what they do and by discussing their own work. Fun for this target groups mainly consists of (next to watching the work of others) watching the number of visitors of one's own videos, by meeting like-minded people and by looking at the event calendar and appointments (viewing appointments was among the most often used functionality with this target group). Especially viewing member profiles and appointments illustrates the importance of getting information about other platform members. Furthermore the logging data for Kabadada members (the community for professional artists) show that this community is mainly used as a promotion tool. 85% of the active usage (true UGC production) consisted of creating appointment entries, editing appointment entries and updating user profiles. Only 4% of the user generated content activities consisted of uploading a video. Active contributions (actual user generated content without only consumption) all taken together created 2% of all user activity on both platforms taken together and only a select group of people on for example Kabadada (6 users) produced more than 50% of all the user-generated content. Another fact supporting the use of Kabadada mainly as a promotional tool is the fact that members asked for support on improving their presentation (e.g. manuals for video production, a live broadcast of cabaret shows). In these conclusions we see as well that also this target group (the performers) are supported in a sufficient way related to their goals. And as we observed in the IPTV platform field trial as well, some UGC remains difficult and time consuming to create. Especially the request for user guides/manuals and live broadcasts indicate Kabadada people having trouble or needing to take too much effort to create video files that live up to their own expectations.

- **Design recommendation 7 (DR7), Increase the level of adoption by helping people to adopt the full service.** To help people to use for them complex technology good support can be provided. Good support will increase the level of acceptance of the service or application as well. One could provide for example to do the work for participants (like the offered video service), but this is sometimes a costly solution. One could give workshops or courses on how to solve and use difficult parts of the application and one could provide guides that help people to for example create their own video materials edit these and upload them to the platform as was suggested for the Engerwitzdorf platform. Furthermore, tools provided for user generated content should have a positive cost/benefit relationship in relation to the user goals. In Kabadada/Kabadu the main contributors of content are the artists and performers. To present themselves creating video material is one of the best ways but also one of the most difficult and time consuming things to do. Applications that make video editing easier and means such as providing a video service which was appreciated in the Kabadu community are therefore very important, however not part of this community (these are external applications). Still the community is depending on these external applications in part.

Finding 2 New content provides fun and enjoyment

Kabadada/Kabadu provide many different experiences to their users. For the audience (people interested in cabaret but not performing themselves) fun and enjoyment is provided mainly through (regular updates of new) content such as news, new platform members and videos (these are also the most used features in the logging data). Furthermore the logging data show that the most often used functions of the Kabadada/Kabadu platform are related to function tuned to getting information. Watching videos (consisting of 22% of all usage activity on both platforms) and viewing profiles (consisting of 14% of all usage activity on both platforms) were among these. During organized community events such as the "Lachnummer" competition in Kabadu, usage of this platform was tripled compared to the month before concerning the consumption of information as well as the number of active contributions such as video uploads which was 6 times as high compared to the month before. Other means that attract users and stimulate activity are promotional activities such as a radio interview with Robert Griess, one of the lead users of Kabadada. After this radio interview the user activity tripled as well compared to the month before.

People visiting Kabadada/Kabadu, the audience, expect to have fun and be enjoyed as suits cabaret very well. New content, which is stimulated by competitions and promotional activities absolutely have a very positive effect on this kind of communities. New content is furthermore very important to keep the active members coming back as can be seen in the logging data. 68% of the (regular) visitors stay on the platform for less than 30 seconds, indicating they are looking for new content and otherwise leave almost immediately. The average time of a session on Kabadada/Kabadu was about eight minutes though, indicating the other 32% do find new content to be enjoyed and use the platform for other purposes as well (these will be addressed further on). In the second questionnaire users from mostly the audience stated fun was the main reason for visiting the platform, characterizing a kind of passive use characterized by consuming information. Passive use as described here made up 97% of all activity on the platforms.

- **Design recommendation 8 (DR8), Organize events and promotion to stimulate the creation of new content and usage.** As we have observed in the IPTV platform field trial, organizing events such as competitions and promotional activities will boost user activity to a large degree. Repeatedly organizing such events will attract new members and continuously increase user activity, stimulating user engagement and involvement as well. Furthermore, when application usage is characterized by a more passive consumption of information it is important to provide regular updates and new information to keep your public interested and coming back.

Finding 3 Changing needs in interaction means

As stated earlier, Kabadu members, next to presenting themselves, are more eager to learn from others and to further develop their cabaret skills and interests. This need is expressed in their openness and mostly positive attitude towards more interactive means to communicate within the Kabadu platform (e.g. the appreciation of the rating system for videos, the blogs and the request for guestbooks and pin boards on their own profiles, links to other profile pages, etc). Kabadada members are more established performers and do not have these needs as strong as do the Kabadu members. We have observed this change in needs and desires for additional interaction means over time. Some current users of Kabadu not only want to present themselves but want to discuss their work and ideas with others and express this desire to do so more clearly, meaning the community is growing into a platform on which not only information consumption and provisioning are key but interaction needs start to emerge as well.

- ***Design recommendation 9 (DR9), observe and address changing needs that emerge over time.*** The need for additional communication and social tools has emerged and been expressed more clearly over time. As a developer one should stay continuously in touch with the target audiences to observe these kinds of changes in needs and has been done within Kabadada/Kabadu. Once people indicate to have additional needs these needs can be addressed accordingly by new developments and functionality added to the platform. Within Kabadada/Kabadu observing changes and needs and desires of the target users has been key to further development of the platform resulting in a growing platform that continuously addresses the needs of its users, thus enhancing different user experiences such as fun, enjoyment, user involvement and engagement as well as trust in the developing team and the platform itself.

Next to aspects related to the needs, fun and enjoyment, etc. we have found some evaluation results that purely relate to usability issues. We will summarize these issues in the following. Issues related to the usability which were found during evaluations concern the structure of the platforms and how new data (UGC) is placed and managed within this structure, difficulties with uploading videos and the separate profiles for Kabadada/Kabadu.

Finding 4 Structure of the platform

In the first workshop in Cologne participants expressed their worries about how the large amount of data generated will be handled and managed by the platform and made easily accessible. In the second online questionnaire this concern was confirmed. Half the participants state they get angry because of the growing amount of content that leads to confusion because people for example cannot find the things that are of interest in the current platform structure. Profiles are for example presented in alphabetical order but when the number of profiles increases these will become long cumbersome lists to work through. Another example are the sorting of videos, this is not clear to many participants as well.

The structure of the platforms is by members of the communities sometimes experienced as somewhat confusing, also prohibiting easy navigation. The main cause identified in the evaluations for this confusion is the way in which the data is structured and presented to the user from the start. A good search function is a must when the content of the platform is growing and normal browsing through content is no longer the best way to find what you are looking for. Still it is very difficult to change from a structure that supports browsing towards a structure that mainly supports searching.

- ***Design recommendation 10 (DR10), Managing increasing amounts of content.*** Making increasing amounts of content available to users in an easy and intuitive way is often a difficult problem in UGC applications. Different means can be considered to manage the growing amount of content and still maintain a certain structure and a good search function. For example rating systems can make popular content easily

accessible, but can have the downside, depending on the chosen implementation, that content that is not rated often enough will not appear in the resulting lists (e.g. new content). Tagging systems can help in creating searches based on tags making searching for specific content easier. Folksonomy principles can help to provide a structure in all the data available which helps users in browsing related information. Recommendation systems (based on for example rating systems) can help to provide users with new interesting information that they are not yet familiar with. Media mining solutions could provide structure in the data as well, which can help to make it more easily available for users.

