SHARE_PERSONAs – Prototypes of older persons

Isabella Buber, Bernhard Wöckl, Ulcay Yildizoglu, Belinda Aparicio,

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Abstract

Ambient Assisted Living (AAL) technology should meet the requirements and specific needs of the heterogeneous target group of older persons. Engineers have to consider the users' concerns, needs and limitations when designing technology for elderly people. However, unless the target group is well-defined, specific problems of the user group often remain unclear. To solve this problem researches implement user requirements analysis approaches like interviews, focus groups, observations or cultural probes which are often based on rather small samples. We aim to generate a set of Senior 'Persona' on the basis of the "Survey of Health, Ageing and Retirement in Europe" (SHARE) database. The Persona method comes from marketing sciences and is used in the realm of Human-Computer Interaction (HCI) to support developers of ICT products and services to feel empathy for their target users. Personas represent archetypical, fictive user groups in form of single user descriptions. In our quantitative analyses we applied partitional clustering to SHARE data with the goal of identifying groups of individuals sharing common limitations, diseases, medical needs, personal and economic situations. The output from quantitative research was then described in a narrative way. The resulting Persona set will support engineers and designers in the area of AAL technologies by getting empathy for their target users for developing products and services that meet the needs of their users.

Keywords

Personas, AAL, SHARE, applied demography

Authors

Isabella Buber is research scientist at the Vienna Institute of Demography of the Austrian Academy of Sciences, Wittgenstein Centre for Demography and Global Human Capital. Email: isabella.buber@oeaw.ac.at

Bernhard Wöckl is HCI researcher at CURE/Center for Usability Research and Engineering, Austria. Email: woeckl@cure.at

Ulcay Yildizoglu is HCI Designer at CURE/Center for Usability Research and Engineering, Austria. Email: yildizoglu@cure.at

Belinda Aparicio was research scientist at the Vienna Institute of Demography of the Austrian Academy of Sciences, Wittgenstein Centre for Demography and Global Human Capital. Email: belinda.aparicio@oeaw.ac.at

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1 Introduction

The aim of this study is to generate prototypes of senior persons for Ambient Assisted Living (AAL) product developers and engineers. Elderly technology users are a rather inhomogeneous group regarding their living situations or their physical and mental possibilities, and engineers have to consider different problems, concerns, needs and limitations of users when designing technology for elderly people. However, unless the target group (senior persons) is defined, specific problems of the user group often remain unclear. To solve this problem, researches implement user requirements analysis approaches applying different methods like interviews, focus groups, observations or cultural probes to generate so-called Personas. Personas represent fictive but realistic archetypical users in form of narrative descriptions which help to bridge the gap between target group and developers. They inform developers and designers about the needs of the target group in order to better integrate know-how in product development circles.

The current problem of Personas development is that they often build on rather small ranges of often independently conducted ethnographic studies. Due to time, budget or methodological problems the outcome of these attempts has not always been satisfying and is often a particular set of specific personas collections, without any claim of broader validity. The current study aims to solve these limitations by creating a valid set of Personas on the basis of the "Survey of Health, Ageing and Retirement in Europe" (SHARE), a large representative sample a set of senior individuals.

Researchers and practitioners working in the fields of smart homes, smart textiles, social support techniques, ambient technologies or other embedded systems for elderly people may benefit from using the developed SHARE_PERSONAs during their development cycles. The results of this project might also be used in future research as support for user requirements analysis or simply as a supportive instrument within AAL technology design.

2 Literature review

Personas are a design tool based on the ideas of Alan Cooper who invented the method in 1999 (Cooper, 1999). Building on Cooper's founding work, the Personas approach has been applied by numerous researchers as well as business organizations in order to gather realistic user descriptions and profiles (e.g. www.primelife.eu/images/stories/deliverables/personas_primelife.pdf; www.forrester.com; http://msdn.microsoft.com/en-us/magazine/dd569755.aspx; www.soft-net.at; www.productbeautiful.com/2006/10/22/fords-use-of-personas). The method was developed to raise empathy for the end users and as a means for communicating peer group definitions. If 'the user' is not precisely defined, developers can always imagine that they themselves are the users. In case of non-generalizable user types, this way of thinking hinders fluent communication between developers and users.

