AMBIENT ASSISTED LIVING, AAL

JOINT PROGRAMME

ICT-BASED SOLUTIONS FOR ADVANCEMENT OF OLDER PERSONS' INDEPENDENCE AND PARTICIPATION IN THE "SELF-SERVE SOCIETY"

D2.1

User Study Framework

Project acronym:	**GeTVivid**
Project full title:	**GeTVivid - Let's do things together**
Contract no.:	**AAL-2012-5-200**
Author:	**PLUS**
Dissemination:	**Public**

TABLE OF CONTENTS

TERMINOLOGY & ABBREVIATIONS

E.g. ..... Example given

HbbTV ..... Hybrid Broadcast Broadband TV

ViA ..... Values in Action

1. EXECUTIVE SUMMARY

1.1 Link with the objectives of the project

In the GeTVivid project a user-centred design approach is applied that is combined with the Values in Action (ViA) approach. The project follows the procedure described in Figure 1. Task 2.1 aims at developing a comprehensive user requirements investigation plan by M3 and a user evaluation framework for the iterative evaluations and the pilot studies by M18, which are described in this deliverable.

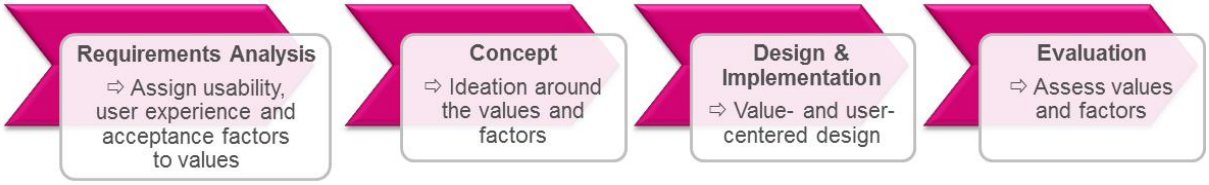

Figure 1: Values in Action (ViA) Approach

Users' needs, concerns, wishes, and preferences will be assessed in the requirements analysis phase, which can also be expressed as values. On basis of the Values in Action approach (ViA) [Fuchsberger et al., 2012], we identify values, which are connected to usability, user experience, and user acceptance aspects of the platform. These values are an integral input for the concept, design & implementation phase, and also serve as a basis for the evaluation phase, supporting our claim of focusing on the users throughout the project.

1.2 State of the art

In the following user-centred design, values and Values in Action approach are described.

1.2.1 User-centred design

The user-centred design [Norman and Draper, 1986] is a multidisciplinary design approach and philosophy, which describes a prototype-driven software development process, where the user is integrated during the design and development process. User-centered design is based on the active involvement of users and refers mainly to the usefulness and usability of a product [Mao et al., 2001]. It enables emergent interaction between designers & developers and users, and finally enhances users' acceptance.

The approach consists of several stages, which are iteratively executed: Requirements analysis, design/ implementation, and evaluation. It is a multi-stage problem solving process that not only requires designers to analyse and foresee how users are likely to use a product, but also to test the validity of their assumptions with regard to user behaviour in real world tests with actual users.

1.2.2 Values

Values are "*desirable transsituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity*" [Schwartz, 1994, p.21]. Values define what a user considers important in life [Friedman et al., 2008]. Values are centred in people and refer to the properties or features of the desired objects (e.g., technologies) [Fuchsberger et al., 2012]. Therefore, users seek to achieve their values and the object needs to deliver them ([Cockton, 2009] or [Shillito and De Marle, 1992]).

1.2.3 Values in Action (ViA)

The Values in Action (ViA) approach aims to support value- and user-centred design in AAL projects. ViA is based on the consideration that values can include both the user's perspective (e.g., emotions or experiences), as well as technological aspects, which are important for AAL projects. It assigns needs from the requirements analysis to different factors related to usability, user experience, and user acceptance and the six different values (i.e., functional, social, emotional, epistemic, interpersonal, and conditional).

Fuchsberger et al. [2012] developed the ViA approach in order to find a suitable evaluation approach that combines usability, user experience and user acceptance and assesses users' requirements and needs. ViA is based on the consideration that values can include the user's perspective (e.g., emotions or experiences) as well as technological aspects (e.g., accessibility or adaptivity), which are important for AAL projects. ViA can also provide a valuable input for the business perspective in terms of helping to define the value proposition [Moser et al., 2014].

2. USER REQUIREMENTS ANALYSIS

For the requirements analysis in a first step the research goal and question are defined. In the second step suitable approaches are selected and mapped with research questions in the last step.

2.1 Research Goal and Questions

We wanted to gain a deeper basic understanding of how our target group organizes their activities of daily living

2.1.1 Goals

The following goals have been identified for the requirements analysis based on the project objectives:

- Identification of activities of daily living (ADLs) for which the target group would need support
- Explore the role of the TV, mobile devices in the target group's life
- Investigation the role of communication to organize support with respect to ADLs and identify "key persons"
- Identification of important information (content) and how it needs to be visualized
- Investigate what a user needs to feel part of a community

2.1.2 Research Questions

Organization of activities of daily living

RQ1 How does the target group organize their activities of daily living?

RQ2 How do social roles affect the way people organize their activities of daily living?

RQ3 How does the target group "use" their social capital to organize activities of daily living?

RQ4: What does the target group need to feel part of a community?

Qualities of information

RQ5: What information (content) needs to be provided to support ADLs and active participation?

RQ6 How does the information on the platform need to be visualized?

2.2 Approaches

In the following the selected approaches for the requirements analysis are briefly described.

2.2.1 Literature Research

A literature review is a description of the literature relevant to a particular field or topic. It gives an overview of the research field of inquiry: what has already been said on the topic, who the key researcher are, what they found out, what questions have been being asked, and what methodologies and methods are appropriate and useful.

2.2.2 Participatory Observation, Interviews and Group discussions

Observations allow the researcher to get insights into processes within an organization, to assess and understand social behaviour and interactions by means of taking notes, or using technical means (e.g., camera, voice recorder). The observations at participants' (residential) homes are organized as a kind of "informal getting together", avoiding that the participants experience a kind of "interviewer situation", but more narrative, talking about his/her experiences regarding ADLs and allowing the observer to get insights into everyday activities.

Whereas observations focus on the assessment of behaviour and social processes, e.g., within an organization, interviews are more actor-centred and focus on assessing a person's opinion about certain topics. Focusing on a more explorative approach, the observer, who is at the residential home, uses guidelines for data assessment, which supports him/her to keep focused during the interviews, but also allows flexibility in order to gain new insights into the topic.

The group discussions are conducted as a kind of "coffee party", thus they have more the character of an informal "getting together" than of a formal discussion. Based on the insights that are gained through the observations and interviews a rough guideline for the discussions is prepared to help the researcher on-site to keep focused on the central topic and to gain deeper insights into the addressed topics.

2.2.3 Survey

Surveys are a method of to gather information mainly quantitative data from individuals. It can be distributed both online and offline to reach a wide audience (representative sample) of participants. A survey consists of a predetermined set of questions. A good sample is the key to allow generalizing the findings from the sample to the population.

2.2.4 Design Workshops

The design workshops are based on the idea of participatory design, the approach of involving users through a design process [Read et al., 2002]. The structure of the workshop allows users to express themselves and provide feedback on design ideas. Small videos, design sketches, etc. can encourage participants to reflect on different topics.

2.3 Mapping Research Questions and Approaches

The following table provides an overview which research questions are addressed in with which approach.

	Literature Research	Participatory Observation, Interviews and Group discussions	Survey	Design Workshops
RQ1 How does the target group organize their activities of daily living?	x	x	x	
RQ2 How do social roles affect the way people organize their activities of daily living?	x	x		
RQ3 How does the target group "use" their social capital to organize activities of daily living?	x	x	x	
RQ4: What does the target group need to feel part of a community?	x	x		
RQ5: What information (content) needs to be provided to support ADLs and active participation?	x		x	x
RQ6 How does the information on the platform need to be visualized?	x			x

Table 1: Requirements Analysis Mapping

2.4 Outcomes

The outcomes of the requirements analysis will be a list of social roles, user requirements and design implications. Afterwards, Personas representing our end user are created to guide the design process. For the creation of the persona, we used a combined approach by integrating both quantitative and qualitative data [Moser et al., 2012].