Finding 5 Uploading videos

Another issue identified during the evaluations is that users encountered problems during video uploads. This had become especially clear during the “Lachnummer” competition during which the number of upload trials was twice as high as the number of videos that ended up on the platform. Part of the problems with uploading videos is that users need an upload function that is easier to handle, in what way exactly is not completely made clear from the evaluation data. On the other hand the number of uploads is much higher than the number of actual videos on the platform because of the link labelled “videos”. Many users will have clicked this link in the expectation to end up with a list of videos, while in fact this link directed users to the video upload page.

- **Design recommendation 11 (DR11), enhancing video uploading.** Video uploading tools are often somewhat difficult to manage and it often takes quite some time to upload a complete video file. These problems are due to technological limitations of the current internet connections and cannot be solved at the moment. However, it will prohibit some users to upload videos or make them aboard an upload when taking too long. Advising users to upload videos while they have planned to do something else than using the internet can be a friendly suggestion. Furthermore, as addressed within the IPTV platform when actions needed to perform by the system take a long time it could be a good idea to support users in undertaking other activities on the platform and be notified when the video is uploaded.

Finding 5 Managing profiles

A last finding from the evaluations indicate that some users where a member of both platform and experienced they had to fill in their profile information and changes on each platform separately. A way to update profiles and information on both platforms at the same time was very much desired by some of these users.

- **Design recommendations 12 (DR12), all in one profile and content editing.** In the IPTV platform we have experienced more or less the same thing when other external applications such as Flickr are used to update one’s pictures on the IPTV platform. Users in general do not like different profiles, accounts, etc. when they use them together or when they are clearly inter-connected. In such cases it is best to provide easy means with which profiles and content can be updated on multiple accounts or platform at the same time.

Summary of pragmatic design recommendations:

- **Design recommendation 7 (DR7), increase the level of adoption by helping people to adopt the full service.** Provide support to help people to use complex technology to stimulate acceptance and adoption by providing services (do what’s difficult for them), teach them how to do it (workshops or courses, user guides or instruction guides) and by providing them with tools that are easy to use.
- **Design recommendation 8 (DR8), Organize events and promotion to stimulate the creation of new content and usage.** Organizing special events (such as competitions) and promotional activities (such as radio interviews) at regular time

intervals increase your user base (critical mass) and user activity, engagement and involvement.

- **Design recommendation 9 (DR9), observe and address changing needs that emerge over time.** Additional needs in UGC and virtual communities often arise over time (especially needs for additional social communication means). As a developer you should stay keen on the development of these additional needs as continuously done within Kabadada/Kabadu and act accordingly by providing suitable means that enhance the complete experience of the interaction and the meaning of participation.
- **Design recommendation 10 (DR10), Managing increasing amounts of content.** Use additional means that provide structure and make exploring the ever growing amount of content possible. Means that can be considered are: a good search function, rating systems that represent specific interests (e.g. popularity), tagging to ease searches, application of the Folksonomy concept to provide structure in new and existing content according to a users' mental models, recommendation systems to provide users with new information and tips about content and media mining principle (for structuring data as well).
- **Design recommendation 11 (DR11), enhancing video uploading.** Advice users to upload videos when they have planned to do other things and provide the possibility to perform other actions and tasks during video upload.
- **Design recommendations 12 (DR12), all in one profile and content editing.** Provide automatic synchronization between different accounts when desired by users.

4.1.3 Recommendations for meaning

Kabadada/Kabadu provide important meaning and value to their members. Within Kabadu the main meaning provided is a platform is self actualization in terms of learning from others by presenting one's own work or performances and viewing that of others. It is therefore to be expected, once users got acquainted with Kabadu, members are quite positive about additional communication means such as a guestbook and pin board on their profile page and the possibility to link from their profile to other profiles to further experience the provided meaning by Kabadu.

The meaning provided by Kabadada for professional cabaret artists mainly focuses on self actualization by presenting oneself and one's work to the outside world and to see what others are doing. Here there is less need for additional communication means.

Finding 6, sociability, co-experience and co-creation

Throughout the last year we have observed the social interaction and needs for communication tools grow. This is a positive sign of a community developing towards a UGC platform in which users interact and communicate with each other. This will enhance the sociability of the communities as well. To stimulate co-creation this trend needs to further develop as addressed in the paragraph about pragmatics (implementing additional social communication means), and additional means that help to create a network of members can be explored in further detail. Once a need for communication has arisen, sociability, co-experience and co-creation come within view. Some key features of co-creation are a network of people that are and feel connected, the need for communication and the shared goal of co-creating something. These key features can be stimulated through different means (design recommendation 13).

Furthermore, for co-creation to emerge it is necessary for both target groups to change their attitudes towards one more interactive. One hypothesized reason why the Kabadu users are already somewhat more open, have a more interactive attitude towards use and co-creation (more responses to videos, the need for additional (social) communication means, etc.) is

that the amateur artists are more interested in their own skill development and what the public thinks about their skills while the response of the public on their performance has less impact on the individual person (the personal goal is to learn and develop oneself and feedback could help). We think professional artists have this need as well but are more reluctant to discuss their performances, skills and appreciation of them in a public space because this can have a big impact on their status and work as a professional cabaret artist. For this target group one could pose the question if open, public co-creation of their work and cabaret at large really suits the goal of professional cabaret artists. Another, safer approach that could be taken is the more private and intimate form of co-creation among few people that feel at ease with and trust each other or an approach that ensures that co-creation and discussion is not directly tied to the professional artist so risks and impact on professional status and work is limited. Design recommendation 14 addresses means that can help to realize this.

Other aspects related to meaning in terms of sociability, co-experience and co-creation in particular are expressed concerns related to the security of the platform and copyright issue which can be gathered under trust in the developers and hosting party and other users/members. Both are mentioned during the workshop in Cologne as topics about which participants worried. In particular people were worried that ratings of content, popularity, etc. could be manipulated by creating false accounts. The second issue, copyright on the materials published on the platform is not a unique problem. Other platforms (video and picture uploading sites) have encountered copyrights problems as well and the fact remains that content published on the internet is often easily copied and made available somewhere else. Otherwise content from elsewhere can be easily published on the Kabadada/Kabadu sites. These are still open issues that can influence the trust of participants in the platforms and other users. When trust in the platform and other users is low this will influence activity and especially contributions. However, no explicit concerns have been mentioned during later evaluations related to security, copyright or trust.

- **Design recommendation 13 (DR13), means to stimulate co-creation.** Means to stimulate co-creation have already been addressed in the IPTV platform design recommendation and have been proven to work. Some of the means that might apply to Kabadada/Kabadu are giving users a challenge in which co-creation is a necessity. Other means have already been mentioned by members of Kabadu, being able to link one's profile to someone else's to establish first lay-outs of a social network. This kind of means stimulate interaction among members and make relations within the group or community explicit, changing it into a social network of people that can inform each other, provide each other with help and feedback, discuss and reflect on cabaret as a discipline more easily. Still, these developments can't be pushed but need to grow from within the community itself. Only when people trust each other enough and have the feeling of being part of the community co-creation is possible.
- **Design recommendation 14 (DR4), create interaction between members and co-creation via intimacy.** Common means to stimulate discussion and co-creation within a group of people that share a certain level of trust and intimacy are means that provide users the possibility to start their own 'closed discussion groups' to which new members can be invited or accepted. For professional cabaret artists this could provide the means to discuss their work or cabaret at large in a, for them intimate and controllable environment (e.g. on their own profile page) that matches their personal goals better for interaction and co-creation with others. Cabaret at large could be discussed in discussion groups or topics accessible for everyone but contributions could for example be made anonymous when preferred. Furthermore users could be empowered to start their own discussion groups in this context as well, with the task to moderate their own groups. Both means provide a kind of control for the user to ensure a feeling of security and trust necessary for open communication and co-creation. Another advantage of 'delegating' part of the discussion and co-creation in

this way is that part of the UGC platform hosting is given to the users. With virtual communities it often has been proven, once communities grow, it is impossible to keep hosting the community as a hosting party yourself. Active users and members necessarily need to be involved in managing all content and interactivity within the community.