Personas are design and communication tools that allow us to specify for which users engineers and developers are creating products and services. Personas build consensus and commitment to the design by this way and help developers to measure the design's effectiveness (Cooper, 1999). In general, Personas show the nature and scope of the design problem (Pruitt and Adlin, 2006). A main advantage of Personas is the unification of the picture of the target user for the project team, which allows a fluent communication (Pruitt and Adlin, 2005). Secondly, Personas make use of the "emotional mind" (Shyba and Tam, 2005) of people, which leads to a better focus on user-centred thinking within a project. Additionally, Personas allow for informed design and - according to Alan Cooper - enlighten the design process (Cooper, 1999). As an archetypical figure, Personas can guide decisions about product features, navigation, interactions, and even visual design (Nieters et al., 2007) and therefore assure an effective user-based end product.

A Persona is a user stereotype with specific practical and emotional goals which can be used to design new services and products. In order to make personas a reliable starting point they must be developed very carefully. They should be sufficiently different, and characterized not only by socio-demographic data but also by personality traits and life styles, identifying desires and values inspiring and guiding them throughout their daily life (Marcengo et al., 2009).

In the literature there are several approaches to generate Personas. Miaskiewicz and colleagues presented the application of the LSA (Latent Semantic Analysis) for developing Personas for an Institutional Repository system (Miaskiewicz et al. 2008). Another approach for generating Personas comes from McGinn and Kotamraju that created Personas for a training organization performing factor analysis (McGinn and Kotamraju, 2008). Their approach first involved the stakeholders in the early design phase to define the needed attributes that are most meaningful to the design team. In a second step data was collected by sending surveys to representatives of the target group that were specifically adjusted to gather information about the defined attributes. Resulting groupings from factor analysis were enlarged with information coming from interviews to refine the Persona set. Further, Tychsen and Canossa defined Personas in games using metrics by generating representations of "how players interact with the game" to inform the game design (Tychsen and Canossa; 2008, p. x). Pruitt and Adlin gave various examples of how to generate and apply Personas in a design team (Pruitt and Adlin, 2006).

Marcengo and colleagues (2009) suggest a Personas layering model that allows to adopt Personas to different contexts. They consider the single Persona as a composite entity, consisting of several layers, namely the 'basic' Persona which is fixed,[1] and the 'external layer' which is developed on the basis of the application context and therefore specific (Marcengo et al., 2009, p. 258). Working in telco projects, Marcengo and colleagues exemplify the Personas layering framework by giving a practical application of their model within different projects developed in their research area, such as seamless communication and interaction within a home or in-car communication.

[1] As the first fixed layer constitutes the basis for different product services, it is called 'reusable'.

3 Data and method

The current study uses SHARE, a large representative dataset, for creating Personas. SHARE is a longitudinal survey on persons aged 50 years and more, including data at the micro level (Börsch-Supan and Jürges, 2005). SHARE is a multidisciplinary endeavor and focuses on three domains, namely health, economics, and social networks. It includes detailed information on physical health, cognitive functions, mental health, healthcare, social support, housing or other activities which can be used to create reliable Personas and subsequently to support the work of both AAL practitioners and researchers.

We followed the approach by Marcengo and colleagues (2009) described above and developed so-called basic Personas based on SHARE. The aspects captured by our 'basic' Personas are socio-demographic situation, health and social networks. Marcengo and colleagues (2009) suggest using quantitative data from national statistical institutes, market research as well as qualitative data collected through focus groups or interviews for building 'basic' Personas. As SHARE includes not only socio-economic and demographic characteristics but also detailed information on life-style, needs and psychological characteristics, we can shape 'basic' Personas by using quantitative SHARE data only. The numerous aspects included in the interdisciplinary survey allow a multifaceted description at rather low costs.