3. USER EVALUATION

For the intermediate evaluation and pilot study in a first step the research goal and the evaluation procedure are defined. In the next step the values for the Values in Action (ViA) approach are derived from the user requirements. In the last step the research questions are defined for selected approaches.

3.1 Goals

The goal of the evaluation is to provide a system to the older adults, which optimally satisfies their needs and preferences. Thus, the results of the requirements analysis, in which the needs and preferences of the target group were identified, are the basis for the evaluation to define its foci. Therefore, the following evaluation procedure has been defined.

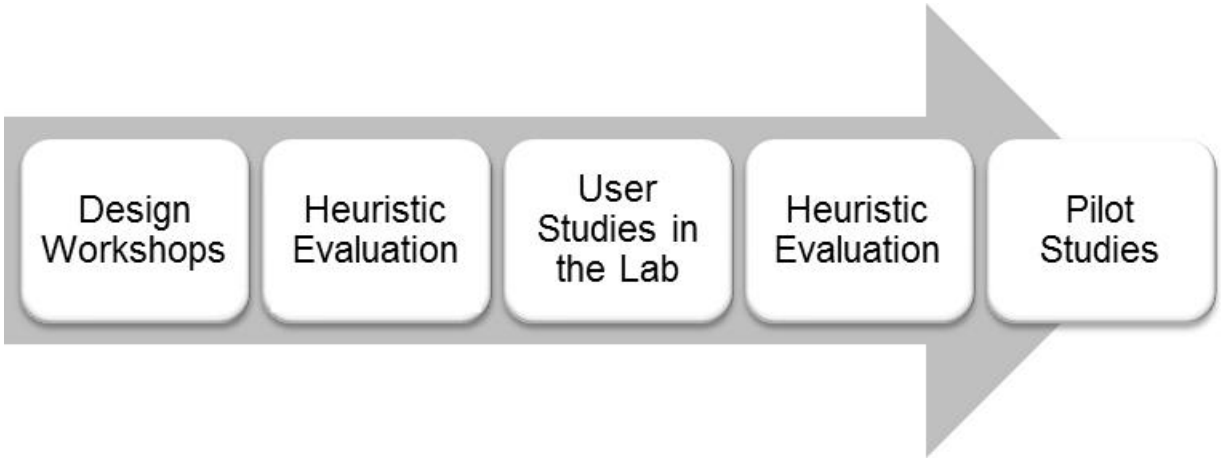

Figure 2: Evaluation Procedure

3.2 Approaches

According to a UCD approach end users are involved in the evaluation phase. The development of the functionalities of the platform is done iteratively, i.e., after an evaluation approach has been conducted, the platform will be improved according to the results and then the next evaluation approach is conducted.

3.2.1 Design Workshops

The design workshops will be based on the idea of participatory design, the approach of involving users through a design process [Read et al., 2002]. The structure of the workshop allows users to express themselves and provide feedback on first design sketches for the GeTVivid platform. Small videos, design sketches, etc. encourage participants to reflect on different functionalities. The aim is to get an embracing picture of

opinions, likes and dislikes in order to improve the ideas and concepts with feedback from the end users in an early stage of the development process.

3.2.2 Heuristic Evaluation

Heuristic expert evaluations will be conducted as a method that investigates the functional value (in particular the usability) of the platform. Based on a list of heuristics, a small group of experts tries to figure out problems users might have when interacting with the platform. First, the identified issues are assigned to the heuristics; afterwards the identified issues are rated according to their severity.

3.2.3 User Studies in the Lab

Formative end user studies will be conducted in Austria, Germany and Switzerland. The platform will be tested by PLUS using a mobile lab at the three EUOs location which are responsible for recruiting the participants. The end user studies aim at evaluating the platform considering usability, user experience and user acceptance. The end user studies will be conducted to evaluate the different functionalities of the platform. A single study will take about 1.5 to 2 hours. Within one user study a moderator, an assistant/wizard and one participant, who is asked to perform defined tasks, will be involved. 10-12 end users per country will evaluate the platform, half of them representing Anna and half Frank (the personas).

3.2.4 Pilot Studies

The pilot study will be conducted after all activities are implemented on the platform, i.e. towards the end of the project. The pilot study will last for about 3 months. 20 end users per country will evaluate the platform, half of them representing Anna and half Frank (the personas)

3.3 Values and Research Questions

In this evaluation framework we consider values as concepts or beliefs, which direct human behaviour to specific action (e.g., to use a technology) and support to judge and justify actions. We see values as centred in people and referring to properties of objects (e.g., a technology) they desire, i.e. users seek to achieve their values, and the object needs to deliver those. Regarding the model used for this evaluation framework (the theory of consumption values) this means that the technology addresses the users' values, which need to be recognized by the individuals and which correspond to the individual's beliefs and concepts. Furthermore, the values within this model address the potentially desired behaviours, goals or needs, which are perceived subjectively and motivate obtaining the technology/system/application.

On basis of the ViA, we identify relevant values at the end of the analysis phase, which are connected to aspects of the technology and are important for the end users in order to actually use the system. For identifying the values and factors we analyse the results for the requirements analysis with the help of an affinity diagram in order to identify factors related to usability, user experience and acceptance and their relevance for the project. Afterwards, the factors are assigned to the six values and the relevance of them can help to prioritize the values. These prioritized values are an integral input for the concept, design, and development, and also serve as a basis for the evaluation [Moser et al., 2014].

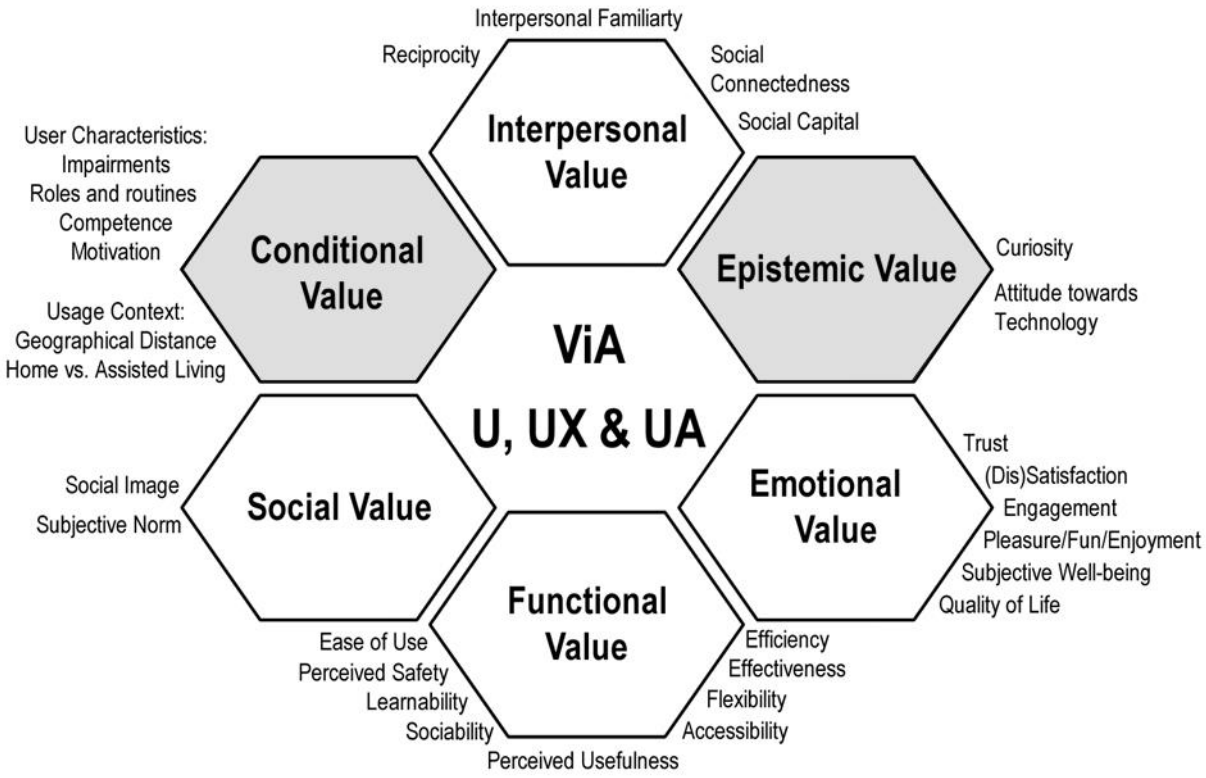

Figure 3: ViA for GeTVivid

According to the results of the requirements analysis all values are important whereby the order is functional, interpersonal, social, and emotional value. The epistemic and conditional are least important and therefore greyed out in Figure 3. In the next sections definition of each factor, the respective research questions and approaches for assessment will be presented. The overview of questionnaire items to be used is provided in Annex A.