- **Design recommendation 14 (DR14), create trust through a clear vision statement and rules.** How one goes about maintaining security and copyright (as an example) and unacceptable contributions in general is within virtual communities often described in a community vision statement or manifest. These kinds of statements address behavioural rules, moderation of content, 'punishments' when rules are neglected, etc. For user generated content applications as for virtual communities such a vision statement or manifest can help very much in stating what is accepted within the community and what is not. Accordingly it gives users the possibility to react or address inappropriate content with the host and actions can be taken accordingly. A vision statement or manifest is often the first step and followed by a mechanism of social control according which emerges automatically and through which the rules described in the vision statement are monitored, creating a community that is in that sense self regulating.

Summary of design recommendations related to meaning:

- **Design recommendation 13 (DR13), means to stimulate co-creation.** To stimulate co-creation first a social network and communication has to be in place, enable users to connect to each other (e.g. linking profile pages), provide communication means, etc. Providing challenges in which co-creation is a necessity can further stimulate co-creation.
- **Design recommendation 14 (DR4), create interaction between members and co-creation via intimacy.** A certain level of trust and intimacy can be a necessity for (social) interaction between members of a community. Trust and intimacy can be increased by empowering the users and giving them some control over what is being shared and with whom and in what way. Closed discussion groups to which members are invited or accepted help to create trust and intimacy. Make sure discussion groups are not about a 'person' or specific idea connected to a person but a more general topic of interest and provide the possibility to make anonymous contributions. Furthermore people can be enabled to start their own discussion groups which they moderate themselves. This also helps the community hosting party to maintain the community and stimulates social control.
- **Design recommendation 14 (DR14), create trust through a clear vision statement and rules.** Create a vision statement for a UGC community that states the goal of the community, what rules apply and what behaviour is accepted and what is not, what 'punishments' are given in case rules are neglected, how moderation is implemented, etc.

4.2 Summary of conclusions

Evaluations performed on the Kabadada/Kabadu platform and the design recommendations based upon these evaluations show there are some interesting Conclusions for designing and building UGC applications that are relevant for future development of these kinds of systems.

Kabadada/Kabadu change cabaret from bringing together an audience and a performer in a theatre to an interactive platform where cabaret is the topic of interest to be discussed, enjoyed, explored, learned and further developed as a discipline. This change brings about new design considerations which are summarized in the following.

Firstly, as stressed, the goal of Kabadada/Kabadu to create a platform for co-creating cabaret as a discipline is a very ambitious one. The platforms are embedded, or build on the local culture surrounding or belonging to cabaret in Cologne. People interested in cabaret (the audience) or actively involved in cabaret (performers (amateur and professional), cabaret hosts and agents, etc) are currently fulfilling their interests through this cabaret culture within Cologne by going to performances, performing in theatres and practicing in amateur cabaret companies or groups. Other information about cabaret in Cologne (e.g. agenda's of performances and theatre groups, etc) are often made available through the internet and there one can also find cabaret videos and additional material to be enjoyed. Co-creating cabaret as a discipline certainly has added value in this context; still is also ambitious in terms of introducing a complete new concept and idea with which most people will not be familiar (there role is changing when cabaret is viewed as a co-creative activity) and for which they might not immediately accept there is a need (how they see their own needs related to their changing role). The design recommendations DR1 to DR3 address how one can start changing current needs and attitudes towards those necessary for co-creation by addressing the current interest in cabaret of the different target groups based on their current familiarity, attitudes and needs in relation to cabaret. From this point the perception and attitude towards cabaret can slowly be changed.

Secondly, DR 7 to DR10 address recommendations for stimulating usage, keeping user enjoyment, fun and engagement at continuous levels or increase usage and user interest in general by: increasing the level of adoption by helping people to accept and start using the technology; organizing events and competitions; addressing emerging needs that appear over the course of time; and managing the increasing amounts of content so interesting content is provided in a good and intuitive way.

Thirdly, usability issues encountered during interaction with the system and solving these issues further creates a more intuitive, easy and straightforward interaction that will increase the experienced enjoyment and fun further. The design recommendations DR4 to DR6 and DR11 and DR12 address some of these usability issues such as: using terminology that addresses the mental models of the users, using Gestalt principles to structure the interface to make it more intuitive and understandable, applying standards that are often used so users will have less difficulty with recognizing specific interface elements or functionality; enhancing the video upload waiting times by providing other activities; and making it easy to edit information that should be changed in different places (e.g. account management).

Lastly, we have formulated 3 design recommendations to stimulate co-creation, a feeling of sociability, co-experience and personal trust (in relation to other users) as addressed in DR 13 to DR15. One can enhance these type of experiences by: enabling users to create a social network and provide challenges in which co-creation is a necessity; creating interaction between members (and thus co-creation opportunities) based on intimacy and trust; and creating trust through a clear set of behavioral rules posed as part of a vision statement for the platforms.

4.3 Main recommendations for Unort Kataster

As briefly addressed earlier Unort Kataster is an online application that virtually facilitates controversial thinking about critical places in a real urban environment (the area of the city of Cologne). Not all UX and UA factors are addressed during the evaluations of Unort Kataster since this trial started much later than Kabadada/Kabadu in Cologne. The main conclusions concerning the evaluation results that are available are briefly addressed in the following paragraphs. These concern the UX aspects: UX 1 – Fun / Enjoyment; UX 3 – Motivation; UX 5 – User Involvement; UX 8 – Usability. UA aspects evaluated are UA1 (Perceived ease of use; UA2 (Perceived value/usefulness); UA3 (Perceived ease of adoption); and UA4 (Trust).

4.3.1 Recommendations for aesthetics

In the interviews and the online questionnaire used in the evaluations of Unort there are no clear indications of aesthetic aspects either positive or negative other than that the interface for Unort Kataster seems quite intuitive to understand and use.

4.3.2 Recommendations for pragmatics

As is the case with the Engerwitzdorf and Cologne field trials, Unort is embedded in an existing community as well, quite strongly so. The connection with real life and Unorts is perceived as fun and enjoyable. Furthermore people enjoy reading and writing about the Unorts identified by themselves or others within the application. Controversies in opinions are also indicated as interesting to observe.

Design recommendation DR1, Embedded in real life. As we have observed in the IPTV platform and Kabadada/Kabadu field trials, embedding a UGC community in real life immediately boosts the interest in and usage of the application due to a user's interest in the real life subject that is central to the application.

This relationship with the real world interest central to the application is reciprocal. People are motivated to contribute to Unort because they expect the reactions within Unort to have an effect in the real world. Especially older people seem to value participation and opinions of others. Though it is somewhat unclear to participants what the community will deliver for them in the long term, people in general state they will actively participate in the future as well. A note however is made that increased participation will only emerge when there is actually something being done with the information; otherwise people predict their interest and participation will decrease over time. From this evaluation result we observe that the link with the real world should not be one way and exclusively virtual (discussion Unorts only online) but should have an effect on the real world as well (resulting in making the Unorts better). Otherwise active participation will possibly decrease over time.

Design recommendation DR2: Embedded communities should have a reciprocal relation with the real world. An embedded community is not only an enhancement of the real world, but should generate an effect in that real world as well to stay interesting for users.

As already addressed usability issues were not really found. The community is well structured and easily used. What participants would like is an enhancement of the possibilities to select and mark specific areas in more detail (e.g. give the boundaries of an Unort). Furthermore the platform could be enhanced by making it available in the areas of the Unort itself to stimulate discussion further (since not all people have internet access). Only elderly people indicated that they would like to have more direct interaction means to communicate with others about Unorts, younger people did not find this very interesting or necessary.