For the 'external layer', we focused on technology usage, more exactly on computer and internet use. The information on the external layer draws on data by Statistics Austria, Eurostat and market research institutes (GfK Austria, 2009), studies by German market research organizations, the Senior Watch project as well as on various medical papers and online information on various diseases and symptoms.

To find the most representative prototypes for older persons, cluster analysis was applied. Cluster analysis is a class of statistical techniques that sorts through the raw data and groups them into so-called clusters. In other words, cluster analysis reduces the number of observations by grouping them into a smaller set. A cluster is a group of relatively homogeneous cases or observations. Objects in a cluster are similar to each other. They are also dissimilar to objects outside the cluster, particularly objects in other clusters. "The goal is that the objects within a group be similar (or related) to one another and different from (or unrelated) to the objects in the other groups." (Tan, Steinbach & Kumar, 2004, p. 490). Technically, the goal is to minimize intra-cluster distances and to maximize inter-cluster distances.

There are numerous ways to form clusters. Hierarchical clustering and partitional clustering are the most commonly used techniques (Norusis, 2010). Whereas hierarchical clustering produces a set of nested clusters organized as a hierarchical tree, partitional clustering divides data objects into non-overlapping subsets (clusters) such that each data object is in exactly one subset. If the number of clusters is specified and the researcher aims to produce a certain number of clusters, partitional clustering (or k-means clustering) is an appropriate tool.

AAL technologies focus on individuals with disabling conditions, health or social limitations and restrictions in daily living. Since interviewed respondents in the age group 50 to 59 years were in good health and since variation in the numerous variables related to health was rather small, we concentrated on individuals aged 60 years and more. SHARE includes countries

across Europe with different cultural and institutional backgrounds. Comparative studies revealed remarkable differences in health status and life expectancy across Europe (Vallin, Meslé and Valkonen, 2001). We therefore divided our sample in three groups: (1) Germany and Austria, (2) Southern European countries (Italy, Spain and Greece) and (3) Northern European countries (Sweden, Denmark, the Netherlands). We concentrated on Central Europe, i.e. on Austria and Germany, as funds were provided by the Austrian Research Promotion Agency and as our target group are developers in this region. We did not include Switzerland, as the individual response rate in this country was very low (Börsch-Supan and Jürges, 2005) which might indicate problems for the representativeness of the Swiss sample. For the two neighboring countries Austria and Germany with similar cultural background we created a full Persona set. Moreover, we created PersonaS for Northern European as well as for Southern European countries in order to explore the rich international data source. The analysis sample comprised 12.496 respondents aged 60 years and older in the three country groups mentioned above. The subset for Austria and Germany included 3,159 people (1,411 men and 1,748 women), the subsets of the northern and southern countries being larger with 4,459 and 4,846 interviewed persons.

4 Results – SHARE_PERSONAs

Due to gender-specific differences in morbidity and mortality (UN, 1988; Luy, 2003; Vallin, 2006) but also in basic demographic characteristics such as partner status,[2] we created separate sets of male and female prototypes. Taking into account that age is a main determinant for health, we further divided our male and female samples into age-groups. In order to keep the number of subgroups small, we chose 10-years age groups. Therefore we ended up with six subgroups: women aged 60 to 69 years, women aged 70 to 79 years, women aged 80 years and more, men aged 60 to 69 years, men aged 70 to 79 years and men aged 80 years and more. For each of these six subgroups, a set of Personas was created.

Numerous cluster analyses were carried out to find a combination of variables which captured the most relevant dimensions for creating Personas, yielded convergent results and allowed a variability between the clusters that is essential for describing the cluster (Personas) for the end users. As can be expected, various health-related variables were highly correlated. The final analyses included the following eight 'clustering variables':

- Self-perceived general health with the categories (1) very good, (2) good, (3) fair, (4) bad, and (5) very bad.
- Self-perceived general health as dichotomous variable with the categories (0) (very) good and (1) less than good.
- Self-reported limitations with 'activities of daily living' (ADL) including the following six activities: dressing, walking across a room, bathing or showering, eating, getting into and out of bed, using the toilet. The categories used for building clusters were (0) no ADL limitations and (1) one or more ADL limitations lasting for at least three months.