3.3.1 Functional value

The functional value is the perceived utility for achieving a specific task or a practical goal.

3.3.1.1 Ease of use / Learnability

Ease of use / Learnability is the extent to which an older adult believes that using the platform would be free of physical and mental effort and easy to learn – addresses the barrier of not using too complex platforms.

Definition

Learnability is about the easiness for users to accomplish basic tasks the first time they encounter the design [Nielsen, 1993] and the ease with which new users can begin effective interaction and achieve maximal

performance [Dix, 2003]. Linja-aho's perspective distinguishes objective and subjective facets: "*Learnability signifies how quickly and comfortably a new user can begin efficient and error-free interaction with the system, particularly when he or she is starting to use the system*" [Linja-aho, 2006, p. 203].

Ease of use describes the extent to which an individual believes that using a particular system would be free of physical and mental effort [Chutter, 2009]. The easier the use of a system, the more likely is an acceptance by the user [Davis, 1989]. As perceived ease of use has an impact on one's intention to use a system it is an important factor within our framework.

RQ How does the platform enable the users to learn how to use it? RQ To which extent do the users believe that using the platform is free of physical and mental effort?	
Heuristic Evaluation	Questionnaire items
User Lab Study	Questionnaire items Interview (experienced ease of use and learnability)
Pilot Study	Questionnaire items

Table 2: Evaluation of ease of use / learnability

3.3.1.2 Perceived usefulness

Perceived usefulness is the extent to which an older adult believes that using the platform would support her/him with activities of daily living – addresses the need for an added value for activities of daily living.

Definition

Perceived usefulness is the extent to which an individual believes that using a particular system would enhance performance [Chutter, 2009]. "*A system high in perceived usefulness … is one for which a user believes in the existence of a positive use-performance relationship*" [Davis, 1989, p. 320].

RQ To which degree do the users believe that the system will meet their expectations? RQ To which extent do the users believe that the platform would facilitate achieving their goals?	
Design Workshops	Discussion
Heuristic Evaluation	Questionnaire items
User Lab Study	Questionnaire items Interview (experienced usefulness)
Pilot Study	Questionnaire items

Table 3: Evaluation of perceived usefulness

3.3.1.3 Perceived safety

Perceived safety describes the older adults' perception of the level of danger when interacting with the platform – addresses the need for accurate information and fraud prevention.

Definition

Perceived safety describes the user's perception of the level of danger when interacting with a system, and the user's level of comfort during the interaction [Bartneck et al., 2009]. Safety is about being protected, while the security is about being free from danger. Being protected leads to a condition of being free from danger or threat, and being free from danger or threat might imply well protection [Albrechtsen, 2003].

RQ To what extent does the platform support security and safety regarding safe use of different functions?	
User Lab Study	Questionnaire items

Table 4: Evaluation of perceived safety

3.3.1.4 Sociability

Sociability is the focus on the interaction between humans supported by technology – addressed the need for communication and collaboration.

Definition

Sociability describes the systems characteristics to support social interaction online [Preece, 2001]. Purpose (i.e., belonging to a community), people (i.e., taking over roles), and policies (i.e., rules guiding the interaction) are three key components that contribute to a good sociability. It is the ability of the system to facilitate the emergence of a social space, which is characterized by affective relationships, strong group cohesiveness, trust, respect and belonging, satisfaction, and a strong sense of community [Kreijns et al., 2007].

RQ *To what extent do users socially interact and maintain social relationships by using the platform?*	
Heuristic Evaluation	Heuristics
Pilot Lab Study	Questionnaire items Number of social interactions (e.g., successful support agreements, exchange of messages)

Table 5: Evaluation of sociability

3.3.1.5 Efficiency

Efficiency is the relation between the accuracy and completeness with which users achieve certain goals – addresses the need that organizing support should not be more complicated than in real world.

Definition

Efficiency is the relation between the accuracy and completeness with which users achieve certain goals and the resources expended in achieving them. Indicators of efficiency include task completion time and learning time [ISO 9241-11 1998]. Efficiency can be measured as the resources expended in relation to the accuracy and completeness with which users achieve goals [Folmer and Bosch, 2004].

RQ How much effort is it for the users to perform a task in relation to the accuracy and completeness?	
Heuristic Evaluation	SUS Questionnaire
User Lab Study	SUS Questionnaire Task completion time

Table 6: Evaluation of efficiency

3.3.1.6 Effectiveness

Effectiveness is the accuracy and completeness with which users achieve certain goals – addresses the need that the platform helps to organize activities of daily living.

Definition

Effectiveness is the accuracy and completeness with which users achieve specified goals [ISO 9241-11 1998]. It is to evaluate if a system as a whole can provide information and functionality effectively to achieve goals [Jeng, 2005].

RQ How accurate and complete can users perform a defined task on the platform?	
Design Workshops	Discussion
Heuristic Evaluation	SUS Questionnaire
User Lab Study	SUS Questionnaire Task completion rate and number and sequence of activities
Pilot Study	SUS Questionnaire

Table 7: Evaluation of effectiveness

3.3.1.7 Flexibility

Flexibility is the extent to which the system is adapting flexibly to user's individual needs – addresses the need of user control and freedom in terms of which device to use for what.

Definition

Flexibility of a system means whether it can be adjusted and incorporated in existing systems, and it is largely connected to ease of use. Flexibility is a system inherent characteristic; the user perceives the system as adapting flexibly to the individual needs. The less flexible a technology is, the lower the perceived ease of use may be [Van Ittersum et al., 2006].

RQ How flexible is the platform regarding individual needs and preferences as well as contexts of use?	
Heuristic Evaluation	Heuristics
User Lab Study	Interview (experienced flexibility)

Table 8: Evaluation of flexibility

3.3.1.8 *Accessibility*

Accessibility enables that users with specified disabilities or limitations can perceive, understand, navigate, and interact with the system and achieve certain goals with the same effectiveness, efficiency and satisfaction of use as non-disabled people or people without limitations – addresses the needs of our target group.

Definition

Accessibility means that users with specified disabilities or limitations can perceive, understand, navigate, and interact with the system in a specified context and thereby achieve certain goals with the same effectiveness, efficiency and satisfaction of use as non-disabled people or people without limitations [Brajnik, 2008]. In general, accessibility refers to the fact that something is accessible to users regardless to the means of access and their individual problems or limitations [Affonso de Lara et al., 2010].

RQ To what extent does the platform address age related limitations (e.g., cognitive or physical) in terms of understanding, navigation, and interaction with the platform?	
Heuristic Evaluation	Barrier walkthrough [Brajnik, 2009] and questionnaire items
User Lab Study	Questionnaire items
Pilot Study	Questionnaire items

Table 9: Evaluation of accessibility

3.3.2 Interpersonal value

The interpersonal value is about the experiences while an interaction between humans via a technology, but not for the purpose of self-presentation.

3.3.2.1 Reciprocity

Reciprocity is the extent of reciprocal communication and support between older adults – addresses the need for give and take relationships.

Definition

Reciprocity is the behavioural response to a perceived kindness or unkindness [Falk and Fischbacher, 2003]. Reciprocity is based on the principle that people match behaviours they experienced from others with the actions they perform for others. It is about the extent to which it comes to reciprocal actions between users and implies that user often match behaviours experienced from others with actions performed for others in proportion to what they receive [Carr, 2006].

RQ What characterizes the support exchange on platform in terms of reciprocity?	
Pilot Study	Interview (experienced reciprocity, kind or unkind actions)

Table 10: Evaluation of reciprocity

3.3.2.2 Social connectedness

Social connectedness is the experience of belongingness and relatedness with other older adults – addresses the need to avoid loneliness.