Summary of pragmatic design recommendations:

- **Design recommendation DR1, Embedded in real life.** As we have observed in the IPTV platform and Kabadada/Kabadu field trials, embedding a UGC community in real life immediately boosts the interest in and usage of the application due to a user's interest in the real life subject that is central to the application.
- **Design recommendation DR2: Embedded communities should have a reciprocal relation with the real world.** An embedded community is not only an enhancement of the real world, but should generate an effect in that real world as well to stay interesting for users.

4.3.3 Recommendations for meaning

What the exact meaning of Unort is for participants and how the community relates to a user's higher order goals is at this moment difficult to evaluate, since the UGC application has started later on compared to the other field trials. For meaning to be evaluated participants need to use the application for a longer period of time to observe the effects of the application on real life and the personal or social value it creates for themselves, they need to fully have adopted the service and have experienced how Unort effect the real world around them. This was at the moment of evaluations not possible to measure. A promising aspect of creating meaning though is the fact that the number of users significantly increased in the last 4 months.

4.4 Summary of conclusions

Though evaluations on Unort Kataster are limited due to time constrains the results obtained are very interesting. First of all there does not seem to be problems with usability indicating other experiences can emerge without these problems being in their way. Furthermore the embedding of Unort Kataster in the Cologne community leads to expectations of a reciprocal relationship between real life and the virtual. Participants state that this reciprocity is a precondition for them to stay active within the Unort Kataster application and community.

5 DESIGN RECOMMENDATIONS OSLO

In Oslo a collaborative storytelling application called Talhonia was developed. Talhonia provides users with a social environment where one or several users are able to write fictional or factual stories, with easy access to previous versions of text. The text-editing system is simple, offering users a clean editing-window. Whereas weblog-software such as Blogger offers users a choice between a composer view (wysiwyg – what you see is what you get) and an html-view, Talhonia can only be used in a composer view without font and paragraph formatting choices.

In this chapter the most important **results for the different evaluations** performed on these applications are addressed. Design solutions are formulated that could improve the applications in terms of the UX and UA. For a complete overview of the evaluation methods, user groups and the general results we refer to the documents D5.2.1 and D5.3.1.

5.1 Main recommendations for the Oslo evaluation

There have been two separate target groups for Talhonia. First evaluations took place with cyclists from Norway which resulted in negative feedback after which the application was redesigned from scratch and evaluated with a different target group, children of 8 years old from Norway.

Talhonia now differs from other applications such as Blogger and Google documents in that you can truly co-write stories together with one or more other people in real time. This change of perspective on collaborative writing moving towards real time collaborative writing delivered some interesting insights during the evaluations. In the following paragraphs these findings and design recommendations are briefly addressed according to the 3 main experience categories mentioned within the framework.

5.1.1 Recommendations for aesthetics

The first evaluations that took place with Talhonia were performed with a target group of cyclists from Norway. During these evaluations quite negative feedback was gathered about the application after which it was redesigned from scratch. However, the aesthetics from the applications were scored quite positive, indicating people liked the simple, clean and straightforward design. A downside of the aesthetics was that people had a hard time understanding what the application was exactly meant for. The home page didn't put the goal of the application straightforwardly clear and although the design was considered to be aesthetic, other problems arose in the interaction based on the design.

One of the things referring to familiarity was that the cyclists, though quite experienced in using different ICT means, had a hard time placing the application and its usage in the context of daily life. In terms of value, they found it difficult to indicate what the value of the application would be for them. They proposed to integrate Talhonia in a map so stories and pictures can be written based on place and time. This would add value for them because the relation with their own interests would become clearer. Though this is not a problem in terms of what the added value of Talhonia could be, this general reaction does indicate that the application should be viewed and used in a specific context or as a software module which can be added or used in a larger platform to provide specific value. Not surprisingly the provided task or interest (co-write a story about...with your friends) in the second target group, the group of eight year olds, led to quite different evaluation results. Here the context was provided (story writing with friends in a learning/classroom setting) and usage was made attractive and stimulating by adding objects such as Teddy Bears (RFID tags) for logging in and the story cards with interesting assignments, that gave the children a starting point and stimulated story telling. At a certain level this is in line with what was found in the

Engerwitzdorf and Cologne testbeds as well. Specific personal goals and interests which can be realized with the application, such as promoting oneself or expressing oneself or sharing things that are important, is in itself stimulating enough to have users participate in UGC applications. Adding additional focus, steering activity, etc. through embedding the UGC platform in a context such as everyday life, has the same effect

- **Design recommendation 1 (DR1), address familiarity through personal goals, interests and context.** Addressing familiarity in terms of referring to someone's personal goals, interests or providing a clear context of use (embeddings in existing communities) with which the user is familiar and that suits the personal goals and interests will enhance the observed (added) value of the UGC application.

5.1.2 Recommendations for pragmatics

As addressed in aesthetics, the Talhonia application did not refer to what people were familiar with and was not viewed as something that could fulfil their interests and personal goals (first target group). Was Talhonia presented differently to this target group, for example as a collaborative writing tool that could be used to write a story of a cycle trip together with a route on a map and pictures, the target group's interest might have been better addressed (as suggested during the first evaluation). Clearly communicating the goal of an application can therefore be very important.

- **Design recommendation 2 (DR2), state clearly the goal of an application.** State clearly what the goal of an application is, thereby addressing familiarity, personal goals and interests. This will enhance the acceptance of an application and its usage.

Besides the benefits a clear goal can provide, some usability issues were found during the first evaluations with cyclists. The first version of Talhonia was designed with panels which needed to be activated by dragging them on the top of others. This was observed as counter intuitive. People are used to just clicking something in the interface and it becomes active. In the second version of Talhonia the panels were re-designed, providing very good interaction means that were intuitively understandable and usable. A second problem that arose from using panels was that the interface easily became cluttered. This problem was also solved in the second iteration of Talhonia by presenting stories in a different way and not as panels overlaying each other.

A usability problem encountered in the evaluations of the second iteration of Talhonia (with the group of eight year olds) was that adding and editing text in the application opened a new window in which text could be added or changed. By opening this window the original text became hidden and a user doesn't have the visible reference and content anymore that he or she was working on. This was experienced as somewhat confusing. Sticking to standard means of interaction seems most appropriate here as well (e.g. editing the text one was working on directly as in for example MSWord).

- **Design recommendation 3 (DR3), apply standard interaction means where possible.** By applying standard and proven means of interaction (clicking to active something, avoiding opening to many windows or panels, keeping the reference or context information on which someone is working visible) intuitive understanding of the interaction is enhanced and usability problems are decreased.

In the second iteration evaluations we have observed a need for meta-communication and interaction means. During evaluations it was for example observed that children had the need to communicate about the process of co-writing as well. They needed for example a name for the monster they were writing about and therefore physically looked for each other to talk and agree on a name.

- **Design recommendation 4 (DR4), provide means for meta-communication.** By providing communication means that enhance the co-creative process, co-creation itself is stimulated. These means should be provided in a more indirect way (e.g. can

be activated when needed), since they are secondary to the main activity, namely co-creation/co-writing.

The need for meta-interaction means was observed in the fact that a search and retrieval system was desired that could provide easy access to different stories or earlier version of a story (during the first iteration and evaluation). In the second iteration of Talhonia this issue was solved by adding more elaborate search and ordering possibilities by for example tagging.

- **Design recommendation 5 (DR5), provide good storage, search and retrieval mechanisms.** Good storage, search and retrieval mechanisms are very important in UGC applications. Especially when the amount of content is growing these functions become increasingly important. Tagging is one of the solutions that can be used to retrieve content and enhance searches. Other means are already addressed in the different other UGC platform described in this chapter. Here also the structure, searching and managing content was a topic of interest.