[2] For example, the partner status shows striking differences by sex. Especially at higher ages, the percentage of widowed persons is much higher among women compared to men. In the age group 80 years and above, 25% of Austrian and German men and 73% of Austrian and German women were widowed (and living without a partner). The main reasons for these findings are women's higher life expectancy and losses during World War II. The gender differences in partner status are observed in all countries included in SHARE (Buber, 2010).

- Cognitive functioning measured by the number of words recalled out of a list of ten words,[3] ranging from (0) zero to (10) ten words.
- Use of home care service including home care for nursing or personal care, home care for domestic tasks as well as meals-on-wheels with the categories (0) none of these services used and (1) one or more of these services used during the last twelve months.
- Economic restraints measured by the way the household makes ends meet with the categories (0) with great difficulties or with some difficulties and (1) fairly easily or easily.
- Taking part in social activities during the last month, including: voluntary or charity work; caring for a sick or disabled adult; providing help to family, friends or neighbors; attending an educational or training course; going to a sport, social or other kind of club; taking part in a religious organization; taking part in a political or community organization. Fur the cluster analysis a dichotomous variable was used indicating (0) at least one or (1) none out of the six mentioned activities.
- Contact with children distinguishing between (1) living with child(ren) in the same household, (2) daily contact, (3) contact several times a week or weekly, (4) less than weekly contact, and (5) childless.

These eight clustering variables used for building the 'skeleton' of our Personas concentrate on rather broad aspects of health and conditions. We included two variables on self-perceived general health, an ordinal one and a dichotomous one. In this way, general health was the main characteristic for generating clusters. As already mentioned before, the described specification of variables used for clustering turned out to produce the most appropriate clusters for AAL purposes.

In order to allow variability between the clusters and to keep the total number of prototypes manageable for the end user, i.e. the product developer, the number of clusters (Personas) was set to five. Thus, using partitional cluster analysis, for each of the six subgroups five clusters were calculated with the software package STATA. It turned out that for some subgroups, three or four was the optimal number of clusters, the initial set includes 26 clusters.As it turned out that some clusters were very similar, we collapsed some clusters and could therefore reduce the number of prototypes to a final set of 18 Personas for Austria and Germany (Appendix table A2).

To take advantage of the three pillars of SHARE, namely health, economics and social context, we used a wide range of information included in SHARE in order to describe the prototypes. The relevant dimensions capture detailed information on demographic background, physical health, mental health, cognitive functioning, behavioral risks, health care, children, and psychological well-being. For a detailed list of 'further variables for description' of our Personas we refer to Table A1 in the Appendix. The aspects we took into consideration are briefly listed below:

- Demographic background: partner status, highest educational level, number of children

[3] A list including the following ten items was read to the interviewed person: Butter, arm, letter, queen, ticket, grass, corner, stone, book, stick. SHARE included immediate memory of these ten items as well as delayed recall, referring to the number of recalled items after a certain delay of time. For more information we refer to Buber (2009).

- Physical health: various chronic diseases and symptoms, various limitations in activities of daily living (ADL) and instrumental activities of daily living (IADL), hearing, eyesight, drug use, limitations in activities of daily living such as bathing, eating, groceries shopping, etc.
- Mental health: various symptoms of depression like sleeping problems, loss of appetite, irritability, fatigue, poor concentration or little hopes for the future
- Cognitive functioning: orientation as to date, month, year and day of the week, numeracy, memory and recall, self-rated reading and writing skills
- Behavioural risks: body mass index (BMI), smoking, drinking alcohol, doing exercise, sports or vigorous activities
- Health care: hospitalisation, including duration and reasons for hospitalisation, receiving different forms of home care
- Children: contact with children, geographical distance to children[4]
- Activities: different dimensions of social engagement such as voluntary or charity work, caring for sick people, attending educational or training courses, participation in political organisations or communities or taking part in religious organisations
- Psychological well-being: satisfaction with life, personal feelings.