Definition

Social connectedness is the sense of belongingness that is based on having sufficient close contacts, which depends on the satisfaction with the size and quality of one's social network. Loneliness is the counterpart of social connectedness and belongingness [Van Bel et al., 2008 or Visser et al., 2010]. The quantitative aspect is constituted by the size of one's social network as well as the amount of interactions with the members of the network. The qualitative aspect comprises the degree of closeness in one's relationship [Van Bel et al., 2008].

RQ To what extent does users' experience of social connectedness increase when using the platform over a longer period of time?	
Pilot Study	Questionnaire items Interview (experienced social connectedness)

Table 11: Evaluation of social connectedness

3.3.2.3 *Interpersonal familiarity*

Interpersonal familiarity is about acquiring and using of information from others to guide the interaction between them – addresses the fear of not knowing each other.

Definition

Familiarity deals with an understanding of the current actions of other people or of objects [Luhman, 2000]. Strauss et al. [2001] explained the "similar-to-me" hypothesis, which was first introduced by Byrne [1971]. The hypothesis says that people will be rated higher the more similar they are or believed they are to the rater (a starting point is to measure the personality with the Big Five Inventory [Rammstedt and John, 2007]).

RQ	
User Lab Study	Personality with Big Five Inventory-10 (BFI-10)
Pilot Study	Personality with Big Five Inventory-10 (BFI-10) Interview (experienced interpersonal familiarity)

Table 12: Evaluation of interpersonal familiarity

3.3.2.4 Social capital

Social capital is the connection among older adults and the norms of reciprocity and trustworthiness that arise from them – addresses one potential benefit from using the platform by linking online with offline.

Definition

Social capital relates to resources, which are embedded and emerge in social relationships, and is non-proprietary to each of the interacting parties [Bourdieu, 1986]. These relationships are characterized by norms of trustworthiness and reciprocity that arise from connections among individuals or social networks [Putnam, 2000]. Putnam [2000] distinguishes between bridging and bonding forms of Social Capital. Whereas bridging forms facilitate the access to external resources and identity of big social groups, bonding forms increase cohesion and identity of small groups.

RQ To what extent does social capital evolve when using the platform over a longer period of time?	
User Lab Study	Questionnaire items
Pilot Study	Questionnaire items

Table 13: Evaluation of social capital

3.3.3 Social value

The social value is the symbolic importance of the technology for conveying social image.

3.3.3.1 Social image

Social image is the extent to which older adults perceive that the use of the platform will enhance her/his status, convey autonomy or empowerment – addresses the need for longer, autonomous living.

Definition

Social image is defined as the extent to which users may derive respect and admiration from peers in their social network [Lin and Bhattacherjee, 2010]. It is however more important in the case of interactive systems, where the systems act as the media for communication and social interaction [Venkatesh et al., 2003]. It is the degree to which one perceives that the usage of the technology can enhance the status within a social group [Chismar and Wiley-Patton, 2002]. It is a central factor that influences the adoption of an innovation.

RQ To what extent does social image of user change when using the platform over a longer period of time?	
User Lab Study	Questionnaire items
Pilot Study	Questionnaire items Interview (experienced social image)

Table 14: Evaluation of social image

3.3.3.2 Subjective norm

Subjective norm is an older adults' perception of what others think about using the platform or of what others think s/he should perform on it – addresses the need for self-determination and fear of peer pressure.

Definition

Kowalcyk [2008] defines subjective norm as an individual's perception of what important others feel about adopting an innovation. Subjective norm refers to the normative influence (e.g., direct or indirect pressure) exerted by significant referent others such as peers, friends and family members on a person's intention or opinion to perform a specific behaviour (e.g., [Peker, 2010] or [Lin and Bhattacherjee, 2010]).

RQ Which subjective norms do users perceive when using the platform (e.g., expectations)?	
Pilot Study	Questionnaire items

Table 15: Evaluation of subjective norm

3.3.4 Emotional value

The emotional value is the potential of the technology to arouse emotions, which are believed to accompany the use.

3.3.4.1 Trust

Trust in system is the extent to which an older adult is satisfied with how the platform will behave and trust in users is the extent to which an older adult is confident in, and willing to act on the basis of, the words, actions, and decisions of another – addresses the need for trustworthiness.

Definition

Trust has been defined as "*the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party*" [Mayer et al., 1995, p 712]. A trustor's decision on whether or not to trust a trustee is accepted to be a composite construct composed of the trustor's interdependent assessments of the trustee's benevolence, integrity, and ability, as well as their own propensity to trust, and any previous experiences they may have had [Mayer, Schoorman et al., 1995].

RQ	
User Lab Study	Questionnaire items
Pilot Study	Questionnaire items

Table 16: Evaluation of trust

3.3.4.2 (Dis)Satisfaction

(Dis)Satisfaction is the older adults' comfort with and positive attitudes towards the use of the platform – addresses the need for satisfying support.

Definition

User satisfaction is the sum of feelings (positive and negative) or affective responses from using a system. Feelings, like satisfaction, lead to intentions of behaviour that themselves lead to actions (use). Subjective satisfaction refers to how pleasant a user finds it to use a computer application or a website [Nielsen, 1993]. According to Lowry et al [2006] satisfaction is a state of mind that is an interaction among three basic components:

- *Expectations* are beliefs or subjective predictions about the platform's attributes or performance.
- *Desires* are the levels of attributes and benefits that users believe will enable them to achieve their desired outcome.
- *Perceived performances* is characterized by a user's perception of how the platform is able to fulfil a user's expectations upon actual usage (increased or decreased satisfaction will depend upon the confirmation or disconfirmation of the expectations and desire).

RQ To what extent are users (dis)satisfied when using the platform?	
Design Workshops	Discussion
User Lab Study	Questionnaire items Interview (experienced satisfaction)
Pilot Study	Questionnaire items Interview (experienced satisfaction)

Table 17: Evaluation of (dis)satisfaction

3.3.4.3 Engagement

Engagement is the emotional, cognitive and behavioural connection that exists between the older adult and the platform – addresses the fear that other older adults might not use it.

Definition

User engagement is the emotional, cognitive and behavioural connection that exists between a user and the platform [Attfield et al., 2011]. It is characterized by, for example, focused attention (user's immersion in an activity and is an indicator for cognitive involvement), positive affect (user experience emotions during an interaction), aesthetics (screen layout can relate to positive affects and stimulate curiosity), or novelty (stimulates users to get curious).

RQ To what extent does the platform evoke engagement?	
User Lab Study	Questionnaire items
Pilot Study	Questionnaire items

Table 18: Evaluation of engagement

3.3.4.4 Pleasure/fun/enjoyment

Pleasure/fun/enjoyment is the extent to which it's enjoyable to use the system – addresses the need to enjoy using the platform and the resulting activity.

Definition

Hu et al. [2005] define enjoyability as the degree of enjoyment that users reach when they are voluntarily undergoing an experience that interests them and gives them some amount of pleasure or release. Blythe and Hassenzahl [2005] describe enjoyment (often used as synonym for fun) as a relationship between ongoing activities and states of mind. In order to experience fun, people's senses must be engaged, when they are voluntarily undergoing an experience.

RQ To what extent does the system provoke fun/enjoyment?	
User Lab Study	Smiley-Scale Interview (experienced enjoyment)
Pilot Study	Smiley-Scale Interview (experienced enjoyment)

Table 19: Evaluation of pleasure/fun/enjoyment

3.3.4.5 Subjective well-being

Subjective well-being is the cognitive and affective evaluations of user's life like life satisfaction or self-esteem, which make life rewarding – addresses our goal to increase subjective well-being and *quality of life.*

Definition

Subjective well-being can be defined by ten features, i.e., competence, emotional stability, engagement, meaning, optimism, positive emotion, positive relationships, resilience, self-esteem, and vitality. High levels of well-being have been shown to be associated with a range of positive outcomes, including effective learning, productivity and creativity, good relationships, pro-social behaviour, and good health and life expectancy [Huppert and So, 2013].