A lost observation addresses the feedback means provided in the earlier version of Talhonia. It was for example unclear if content was saved after saving (no acknowledgment or message that the content had been saved) and some feedback was too difficult for users to understand. Especially for example during the picture uploading a technically described error would occur that is for the user difficult to understand and does not make it clear to the user what he/she can do about the error.

- **Design recommendation 6 (DR6), Provide consistent, clear and concise feedback and error messages.** Provide feedback wherever the user can take an action of which the results normally would not be directly visible (e.g. saving files vs. typing text, with saving files a user needs an acknowledgement that the file has been saved). Give feedback and error message in the language of the user; refer to his or her mental model. Technical language will not be understood. Explain to the user what he or she can do to prevent error messages in the future.

In general the Talhonia application was experienced quite positive, as fun and enjoyable to use in the second evaluations. Fun and enjoyment seemed largely related to the surprises that were experienced in 'writing together' without seeing each other. Sometimes a child would wait and see what the other was typing and this could be very surprising, giving a different angle to the story than the one would expect, thus stimulating children to change their own story ideas or angle as well. On the other hand co-writing provided a sense of accomplishment and especially the collaboration with others was enjoyed as was found in responses such as "this is better than writing a story alone".

5.1.3 Recommendations for meaning

What the true meaning of this application such as Talhonia would be in practice is not completely tested during the evaluations due to time constraints. For meaning to be evaluated thoroughly users should use an application over a longer period of time. We did however observe that eight year olds very much liked the application in terms of self expression. Furthermore we hypothesize that collaboratively writing stories will enhance the social relations between children within the class. However, these preliminary results should be tested in further evaluations.

5.2 Summary of conclusions

Next to some observed usability problems, which were already partially solved in the second iteration, especially the eight year old target group had fun and enjoyed themselves with Talhonia. For the meaning in terms of sociability, co-experience, trust and the value the field trial should be prolonged to give a better understanding of these aspects. These aspects need time to develop and Talhonia evaluations were in that respect to restricted in time. The

main conclusions of the evaluations performed in Talhonia seem to focus on the goal of the application, how this is communicated to its users and how familiarity is addressed through interests and personal goals. To create an application that people are willing to use, clear value should be delivered by referring to the personal goals and interests and by applying the application in a context that supports this value. This was done in the second iteration by presenting the application as part of a learning environment very well.

6 DESIGN RECOMMENDATIONS FOR UGC PLATFORMS

This chapter summarizes the design recommendations for UGC applications. Similar recommendations for different testbeds have been combined to get a clean and usable list. At the same time the specific recommendations for a specific application have rephrased to serve as more general recommendations for UGC applications. Rephrasing has been done based on the expertise of the authors and is not the result of research. It is good to see that the more general formulated recommendations have some resemblance to the patterns that are the result of D 5.4.1. This indicates that the methods used can possibly be combined in one theory / method or framework with a bigger scope.

6.1 Aesthetic design recommendations for UGC applications

Design recommendations related to addressing a user's familiarity with UGC applications and concepts (FAC_DR's, Familiarity with Applications and Concepts Design Recommendations):

- **FAC_DR1: Address a user's familiarity with the UGC concepts to stimulate initial acceptance and adoption of the application.** Through iterative design cycles new technology should be introduced gradually, giving users the time to get acquainted with the UGC application and the specific functionality provided within the application. Addressing what the user is familiar with (user's knowledge, skills, and mental models) is important at the time of introduction. Later on the user's perception and views can slowly be changed by introducing for example additional functionality with which user will not be as familiar.
- **FAC_DR2: Address familiarity with relations a user has with other users to stimulate initial interaction.** Within relationships different users related to each other can have different goals. By addressing these differences in goals in design correctly one can stimulate specific behaviours that belong to a specific relationship (e.g. communication and specific activities important to the relationship).
- **FAC_DR2: Organize supporting activities that enhance becoming familiar with the application.** Organize additional activities surrounding the UGC application to support users becoming familiar with the application (e.g. live events on which people can ask questions and find support, user support through a helpdesk, competitions to stimulate skill development and online tutorials that give an initial introduction into the workings of the system). These kinds of organized support will further enhance a feeling of becoming familiar with the application by developing skills, knowledge and a correct mental model.
- **FAC_DR3: State the goal of the UGC clearly.** From the beginning, the launch of the UGC application, state the goal clearly to steer initial usage, address a user's familiarity with different concepts presented in the goal and do not be too ambitious. Change or reformulate the goal regularly when the UGC application/community changes over time according to user preferences, desires, needs and additional functionality provided. By continuously addressing a user's personal goals and clearly stating these one will give the user the chance to define the added value more easily.

Design recommendations related to addressing a user's familiarity with interface elements (FIE_DR's, Familiarity with Interface Elements Design Recommendations):

- **FIE_DR1: Use labels that refer to a user's mental model for interaction elements to enhance the user's understanding of the interaction possibilities.** An interface will become more understandable if the vocabulary of the user is used. A user has a better idea about what to expect from for example links and buttons that are clearly

named in terms of what the users knows and expects (e.g. always use “Home” for links or buttons directing users to the home page of a site).

- ***FIE_DR2: Provide automatic recognition of interface elements by applying standards in interface design.*** Some interface elements have a standard look and feel and place in the interface. This standard look and feel and place can for example be found in search functions. These are often placed somewhere at the top or the right side of the page and always visible. Furthermore search functions often have pictograms such as a looking glass to indicate their function. Another example is the standard icon for RSS feed functionality, often place on the right side of the page or below the page. Or the colour changes for hyperlinks within pages. When applying these types of standards a user can more easily find these functionalities due to past experiences and can more easily navigate the interface.

Design recommendations related to the visual design of the interface (V_DR's, Visual Design Recommendations):

- ***V_DR1: Create one look and feel for different modules and applications of which the UGC application consists.*** Give different modules used in the UGC application (even when they are external modules provided by other parties) the same look and feel by integrating the different modules in one visual design. This one design will make it easier for the user to understand the application and its workings by making it easier to form a mental model of all the parts of which the application consists.
- ***V_DR2: Create an interface that will be automatically and intuitively understood.*** Use Gestalt principles to structure the interface into different parts that are clearly distinguishable and give content and interaction elements each their own specific design that is reused consistently throughout the application. Use colour theory to create an attractive interface and support the interface structure based on Gestalt principles even further.
- ***V_DR3: Use metaphors to influence user behaviour.*** Using metaphors not only enables you to address a user's familiarity with certain concepts and visual elements but can also influence the user's behaviour. Think about applying metaphors to influence the perception of interface elements and the user's behaviour (e.g. presenting a podium or television screen invites people to watch, thus stimulating this type of behaviour/interaction).

6.2 Pragmatic design recommendations for UGC applications

Design recommendations related to the needs and goals of users (NG_DR's, Needs and Goals Design Recommendations):

- ***NG_DR1: Observe changing user needs and goals and act accordingly.*** User goals and needs in UGC applications change over the course of time. It is important to observe these changes and provide changed or additional functionality accordingly.
- ***NG_DR2: The promise of self expression increases contributions and involvement.*** Possibilities for self expression are liked by some users and can be very rewarding for these users (e.g. sharing one's thoughts, opinions, moments that are important for one self, skills, etc). By addressing this promise in the goal statement of the UGC application and providing the right and easy to use tools UGC contributions and the user's involvement will be increased.