RQ To what extent does subjective well-being change when using the platform over a longer period of time?	
Pilot Study	Questionnaire items

Table 20: Evaluation of subjective well-being

3.3.5 Epistemic value

The epistemic value is about experiencing new technologies.

3.3.5.1 Attitude towards technology

Attitude towards technology is older adults overall affective reaction to use the platform – addresses the technology affinity of older adults and possible avoidance of /scepticism regarding new technologies.

Definition

The attitude toward using a technology is defined as an individual's overall affective reaction to using a system, whereby the attitude toward behaviour, intrinsic motivation, affect toward use, and affect are important drivers [Venkatesh et al., 2003]. Once activated, attitudes and intentions will automatically guide behaviour without the need for conscious mental activities [Venkatesh et al., 2012].

RQ To what extent does the attitude towards technologies change when using the platform?	
User Lab Study	Questionnaire items
Pilot Study	Questionnaire items

Table 21: Evaluation of attitude towards technology

3.3.5.2 Curiosity

Curiosity is older adult's interest in the platform and is initiated by novelty, complexity, or ambiguity – addresses the fear that other older adults might not be interested.

Definition

Hu et al. [2005] investigated curiosity and defined it as the tendency of users to seek for something novel. This is a condition for sustained interest and a prerequisite for users to focus their attention. Curiosity is also an important motivator for exploratory behavior to gain new information. The epistemic curiosity, which is the drive to know, can be further distinguished into specific curiosity (i.e. the desire for certain pieces of information, and is initiated by variables such as novelty, complexity, or ambiguity) and diverse curiosity (i.e. motivated by feelings of boredom or a desire for stimulus variation) [Mussel 2010].

RQ To what extent does the usage of the system provoke the user's curiosity about and interest in the system and its content?	
Heuristic Evaluation	Interview
User Lab Study	Questionnaire items
Pilot Study	Questionnaire items

Table 22: Evaluation of curiosity

3.3.6 Conditional value

The conditional value is about technologies being tied to a specific context and the user context.

3.3.6.1 User characteristics

User characteristics (e.g., motives, competence, impairments, social roles, or daily routines of older adults)

RQ Which user characteristics influence the usage of the platform?	
Design Workshops	Contact Sheet
User Lab Study	Contact Sheet
Pilot Study	Contact Sheet

Table 23: Assessment of user characteristics

3.3.6.2 Usage context

Usage context (e.g., geographical distance between older adults, home vs. assisted living)

RQ Which context factors influence the usage of the platform?	
Pilot Study	Contact Sheet

Table 24: Assessment of usage context

3.4 Mapping Values and Approaches

The following table provides an overview which values are addressed in with which approach.

	Design Workshops	Heuristic Evaluation	User Studies in the Lab	Pilot Studies
Functional value	x	x	x	x
Interpersonal value			x	x
Social value			x	x
Emotional value	x		x	x
Epistemic value		x	x	x
Conditional value	x		x	x

Table 25: Evaluation Mapping

3.5 Outcomes

The different evaluations will provide input for the GeTVivid platform iteration and will ensure that the platform is usable, user-friendly and accessible for older adults. List of design/development implications will be provided as input for WP3 and WP4.

4. OVERALL CONCLUSION

This evaluation framework defines the iterative evaluation process in the GeTVivid project in terms of research questions and used methods. The evaluation focuses on the end users' feedback regarding usability, user experience and user acceptance, which was assessed during the requirements analysis phase. The ViA approach provides the theoretical basis for this evaluation, within which different relevant factors are assigned to values. The iterative evaluation process begins with workshops on designs, followed by heuristic expert evaluations and end user studies in a laboratory setting. Finally, the integrated system will be evaluated by the end users in a pilot study in the field.

REFERENCES

Affonso de Lara, S.M., Watanabe, W.M., dos Santos, E.P B. and Fortes, R.P. 2010. Improving WCAG for elderly web accessibility. In *Proceedings of the 28th ACM International Conference on Design of Communication*, ACM, 175-182.

Albrechtsen, E. 2003. *Security vs safety*. Norwegian University of Science and Technology, Department of Industrial Economics and Technology Management.

Attfield, S., Kazai, G., Lalmas, M. and Piwowarski, B. 2011. Towards a science of user engagement (Position Paper). In *WSDM Workshop on User Modelling for Web Applications*.

Bartneck, C., Kulić, D., Croft, E. and Zoghbi, S. 2009. Measurement instruments for the anthropomorphism, animacy, likeability, perceived intelligence, and perceived safety of robots. *International journal of social robotics*, 1(1), 71-81.

Blythe, M. and Hassenzahl, M. 2005. The semantics of fun: Differentiating enjoyable experiences. *Funology*. Springer Netherlands, 91-100.

Bourdieu, P. 1986. The forms of capital. Handbook of theory and research for the sociology and education, red. JG Richardson. Greenwood, New York.

Brajnik, G. 2008. Beyond conformance: the role of accessibility evaluation methods. In *Web Information Systems Engineering–WISE 2008 Workshops*, Springer Berlin Heidelberg, 63-80.

Brooke, J. 1996. SUS: A quick and dirty usability scale. In Jordan, P.W., Thomas, B., Weerdmeester, B.A., McClelland, A.L. (ED.) *Usability Evaluation in Industry*. London: Taylor and Francis.

Byrne, D. 1971. *The attraction paradigm*. New York: Academic Press.

Carr, C.L. 2006. Reciprocity: The golden rule of IS-User Service Relationship Quality and Cooperation. Seeking a mutually beneficial relationship between IS departments and users. *Communications of the ACM – Hacking and innovation*, 49(6), 77-83.

Chismar, W.G and Wiley-Patton, S. 2002. Test of the technology acceptance model for the internet in pediatrics. In *Proceedings of the AMIA Symposium*, American Medical Informatics Association.

Chutter, M.Y. 2009. Overview of the Technology Acceptance Model: Origins, Developments and Future Directions. In Working Papers on Information Systems, 9(37). Sprouts, Indiana University, USA. Http://sprouts.aisnet.org/9-37

Cockton, *G.* 2009*. When and Why Feelings and Impressions Matter in Interaction Design* (Invited Keynote), Kansei.

Cutrona, C.E. and Russell, D.W. 1987. The provisions of social relationships and adaptation to stress. *Advances in personal relationships*, 1(1), 37-67.

Davis, F.D. 1989: Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13 (3), 319-340.

Dix, A., Finalay, J., Abowd, G.D. and Beale, R. 2003.*Human-Computer Interaction*. Prentice Hall.

Falk, A. and Fischbacher, U. 2006. A theory of reciprocity. *Games and Economic Behavior*, 54(2), 293-315.

Friedman, B., Kahn, P.H. and Borning, A. 2008. Value Sensitive Design and Information Systems. In Himma, K.E., and Tavani, H.T. (Ed.) *The Handbook of Information and Computer Ethics*, John Wiley & Sons, Inc., 69-101.

Folmer, E. and Bosch, J. 2004. Architecting for usability: a survey. *Journal of systems and software*, 70(1), 61-78.

Fuchsberger, V., Moser, C. and Tscheligi, M. 2012. Values in action (ViA): combining usability, user experience and user acceptance. In *CHI'12 Extended Abstracts on Human Factors in Computing Systems (CHI EA '12)*, ACM Press, 1793-1798.

Hu, J., Janse, M. and Kong, H. J. 2005. User experience evaluation of a distributed interactive movie. In *HCI International*.

Huppert, F.A. and So, T.T. 201). Flourishing across Europe: Application of a new conceptual framework for defining well-being. *Social Indicators Research*, 110(3), 837-861.

ISO 9241-11. 1998. Ergonomic requirements for office work with visual display terminals (VDTs) – art 11: Guidance on usability.

Jeng, J. 200). Usability assessment of academic digital libraries: effectiveness, efficiency, satisfaction, and learnability. *Libri*, 55(2-3), 96-121.

Kowalczyk, N.K. 2008. The impact of voluntariness, gender, and age on subjective norm and intention to use digital imaging technology in a healthcare environment: Testing a theoretical model (Doctoral dissertation, The Ohio State University).

Kreijns, K., Kirschner, P.A., Jochems, W. and Van Buuren, H. 2007. Measuring perceived sociability of computer-supported collaborative learning environments. *Computers & Education*, 49(2), 176-192.

Lee, R.M. and Robbins, S.B. 1995. Measuring belongingness: The Social Connectedness and the Social Assurance scales. *Journal of Counseling Psychology*, 42(2), 232.

Lin, C.P. and Bhattacherjee, A. 2010. Extending technology usage models to interactive hedonic technologies: a theoretical model and empirical test. *Information Systems Journal*, 20(2), 163-181.

Linja-aho, M. 2006. Creating a framework for improving the learnability of a complex system.

Lowry, P.B., Spaulding, T., Wells, T., Moody, G., Moffit, K. and Madariaga, S. 2006. A theoretical model and empirical results linking website interactivity and usability satisfaction. In *Proceedings of the 39th Annual Hawaii International Conference (HICSS'06),* IEEE, 123a-123a.

Luhmann, N. 2000. Familiarity, Confidence, Trust: Problems and Alternatives. In Gambetta, Diego (ed.) *Trust: Making and Breaking Cooperative Relations, electronic edition*, Department of Sociology, University of Oxford, chapter 6, 94-107.

Mao, J.Y., Vredenburg, K., Smith, P.W. and Carey, T. 2001. User-centered design methods in practice: a survey of the state of the art. In *Proceedings of the 2001 conference of the Centre for Advanced Studies on Collaborative research*, IBM Press.

Mayer, R., Davis, J. and Schoorman, F. 1995. An integrative model of organizational trust. *Academy of management review*, 709–734.

McNamara, R., Yu, D. and Kelly, J. 1997. Public perception of safety and metal detectors in an urban emergency department. The American journal of emergency medicine, 15(1), 40–42.

Moore, G.C. and Benbasat, I. 1991. Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research*, 2(3), 192-222.

Moser, C., Fuchsberger, V., Neureiter, K., Sellner, W. and Tscheligi, M. 2012. Revisiting personas: the making-of for special user groups. In *CHI'12 Extended Abstracts on Human Factors in Computing Systems*, ACM, 453-468.

Moser, M., Fuchsberger, V. and Tscheligi, M. 2014. ViA - Values in Action within Healthcare. In *CHI'14 Workshop on HCI Research in Healthcare: Using Theory from Evidence to Practice*, http://hcihealthcarefieldwork.wordpress.com/chi-2014-theory-workshop/.

Mussel, P. 2010. Epistemic curiosity and related constructs: Lacking evidence of discriminant validity. *Personality and Individual Differences*, 49(5), 506-510.

Nielsen, J. 1993. *Usability Engineering*. New York, NY,USA. Morgan Kaufmann.

Norman, D.A. and Draper, S.W. 1986. User centered system design. *New Perspectives on Human-Computer Interaction*, L. Erlbaum Associates Inc., Hillsdale, NJ.

O'Brien, H.L., and Toms, E.G. 2010. The development and evaluation of a survey to measure user engagement. *Journal of the American Society for Information Science and Technology*, 61(1), 50-69.

Peker, C. 2010. An Analysis of The Main Critical Factors that affect the acceptance of Technology In Hospital Management systems (Doctoral dissertation, MIDDLE EAST TECHNICAL UNIVERSITY).

Preece, J. 2001. Sociability and usability in online communities: Determining and measuring success. *Behaviour & Information Technology*, 20(5), 347-356.

Putnam, R.D. 2000. Bowling alone: The collapse and revival of American democracy. Simon and Schuster Nova York.

Rammstedt, B. and John, O.P. 2007. Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, 41(1), 203-212.

Read, J. C., Gregory, P., MacFarlane, S., McManus, B., Gray, P. and Patel, R. 2002. An investigation of participatory design with children-informant, balanced and facilitated design. *Interaction design and Children*, Shaker, 53-64.

Renner, B. 2006. Curiosity about people: The development of a social curiosity measure in adults. *Journal of personality assessment*, 87(3), 305-316.

Russel, D.W. 1996. UCLA Loneliness Scale (Version 3): Reliability, Validity, and Factor Structure. *Journal of Personality Assessment*, 66(1), 20-40.

Schwartz, S.H. 1994. Are there universal aspects in the structure and the contents of human values? *Journal of social issues*, 50(4), 19-45.

Shillito, M.L. and De Marle, D.J. 1992. *Value: its measurement, design, and management*. Wiley-Interscience.

Strauss, J.P., Barrick, M.R. and Connerley, M.L. 2001. An investigation of personality similarity effects (relational and perceived) on peer and supervisor ratings and the role of familiarity and liking. *Journal of Occupational and Organizational Psychology*, 74(5), 637-657.

Van Bel, D.T., Ijsselsteijn, W.A. and de Kort, Y.A.W. 2008. Interpersonal Connectedness: Conceptualization and Directions for a Measurement Instrument. In *Proceedings of CHI 2008*, ACM, 3129-3134.

Van Ittersum, K., Rogers, W.A., Capar, M., Caine, K.E., O'Brien, M.A., Parsons, L.J. and Fisk, A.D. 2006. *Understanding Technology Acceptance: Phase 1 – Literature Review and Qualitative Model Development*, Technical Report, Georgia Institute of Technology. Retrieved from: http://hdl.handle.net/1853/40580.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. 2003. User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.

Venkatesh, V., Thong, J.Y. and Xu, X. 2012. Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 36(1), 157-178.

Visser, T., van Bel, D.T., Dadlani, P. and Yarosh, S. 2010, Designing and evaluating affective aspects of sociable media to support social connectedness. In *Proceedings of the CHI 2010*, ACM, 4437-4440.

Wiebe, E.N., Lamb, A., Hardy, M. and Sharek, D. 2014. Measuring engagement in video game-based environments: Investigation of the User Engagement Scale. *Computers in Human Behavior*, 32, 123-132.

Williams, D. 2006. On and off the 'Net: Scales for social capital in an online era. *Journal of Computer-Mediated Communication*, 11(2), 593-628.

ANNEX A

Learnability	Strongly agree	Rather agree	Neither /nor	Rather disagree	Strongly disagree
I found the platform unnecessarily complex.	○	○	○	○	○
I continuously knew where I was located on the platform.	○	○	○	○	○
I found the platform easy to use.	○	○	○	○	○
I need to learn a lot about the platform before I could effectively use it.	○	○	○	○	○
I felt very confident using the platform.	○	○	○	○	○
I think I would need support of a technical person to be able to use this platform.	○	○	○	○	○
I would imagine that most people would learn to use this platform very quickly.	○	○	○	○	○
I found the various functions on this platform were well integrated.	○	○	○	○	○
The functions on the platform could be explored by trial and error.	○	○	○	○	○
The information (texts, content) on the platform was easy to understand.	○	○	○	○	○
The terms and labels used were easy to understand for me.	○	○	○	○	○
The meaning of the existing charts and pictures was understandable.	○	○	○	○	○
The assistance on the website was useful.	○	○	○	○	○
It was difficult for me to learn how to use the platform.	○	○	○	○	○
I obtained the expected content when clicking the links on the platform.	○	○	○	○	○

Table 26: Items for Learnability (Web Usability Questionnaire)

Perceived ease of use	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
Learning to operate the platform was easy for me.	○	○	○	○	○
I found it easy to get the platform to do want I want it to do.	○	○	○	○	○
My interaction with the platform was clear and understandable.	○	○	○	○	○
I found the platform flexible to interact with.	○	○	○	○	○
It was easy for me to become skilful at using the platform.	○	○	○	○	○
I found the platform easy to use.	○	○	○	○	○

Table 27: Items to evaluate perceived ease of use, adapted from Davis [1989] and Chutter [2009]

Perceived usefulness	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
Using the platform for my daily activities would enable me to accomplish them more quickly.	○	○	○	○	○
Using the platform would improve my daily life.	○	○	○	○	○
Using the platform in my job would increase my productivity in daily life.	○	○	○	○	○
Using the platform would enhance my effectiveness on the daily activities.	○	○	○	○	○
Using the platform would make it easier to do my daily activities.	○	○	○	○	○
I would find the platform useful for my daily activities.	○	○	○	○	○

Table 28: Items to evaluate perceived usefulness, adapted from Davis [1989] and Chutter [2009]