Design recommendations related to the usability of the UGC application (U_DR's, Usability Design Recommendations):

- ***U_DR1: Provide easy access to the UGC application and its different modules:*** Especially when the UGC application consists of different modules it is important to provide easy access to these different modules by giving the user the opportunity to use one username and password for all these modules. Furthermore user names and passwords should be chosen by the user and provide possibilities for changing them and content updated in one module should automatically be updated in the other modules as well.
- ***U_DR2): Provide easy access to the UGC application functionality.*** To provide a well structured and easy to use interaction the interaction functionality should be readily accessible for users. The 20 – 80 percent rule states that content and functionality that is often used (about 20 percent of the application) should be offered at the top level of the application (access level or menu). Other functionality and content can be presented or accessed via sub-menus. Especially for devices with a limited screen size and resolution this rule should be applied.
- ***U_DR3: Correctly and intuitively map input devices and interaction elements.*** Make mappings between interaction elements such as scrollbars and input devices such as soft keys (e.g. a remote control) visible on the screen and relate these interaction elements/functions directly to the content on which they apply. A user can for example select content on the screen and the actions applicable to that content can pop up or become visible. Use this kind of mapping consistently throughout the design.
- ***U_DR4: Provide usable and efficient tooling.*** Some UGC tools are hard to use (e.g. video and picture editing tools). By providing good (partially automated) tools with which a user can easily create and edit (high) quality videos and pictures one will enhance UGC contributions. The cost-benefit relations in terms of time spend and the result obtained is a very important one in relation to UGC. One could also help a user by teaching him/her how to create content through the organization of live events, tutorials, and manuals and by providing a helpdesk or additional functionality through which they could ask other users for help.
- ***U_DR5): Apply filter mechanisms to make content easily available.*** General filter mechanisms and filter mechanisms based on users' interests should enable users to: gain a comprehensive overview of "what is there" (e.g. categories, topics, self created groups of content, etc.) and to personalize the feed of (new) content tuned to one's own interests (rating systems that compare rating of one user with others, personal profiles indicating interests that can be mapped on pre-set categories of pictures/videos (e.g. based on genre), etc). Filter mechanisms will enhance the perceived ease of use and usability when applied in systems where content is continuously added.
- ***U_DR6: Provide good feedback messages and limit perceived response times.*** Good error message explain to the user what went wrong and what the user can do to solve the problem. Good feedback indicating the exact status, progress and remaining time is furthermore given when a system will take a long time to perform an action (when response times are > 10 sec). When response times or actions take a lot of time one could consider to give the user the opportunity to continue with other activities until the activity initially chosen has finished and can be performed or ended (e.g. a user should be able to browse through more video files, while the one clicked is loaded in the background until it is ready). Last, users should always have the possibility to undo their last action (multiple times) whenever desired.
- ***U_DR7: Managing increasing amounts of content.*** The content in UGC applications grows over time. Management means that automatically provide structure and make exploring the ever growing amount of content possible for the users will become a necessity. There are two different kinds of means to manage the

growing amounts of content: Means that let users 'order' the information for you and which you can use to manage, structure and provide the content (e.g. rating systems that represent specific interests (e.g. popularity), tagging to add meta information to specific content, Folksonomy concepts to provide structure in new and existing content according to a users' mental models, recommendation systems based on for example rating systems). And automated means such as media mining principles.

- **U_DR7: Apply standard interaction designs were possible.** By applying standard and proven interaction means (e.g. click to active windows, keep the reference or context information on which someone is working visible, etc.) intuitive understanding of the interaction and task performance are enhanced.

Design recommendations for increasing UGC and user involvement (UI_DR's, User Involvement Design Recommendations):

- **UI_DR1: Provide regular new content to keep users involved.** Every UGC application/community needs a critical mass so the number of users actually creating content is large enough. Users need to find new content on a regular base to stay interested in the UGC application and to keep coming back.
- **UI_DR2: Make content creation rewarding by addressing a user's motivation.** As addressed in NG_DR2, the promise of self expression, content creation itself can be rewarding. By addressing additional intrinsic and extrinsic motivations, creating UGC can become even more rewarding. Intrinsic means are introducing cooperation (shared goal or challenge) and co-creation ('making' something together with others). Via challenges that one has to do together with others, possibilities to reflect on the content (discuss the content) with others, etc. individual contributions are acknowledged in this way and the interaction itself is enjoyed. Cooperation and co-creation are therefore often enjoyed because of the social interaction. Furthermore one can extrinsically motivate users to create UGC by introducing challenges, competitions and rating systems in which someone competes with others. By addressing both motivations more UGC will be produced and the user involvement will increase.
- **UI_DR3: Stimulate new users to participate in the UGC application/community.** Promotional activities (e.g. interviews of users on radio shows) stimulate potential users to visit the UGC application tremendously. Promotional activities should be organized regularly to keep new, potential users coming.
- **UI_DR4: Stimulate users to participate in physical communities embedded UGC applications.** An UGC application that is embedded in a physical community can be viewed as an enhancement of the real world interaction. Users therefore often expect that important topics discussed in the UGC application will have an effect on the real world community in which it is embedded. In this sense the relation between the real world and the UGC application should be reciprocal and when it is, it will enhance user participation within the UGC application.

Design recommendations for increasing the experience of fun and enjoyment (FE_DR's, Fun and Enjoyment Design Recommendations):

- **FE_DR1: Designing fun and enjoyment.** One can enhance the experienced fun and enjoyment in UGC application through different means: by providing a UGC application that is embedded in an existing physical community (e.g. fun and enjoyment through local news, viewing and reacting to content of people one knows or shares interests with); by providing synchronous (social and awareness) communication means (playing a game with or against each other).

6.3 Design recommendations for meaning in UGC applications

Design recommendations for increasing co-creation (CC_DR's, Co-Creation Design Recommendations):

- **CC_DR1: To provide co-creation a (social) network or relations among users should be created first.** To stimulate co-creation first a social network or social relations between participants should be in place. Means that make the social network or relations more explicit can further enhance communication and co-creation when the network or relations made explicit are used to initiate communication (means) (e.g. activate communication means or visiting content of others through a list of one's own contacts).
- **CC_DR2: Provide meta-communication means to enhance co-creation by making it easier through communication.** Communication means enabling users to communicate about the co-creation process enhances co-creation itself. These communication means are often secondary to the main activity or interaction and should therefore be easily activated when needed. The meta-communication itself however does not have to be continuously present within the interface, but made easily available.
- **CC_DR3: Create social communication, co-creation and sharing content through trust and intimacy.** A certain level of trust and intimacy can be a necessity for (social) interaction between users of a UGC application. Trust and intimacy are increased by empowering the users and giving them some control over what is being shared and with whom and in what way. This applies to the content made available by users as well as to the social communication in which the user takes part. Control over one's own content and influence on the communication (about one's content) provides the means to create trust and support intimacy which are necessary preconditions for co-creation, social communication and sharing content that is most interesting to oneself and others. Trust can furthermore be enhanced by clearly stating behavioural rules in a vision statement (goal description) together with what happens if someone does not apply to these rules.

Design recommendations that increase the social meaning in the physical world or real life (MPW_DR's, Meaning in the Physical World Design Recommendations):

- **MPW_DR1: Embed UGC applications in real life (communities).** By embedding UGC applications in real life communities the UGC application can be viewed as an enhancement to this real life community and can stimulate a sense of community and group cohesion within the UGC application as well as within the real life community. Organized live events and competitions can further enhance this real and virtual sense of community. Especially when combined with social communication and awareness means within the UGC, through which the interaction in real life can be supported by the virtual interaction and the other way around.

Design recommendations that create personal meaning (PM_DR's, Personal Meaning Design Recommendations):

- **PM_DR1: Providing means for self expression and the recognition of this expression by others contribute to the personal meaning a UGC application has for the user.** Some people like to express themselves, show what they think, who they are, what is important to them, etc. These kinds of self expressions are really observed as being rewarding when the self expression is recognized and appreciated by other users. Communication means such as discussion means and different kinds of rating systems are therefore important.