Perceived safety	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
I feel safe when using the platform.	○	○	○	○	○
I am satisfied with the level of security on the platform.	○	○	○	○	○
I worry that I may be cheated on the platform.	○	○	○	○	○
I feel safe, as everyone has to register by the community manager.	○	○	○	○	○
I would be less likely to use the platform, if everyone could register on the platform.	○	○	○	○	○

Table 29: Items to evaluate perceived safety, adapted from McNamara et al. [1997]

Perceived safety	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
The platform enables me to easily contact with other people.	○	○	○	○	○
I do not feel lonely on the platform	○	○	○	○	○
The platform enables me to get a good impression of other people.	○	○	○	○	○
The platform allows spontaneous informal conversations.	○	○	○	○	○
The platform enables to develop well performing relationships.	○	○	○	○	○
The platform enables me to develop good relationships with other people.	○	○	○	○	○
The platform enables me to identify myself with the community.	○	○	○	○	○
I feel comfortable on the platform.	○	○	○	○	○
The platform allows for non-support-related conversations.	○	○	○	○	○
The platform enables me to make close friendships with other people.	○	○	○	○	○

Table 30: Items to evaluate sociability, adapted by Kreijns et al. [2007]

Accessibility	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
The labels (i.e. wordings) of functionalities in the platform were clear.	○	○	○	○	○
The meanings of the icons used in the platform were clear.	○	○	○	○	○
Important information was highlighted in the platform.	○	○	○	○	○
The colours used in the platform were well differentiable.	○	○	○	○	○
Selecting functionalities in the platform was not a problem.	○	○	○	○	○
The contrast between the foreground (e.g., text) and the background in the platform was high enough.	○	○	○	○	○
All necessary information to use the platform was provided in the system.	○	○	○	○	○
The navigation in the platform was always clear enough to proceed.	○	○	○	○	○
The main elements of the platform (e.g., menus or buttons) were highlighted well.	○	○	○	○	○
The warning signals (e.g., sound or visual signals) were helpful in order to use the platform.	○	○	○	○	○
Sufficient feedback was provided in the platform, to know whether my operations were correct or not.	○	○	○	○	○
A lot of choices were needed in order to reach a goal.	○	○	○	○	○
It was very challenging to interact with the platform, due to too much information on it.	○	○	○	○	○

Table 31: Items to evaluate accessibility

System Usability Scale (SUS)	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
I think that I would like to use this system frequently	○	○	○	○	○
I found the system unnecessarily complex	○	○	○	○	○
I thought the system was easy to use	○	○	○	○	○
I think that I would need the support of a technical person to be able to use this system	○	○	○	○	○
I found the various functions in this system were well integrated	○	○	○	○	○
I thought there was too much inconsistency in this system	○	○	○	○	○
I would imagine that most people would learn to use this system very quickly	○	○	○	○	○
I found the system very cumbersome to use	○	○	○	○	○
I felt very confident using the system	○	○	○	○	○
I needed to learn a lot of things before I could get going with this system	○	○	○	○	○
I think that I would like to use this system frequently	○	○	○	○	○
I found the system unnecessarily complex	○	○	○	○	○
I thought the system was easy to use	○	○	○	○	○
I think that I would need the support of a technical person to be able to use this system	○	○	○	○	○

Table 32: Items to evaluate usability, System Usability Scale (SUS) [Brooke, 1996]

Social connectedness	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
I feel disconnected from the world around me.	○	○	○	○	○
Even around people I know, I do not feel that I really belong.	○	○	○	○	○
I feel so distant to people.	○	○	○	○	○
I have no sense of togetherness with my peers.	○	○	○	○	○
I do not feel related to anyone.	○	○	○	○	○
I catch myself losing all sense of connectedness with society.	○	○	○	○	○
Even among my friend, there is no sense of brother/sisterhood.	○	○	○	○	○
I do not feel I participate with anyone or any group.	○	○	○	○	○

Table 33: Items to evaluate social connectedness [Lee and Robbins, 1995]

Social connectedness	never	rarely	some-times	always
How often do you feel that you are “in tune” with the people around you?	○	○	○	○
How often do you feel that you lack of companionship?	○	○	○	○
How often do you feel that there is no one you can turn to?	○	○	○	○
How often do you feel alone?	○	○	○	○
How often do you feel part of a group of friends?	○	○	○	○
How often do you feel that you have a lot in common with the people around you?	○	○	○	○
How often do you feel that you are no longer close to anyone?	○	○	○	○
How often do you feel that your interests and ideas are not shared by those around you?	○	○	○	○
How often do you feel outgoing and friendly?	○	○	○	○
How often do you feel close to people?	○	○	○	○
How often do you feel left out?	○	○	○	○
How often do you feel that your relationships with others are not meaningful?	○	○	○	○
How often do you feel that no one really knows you well?	○	○	○	○
How often do you feel isolated from others?	○	○	○	○
How often do you feel you can find companionship when you want it?	○	○	○	○
How often do you feel that there are people who really understand you?	○	○	○	○
How often do you feel shy?	○	○	○	○
How often do you feel that people are around you but not with you?	○	○	○	○
How often do you feel that there are people you can talk to?	○	○	○	○
How often do you feel that there are people you can turn to?	○	○	○	○

Table 34: Items to evaluate social loneliness scale [Russel, 1996]

Social connectedness	never	rarely	some-times	always
There are people I can depend on to help me if I really need it.	○	○	○	○
I feel that I do not have close personal relationships with other people	○	○	○	○
There is no one I can turn to for guidance in times of stress.	○	○	○	○
There are people who depend on me for help	○	○	○	○
There are people who enjoy the same social activities I do.	○	○	○	○
Other people do not view me as competent	○	○	○	○
I feel personally responsible for the well-being of another person.	○	○	○	○
I feel part of a group of people who share my attitudes and beliefs.	○	○	○	○
I do not think other people respect my skills and abilities	○	○	○	○
If something went wrong, no one would come to my assistance.	○	○	○	○
I have close relationships that provide me with a sense of emotional security and well-being.	○	○	○	○
There is someone I could talk to about important decisions in my life.	○	○	○	○
I have relationships where my competence and skills are recognized.	○	○	○	○
There is no one who shares my interests and concerns	○	○	○	○
There is no one who really relies on me for their well-being.	○	○	○	○
There is a trust worthy person I could turn to for advice if I were having problems.	○	○	○	○
I feel a strong emotional bond with at least one other person	○	○	○	○
There is no one I can depend on for aid if I really need it	○	○	○	○
There is no one I feel comfortable talking about problems with.	○	○	○	○
There are people who admire my talents and abilities.	○	○	○	○

Table 35: Items to evaluate social provision scale [Cutrona and Russel, 1987]

Interpersonal Familiarity (BFI-10) I see myself as someone who …	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
… is reserved	○	○	○	○	○
… is generally trusting	○	○	○	○	○
… tends to be lazy	○	○	○	○	○
… is relaxed, handles stress well	○	○	○	○	○
… has few artistic interests	○	○	○	○	○
… is outgoing, sociable	○	○	○	○	○
… tends to find fault with others	○	○	○	○	○
… does a thorough job	○	○	○	○	○
… gets nervous easily	○	○	○	○	○
… has an active imagination	○	○	○	○	○

Table 36: Items to evaluate personality with Big Five Inventory-10 (BFI-10) [Rammstedt and John, 2007]

Social capital	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
Bonding subscale					
There are several people online/offline I trust to help solve my problems.	○	○	○	○	○
There is someone online/offline I can turn to for advice about making very important decisions.	○	○	○	○	○
There is no one online/offline that I feel comfortable talking to about intimate personal problems. (reversed)	○	○	○	○	○
When I feel lonely, there are several people online/offline I can talk to.	○	○	○	○	○
If I needed an emergency loan of €500, I know someone online/offline I can turn to.	○	○	○	○	○
The people I interact with online/offline would put their reputation on the line for me.	○	○	○	○	○
The people I interact with online/offline would be good job references for me.	○	○	○	○	○
The people I interact with online/offline would share their last dollar with me.	○	○	○	○	○
I do not know people online/offline well enough to get them to do anything important.(reversed)	○	○	○	○	○
The people I interact with online/offline would help me fight an injustice.	○	○	○	○	○
Bridging subscale					
Interacting with people online/offline makes me interested in things that happen outside.	○	○	○	○	○
Interacting with people online/offline makes me want to try new things.	○	○	○	○	○
Interacting with people online/offline makes me interested in what people unlike me are thinking.	○	○	○	○	○
Talking with people online/offline makes me curious about other places in the world.	○	○	○	○	○
Interacting with people online/offline makes me feel like part of a larger community.	○	○	○	○	○
Interacting with people online/offline makes me feel connected to the bigger picture.	○	○	○	○	○
Interacting with people online/offline reminds me that everyone in the world is connected.	○	○	○	○	○
I am willing to spend time to support general online/offline community activities.	○	○	○	○	○
Interacting with people online/offline gives me new people to talk to.	○	○	○	○	○
Online/Offline, I come in contact with new people all the time.	○	○	○	○	○

Table 37: Items to evaluate social capital [Williams, 2006]

Social image	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
Using the platform improves my image within the community.	○	○	○	○	○
People in my community who use the platform have more prestige then those who do not.	○	○	○	○	○
People in my community who use the platform have a good reputation.	○	○	○	○	○
Using the platform is a status symbol in my organization.	○	○	○	○	○

Table 38: Items to evaluate social image adapted from Moore and Benkast [1991]

Social image	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
I get more respect from others when supporting a lot of people on the platform.	○	○	○	○	○
I get admired by friends while supporting a lot of people on the platform.	○	○	○	○	○
In all honesty, I like to impress others by supporting others on the platform.	○	○	○	○	○

Table 39: Items to evaluate social image adapted from Lin and Bhattacherjee [2010]

Subjective norm	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
People who influence my behaviour think I should use the platform.	○	○	○	○	○
People who are important to me think I should use the platform.	○	○	○	○	○
My immediate supervisor thinks I should use the platform.	○	○	○	○	○
My close friends think I should use the platform.	○	○	○	○	○
My peers think I should use the platform.	○	○	○	○	○
People whose opinions I value prefer that I use the platform.	○	○	○	○	○

Table 40: Items to evaluate subjective norm adapted from Kowalczyk [2008]

(Dis)Satisfaction	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
It was very easy to learn how to use the platform.	○	○	○	○	○
Using the platform was a very frustrating experience.	○	○	○	○	○
I feel that the platform allows me to achieve very high productivity	○	○	○	○	○
I worry that many of the things I did on the platform may have been wrong.	○	○	○	○	○
The platform provides everything I think I would need.	○	○	○	○	○
The platform is very pleasant to work with.	○	○	○	○	○

Table 41: Items to evaluate subjective norm adapted from Nielsen [1993]

Trust	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
Belevolence subscale					
In general, people really do care about the well-being of others.	○	○	○	○	○
The typical person is sincerely concerned about the problems of others.	○	○	○	○	○
Most of the time, people care enough to try to be helpful, rather than just looking out for themselves.	○	○	○	○	○
Integrity subscale					
In general, most people keep their promises.	○	○	○	○	○
I think people generally try to back up their words with their actions.	○	○	○	○	○
Most people are honest in their dealings with others.	○	○	○	○	○
Trusting stance subscale					
I usually trust people until they give me a reason not to trust them.	○	○	○	○	○
I generally give people the benefit of the doubt when I first meet them.	○	○	○	○	○
My typical approach is to trust new acquaintances until they prove I should not trust them.	○	○	○	○	○
Trusting beliefs benevolence subscale					
I believe that people on the platform would act in my best interest.	○	○	○	○	○
If I required help, people on the platform would do their best to help me.	○	○	○	○	○
People on the platform are interested in my well-being and not just in their own.	○	○	○	○	○
Trusting beliefs competence subscale					
I believe that most (professional) people do a very good job on the platform.	○	○	○	○	○
Most people are very knowledgeable in their chosen field.	○	○	○	○	○
A large majority of (professional) people on the platform are competent in their area of expertise.	○	○	○	○	○

Table 42: Items to evaluate trust adapted from McKnight et al. [2002]

Engagement	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
I felt discouraged while using the platform. (PU)	○	○	○	○	○
I felt frustrated while using the platform. (PU)	○	○	○	○	○
I felt annoyed with using the platform. (PU)	○	○	○	○	○
I could not do some of the things I needed to do on the platform. (PU)	○	○	○	○	○
I found the platform confusing to use. (PU)	○	○	○	○	○
Using the platform was mentally taxing. (PU)	○	○	○	○	○
Using the platform was demanding. (PU)	○	○	○	○	○
I felt in control of the platform usage experience. (PU)	○	○	○	○	○
I continued to use the platform out of curiosity. (NO)	○	○	○	○	○
I felt interested in using the platform. (NO)	○	○	○	○	○
The content of the platform incited my curiosity. (NO)	○	○	○	○	○
The platform usage experience was fun. (FI)	○	○	○	○	○
I felt involved in using the platform. (FI)	○	○	○	○	○
I was really drawn into using the platform. (FI)	○	○	○	○	○
The platform usage experience did not work out the way I had planned. (EN)	○	○	○	○	○
My platform usage experience was rewarding. (EN)	○	○	○	○	○
I would recommend the platform to my friends and family. (EN)	○	○	○	○	○
I consider my platform usage experience a success. (EN)	○	○	○	○	○
Using the platform was worthwhile. (EN)	○	○	○	○	○
The platform was aesthetically appealing. (AE)	○	○	○	○	○
The screen layout of platform appealed to my visual senses. (AE)	○	○	○	○	○
The platform interface is aesthetically appealing. (AE)	○	○	○	○	○
The platform interface is attractive. (AE)	○	○	○	○	○
I liked the graphics and images used on the platform. (AE)	○	○	○	○	○
When I was using the platform, I lost track of the world around me. (FA)	○	○	○	○	○
I was so involved in using the platform that I lost track of time. (FA)	○	○	○	○	○
The time I spent using the platform just slipped away. (FA)	○	○	○	○	○
I lost myself while using the platform. (FA)	○	○	○	○	○
I blocked out things around me when I was using the platform. (FA)	○	○	○	○	○
I was absorbed in using the platform. (FA)	○	○	○	○	○

Table 43: Items to evaluate engagement adapted from O'Brien and Toms [2010] and Wiebe et al. [2014]

Figure 4: Smiley-Scale

Subjective well-being	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
Most days I feel a sense of accomplishment from what I do.	○	○	○	○	○
(In the past week) I felt calm and peaceful.	○	○	○	○	○
I love learning new things.	○	○	○	○	○
I generally feel that what I do in my life is valuable and worthwhile.	○	○	○	○	○
I am always optimistic about my future.	○	○	○	○	○
Taking all things together, I'm happy with my life.	○	○	○	○	○
There are people in my life who really care about me.	○	○	○	○	○
When things go wrong in my life it generally takes me a long time to get back to normal. (reverse score)	○	○	○	○	○
In general, I feel very positive about myself.	○	○	○	○	○
(In the past week) I had a lot of energy.	○	○	○	○	○

Table 44: Items to evaluate subjective well-being adapted from Huppert and So [2013]

Attitude towards using technology	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
Using the system is a bad/good idea.	○	○	○	○	○
The system makes work more interesting.	○	○	○	○	○
Working with the system is fun.	○	○	○	○	○
I like working with the system.	○	○	○	○	○

Table 45: Items to evaluate attitude towards using technology adapted from Venkatesh et al. [2003]

Curiosity	Strongly agree	Rather agree	Neither/ nor	Rather disagree	Strongly disagree
When I meet a new person on the platform, I am interested in learning more about him/her.	○	○	○	○	○
I'm interested in the people on the platform.	○	○	○	○	○
I find it fascinating to get to know new people on the platform.	○	○	○	○	○
I like to learn about the habits of others with the help of the platform.	○	○	○	○	○
I like finding out what others are doing on the platform.	○	○	○	○	○
I like to look into other people's profiles.	○	○	○	○	○
When I see a new offers and demand on the platform, I take a look at them.	○	○	○	○	○
I'm interested in other people's thoughts and feelings.	○	○	○	○	○
Other people's life stories interest me.	○	○	○	○	○

Table 46: Items to evaluate curiosity adapted from Renner [2006]