7 OVERALL CONCLUSION

Aesthetics play an important role in determining a user's initial adoption, acceptance and observed meaning of a service and pragmatic aspects such as the usability and ease of use

Aesthetics for a large part determine the user's initial adoption, acceptance and observed meaning of a service (e.g. perceived usefulness/value) and influence pragmatic aspects such as the usability (e.g. perceived ease of use). Within aesthetics we can therefore differentiate between at least two types of aesthetics. The first addresses the familiarity with the concept the application presents, the second addressed the familiarity with the application design/interface itself.

The user's initial adoption and acceptance is influenced by the means used in the application to address a user's familiarity with the concept the application presents. When the familiarity is addressed correctly, the application's intended goal is immediately and intuitively understood by the user and can easily be placed in the context of everyday life thus influencing the initially observed meaning (e.g. the IPTV platform in Engerwitzdorf in which people observed the value of the platform as an extension of their own place in the Engerwitzdorf community and the real life community itself at large). When familiarity on this level is not addressed correctly users will have a hard time observing the value and worth of the application and its place, use and possible impact on their everyday life, leading to lower levels of initial adoption, acceptance and observed meaning (e.g. as the cyclists experienced with the first version of Talhonia). It is therefore very important to find the right initial mix of addressing familiarity and developing real innovation in UGC applications and maintain this right mix throughout UGC applications during their course of life.

The second type of aesthetics addresses the familiarity with the application design/interface itself. Every user has a mental model of ICT products, applications and services that determine their expectations of provided functionality and how these different functionalities are organized in the interface. Design elements such as the structure (Gestalt principles) combined with the use of colours, their contrast and saturation (colour theory), etc. determine how different interface elements and functionalities are automatically and intuitively perceived and interpreted thus enhancing the initially perceived ease of use and observed usability of the interface.

In designing the aesthetics of UGC applications a user's predispositions and the context in which the application will be used are important aspects. A user's predispositions state what a user is familiar with, his or her (earlier) experience with UGC or related applications, what mental model a user has of ICT in general and UGC applications specifically and what a user usually does with ICT and UGC (which goals are related to ICT). The aesthetics of an application should mirror these attitudes, experiences, derived motivation, and current knowledge of ICT to address familiarity correctly. The context mirrors where and what for an application is used in everyday life. The IPTV platform (TV part) is used (often) in the living room in which other people might be present as well. Kabadada/Kabadu is used on a personal computer, which is often used by one individual. The Talhonia application is used in a classroom setting. The context ultimately determines what goals are suitable to address given in that specific context (e.g. watching and enjoying videos and pictures together, promoting oneself on a website or learning to write stories together with others during class).

Pragmatics effect personal and social meaning and are the result of a balance between the usability and experiences such as fun and enjoyment during interaction

Usability is an enabler for pragmatic experiences such as perceived ease of use, fun and enjoyment and indirectly feelings of engagement and involvement expressed in participation in the UGC community. In other words, good usability enables users to have pragmatic experiences such as fun and enjoyment more easily because it automatically leads to a higher level of perceived ease of use. Fun, enjoyment and the perceived ease of use will stimulate a user's involvement and engagement in using the UGC application.

Still, current usability research, evaluations and guidelines/heuristics are often tuned to classifying how difficult or easy it is for the user to execute a certain (predefined) task and what problems are encountered during task execution. Usability in this sense is related to fulfilling a user's expectations to perform a certain task. This focus in itself does not very actively contribute to experiences such as fun and enjoyment; it does not create these experiences by itself.

Fun and enjoyment are said to be related to aspects such as challenge and surprise (Salen and Zimmerman 2003). Challenge provides the promise of being able to reach a goal, but the outcome during interaction is still uncertain. Challenge is a trade-off of the level of experienced complexity and the control a user has to handle this complexity (his or her skills). When the balance between complexity and control (skills) is optimal a user reaches the highest level of engagement (a state of flow). Part of the skills to handle challenge is related to a user's predispositions (previous experiences, knowledge and mental models, what the user brings to the product interaction). It therefore is important to address a user's current level of skills and knowledge correctly. Another part of challenge and engagement lies in the interaction itself and has a behavioural as well as an appearance component. The behavioural component or behavioural richness is related to the expressiveness of the product or the levels of physical involvement in interaction. It includes the number of possibilities for interaction, the degree of freedom in interaction and variations in interaction possibilities (surprise can be included here by providing suitable obstacles or intermezzos during interaction). Appearance aspects are related to aesthetics such as colour usage, levels of graphical detail, (a)symmetry and form diversity.

Positive surprise is experienced when an event occurs that was not predicted or expected and that creates positive feelings and appreciation (sometimes exceeding one's expectations). In different UGC applications we have observed the effect of challenge and surprise on the fun and enjoyment. In the IPTV platform for example people (especially elderly) experienced fun and enjoyment because of the challenge which stimulated learning new skills. In Kabadada/Kabadu people liked watching videos because users are challenged and surprised by the performance given, they reflect on it during the performance, interpret it and therefore enjoy the performance itself. In the Talhonia application children experienced fun and enjoyment partially due to the surprise of what the other co-writer would write and the challenge was to incorporate one's own ideas so they would fit the story when it further developed.

Still we seem to be missing one additional third component, not explicitly addressed in interaction design literature or research. Fun and enjoyment during interaction with an application also has a relation with the context in which the applications is used, the user's everyday life. These aspects include for example sharing stories, pictures and videos to express yourself or inform dear ones or friend and acquaintances about important events taking place in your life. The interaction can stimulate and support people in doing so and the fun and enjoyment experienced during content creation will be connected to thoughts such as thinking of how someone else would like your contribution (IPTV), what people will think of your performance (Kabadada/Kabadu), how best to create your story line in videos to present it to the outside world, etc. These kinds of pragmatic aspects are directly related to creating a sense of personal and social meaning that goes beyond the interaction. Tools that

support these kinds of pragmatic experiences are meta-interaction and meta-communication tools. Meta-interaction tools help the user with or advise the user in creating that what is important for him or her. For example, creating a video of your children for your grandparents and time-consuming tasks are performed by the system such as selecting only fragments of video in which your children appear. Meta-communication tools help to create content by discussing it and talking about it with others (e.g. such a need appeared to exist in the Talhonia application where children wanted to 'talk' about how for example to name the monster that appeared in the story).

Meaning consists of two components, the personal and the social meaning of the application in the context of everyday life. Meaning thus mirrors how a user's higher order goals are addressed. Aesthetics and pragmatics influence and support these higher order goals during interaction with an UGC application

The meaning an application has in a user's everyday life is an interesting object of study but currently not addressed very elaborately in research and literature. In the evaluations of the CITIZEN MEDIA testbeds we have observed that the applications deliver personal meaning as well as social meaning.

Personal meaning is delivered by giving users the possibilities to express (promote) themselves (e.g. IPTV, Kabadada/Kabadu), experience a good time and thus relax during daily life (e.g. IPTV and Kabadada/Kabadu video watching), stay informed (about local news and events, e.g. IPTV, Kabadada/Kabadu, Unort Kataster) and self development and realization (e.g. learning new skills such as Internet skills for elderly in the IPTV platform they can use during daily life, cabaret skills in Kabadu by taking the advice and ideas of others).

Social meaning in the context of everyday life is delivered by the UGC platform having a reciprocal relationship with the community in which it is embedded. The UGC platform opens up a new window through which one can obtain and act on insights in a physical community that was beforehand not possible in the same way. The reciprocity of the relation between the online and the physical community seems to be a key element in the success of the online community. People expect, when they are participating, that their contributions have an effect on the physical community (e.g. Unort Kataster in which contributions are expected to have an influence on how the problems around Unorts in Cologne will be tackled). Through participation people meet new people based on for example interests. People stay informed about what is happening within a community (e.g. IPTV, Unort Kataster, Kabadada/Kabadu) and can act based on this knowledge. All these activities can create a sense of sociability (being more connected to a community, group of persons, other users) and feelings of trust emerge through regular contact and a relationship that is growing and this is what provides social value in real life. This is expressed by the enthusiastic attendance of real life events in for example the Engerwitzdorf (IPTV) platform.

Two types of design aspects seem of influence: how personal and social higher order goals are addressed within the application (what do you deliver to realize these kinds of goals) and how personal and higher order goals supported by the application are also implemented in real life (e.g. embeddings of communities).

UX and UA factors can be described in the "Design – experience – value" framework in a coherent manner, to interpret the evaluation results from different studies and translate these into design recommendations

The "Design – experience – value" framework provides a reference window that helps translating evaluation results into design recommendations, thus relating specific design elements to specific experiences. Furthermore some relations were found between different UX and UA aspects as addressed above. However, the exact relationships among UX and UA aspects, their causality, and their influence on value are difficult to formulate based on

qualitative research and the current state of the art in UX and UA. Insight in relations among the above mentioned aspects needs to be obtained and empirically proven in future research.

Classical aesthetics partially relate to usability but the influence of expressive aesthetics on other pragmatic aspects such as fun and enjoyment largely remains unknown

Through we have found a relation between aesthetics and usability (expressed in what a person is familiar with, the perception of this familiarity within the application, and how this perception is related to the perceived ease of use, usefulness, etc.) it is still unclear if aesthetic aspects also influence UX aspects such as fun, enjoyment, engagement and involvement. As described by (Lavie and Tractinsky 2003), classical aesthetics such as form, structure, perceived clearness of the interface and the like, often relate to usability issues. Still, the influence of expressive aesthetics such as beauty, and the emotions triggered by colour usage, etc. could very well influence fun, enjoyment and engagement however this has not been obtained as an insight from the current CITIZEN MEDIA evaluations. In future research these issues should be addressed.

REFERENCES

Arnold, M. B. (1960). *Emotion and Personality*, Columbia University Press.

Crawford, C. (1982). *The Art of Computer Game Design*.

Csikszentmihalyi, M. and E. Halton (1981). *The Meaning of Things: Domestic Symbols and the Self*. Cambridge, Cambridge University Press.

Desmet, P. and P. Hekkert (2007). "Framework of Product Experience." *International Journal of Design* 1(1): 10.

Federoff, M. (2002). *Heuristics and usability guidelines for the creation and evaluation of fun in video games*. Department of Telecommunications of Indiana University. Indiana, Indiana University. Master of Science.

Figallo, C. (1998). *Hosting Web Communities: Building Relationships, Increasing Customer Loyalty, and Maintaining A Competitive Edge*, John Wiley & Sons.

Forceville, C., P. Hekkert, et al. (2005). The adaptive value of metaphors. *Anthropology and social history: Heuristics in the study of literature*. U. Klein, K. Mellman and S. Metzger.

Frijda, N. H. (1986). *The emotions*. Cambridge, Cambridge University Press.

Hekkert, P. (2006). *Design Aesthetics: Principles of Pleasure in Product Design*. Delft, Delft University of Technology, Department of Industrial Design: 14.

Kort, J., A. P. O. S. Vermeeren, et al. (2007). *Conceptualizing and Measuring UX. Towards a UX Manifesto*, COST294-MAUSE affiliated workshop. E. Law, A. P. O. S. Vermeeren, M. Hassenzahl and M. Blythe. Lancaster, COST294-MAUSE: 83.

Lai-Chong Law, E., E. T. Hvannberg, et al. (2006). *User eXperience, Towards a unified view*. The 2nd COST294-MAUSE International Open Workshop, Oslo, Norway, COST294-MAUSE.

Lavie, T. and N. Tractinsky (2003). "Assessing dimensions of perceived visual aesthetics of web sites." *Int. J. Human-Computer Studies*(60): 269-298.

Law, E., V. Roto, et al. (2009). *Understanding, Scoping and Defining User eXperience: A Survey Approach*. CHI2009, Boston, USA, ACM.

Law, E., V. Roto, et al. (2008). Towards a Shared Definition of User Experience. CHI 2008. Florence, Italy.

Law, E., A. Vermeeren, et al. (2007). Towards a UX manifesto. COST294-MAUSE affiliated workshop, Lancaster, UK, COST294-MAUSE.

Leder, H., B. Belke, et al. (2004). "A model of aesthetic appreciation and aesthetic judgements." *British Journal of Psychology*(95): 489-508.

Loewy, R. (1951). *Never Leave Well Enough Alone*. New York, Simon and Schuster.

Lombard, M., T. B. Ditton, et al. (2000). Measuring presence: A literature-based approach to the development of a standardized paper-and-pencil instrument. Third International Workshop on Presence. Delft, the Netherlands.

McCarthy, J. and P. Wright (2007). *Technology as Experience*. Cambridge, Mass., The MIT Press.

Myers, D. (1990). "A Q-Study of Game Player Aesthetics." *Simulation & Gaming* 21(4): 375-396.

Nielsen, J. (1994). *Usability Engineering*. San Francisco, Morgan Kaufmann.

Norman, D. A. (1988). *The Psychology of Everyday Things*. New York, Basic Books.

Norman, D. A. (2004). *Emotional Design, Why we love (or hate) everyday things*. New York, Basic Books.

Ortony, A., G. L. Clore, et al. (1988). *The Cognitive Structure of Emotions*. Cambridge, Cambridge University Press.

Pals, N., M. G. D. Steen, et al. (2008). "Three approaches to take the user perspective into account during new product design." *International Journal of Innovation Management* In press.

Pinelle, D., N. Wong, et al. (2008). Heuristic Evaluation for Games: Usability Principles for Video Game Design. CHI2008. Florence, Italy, ACM.

Preece, J. (2000). *Online Communities: Designing Usability and Supporting Sociability*, Wiley.

Ramachandran, V. S. and W. Hirstein (1999). "The science of art: A neurological theory of aesthetic experience." *Journal of Consciousness Studies*(6): 15-51.

Romero, N., P. Markopoulos, et al. (2007). Connecting the family with awareness systems. *Pers. Ubiquit. Comp.* 11: 299-312.

Salen, K. and E. Zimmerman (2003). *Rules of Play, Game Design Fundamentals*, The MIT Press.

Tractinsky, N. (2007). Aesthetics and Apparent Usability: Empirically Assessing Cultural and Methodological Issues. CHI '97. Atlantis GA, USA, ACM.

Tractinsky, N., A. S. Katz, et al. (2000). "What is beautiful is usable." *Interacting with computers*(13): 127 - 145.

Tractinsky, N. and T. Lavie (2002). Aesthetic and usability considerations in user's choice of personal media players. *British HCI Conference*. London, UK: 70-73.

Vermeeren, A. P. O. S. and J. Kort (2006). Developing a testbed for automated user experience measurement of context aware mobile applications. *User eXperience, Towards a unified view*. E. Law, E. T. Hvannberg and M. Hassenzahl. Oslo, COST294-MAUSE: 161.

Vermeeren, A. P. O. S., J. Kort, et al. (2008). "Comparing UX measurements, a case study."

Visocky O'Grady, J. and K. Visocky O'Grady (2009). *A Designer's Research Manual: Success in design by knowing your clients and what they really need*. Massachusetts, USA, Rockport Publishers, Inc. .

Whitfield, T. W. A. and P. E. Slatter (1979). "The effects of categorization and prototypicality on aesthetic choice in a furniture selection task." *British Journal of Psychology*(70): 65-75.