To sum up, we used in a first step eight 'cluster variables' to build the clusters, incorporating in a second step further variables for interpretation. Therefore, the distribution of the 'variables for description' was the base for a more detailed description of Personas. Whereas the parameter values of certain variables allowed a clear classification, for other variables the different parameter values were rather equally distributed and allowed no specification. In the first case, a specific variable was used for describing the Personas, in the latter one this variable was not taken into consideration. This is why the variables used for describing the various Personas differ and do not constitute a fixed set of items. For the detailed description of our SHARE-PERSONAs we refer to the Appendix 3 which – as an example – collects the created Personas aged 80 years and more.

Apart from the Personas for Germany and Austria, we created Personas for Northern European countries and for Southern European countries. Compared to Austria and Germany, it turned out that the main differences were related to housing and family status and to mental health. Since these differences appeared especially at higher ages, we created Personas for Northern as well as for Southern Europe only for the age group 80 years and more. Cluster analyses generated three clusters for men as well as for women in the two regions, thus yielding 12 further Personas. In total, we generated 30 Personas (18 for Austria and Germany, 6 for Southern European countries and 6 for Northern European countries).

5 Dissemination

A main goal of the project is the dissemination of the created Personas. For that purpose, a homepage is currently set up which provides the SHARE_PERSONAs to end-users with detailed information on how to use our Personas and how to finalize them for the purpose of specific projects.

[4] For respondents with two or more children, we considered the most frequently contacted child as well as the child living closest to the respondent.

5 Discussion (very preliminary)

Companies working in the area of smart homes, smart textiles, social support techniques, ambient prototyping or other embedded systems for elderly people (and many more) may benefit from using the developed SHARE_PERSONAs. The results of this project might also be used in upcoming research projects supporting user requirements analysis or simply as a supportive instrument of product design.

The current project constitutes a cooperation of scientists applying quantitative methods on the one hand, and researchers focusing on human-computer interaction (HCI) and the development of usable engineering knowledge. The quantitative results of the cluster analyses on the one hand and the distribution of the various items on the other, were used by HCI researchers to create text components and to generate Personas meeting the requirements of developers of AAL-products and services.
Although we are aware that each single project requires a specific research focus (with a specific research methodology), a set of Personas on the basis of SHARE can support research by providing overall findings about to this target group. Hence, engineers, designers and researchers get a better picture whom they are designing and implementing for.

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Appendix

Table A2
Personas: names and relative distribution by age and sex

	60-69 years	Frequency	70-79 years	Frequency	80+ years	Frequency
Group 1	Ingrid Reisen	9	Hilfe Eifrig	16	Renate Mittel	30
Group 2	Judith Einzig	30	Klaus-Maria Tugend	36	Luise Insel	22
Group 3	Maria-Klaus Liege	10	Doris Schwester	13	Renate Mittel	26
Group 4	Roswitha Blumenthal	26	Roswitha Blumenthal	17	Maria Jung	22
Group 5	Hilde Eifrig	24	Maria-Klaus Liege	18		
Total		99		100		100
	60-69 years	Frequency	70-79 years	Frequency	80+ yeas	Frequency
Group 1	Peter Meister	15	Andreas Renner	24	Karl-Heinz Ruhend	50
Group 2	Stefan Vater	50	Achim Herz	15	Helmuth Schlingel	27
Group 3	Maria-Klaus Liege	15	Stefan Vater	21	Siegfried Trauer	23
Group 4	Achim Herz	19	Michael Elend	27		
Group 5			Klaus-Maria Tugend	13		
Total		99		100		100

Table A1
Variables used for analysis

Description of variable	Labels	Variable name[5]
Age and sex		
Gender	1 male 2 female	gender
Age group	2 60-69 3 70-79 4 80+	age_group
Cluster variables		
Self-perceived health (European version)	1 very good 2 good 3 fair 4 bad 5 very bad	spheu
Self-perceived health, dichotomous (European version)	0 (very) good 1 less than good	spheu2
Limitations in activities of daily living (ADL)	0 none 1 one or more	adl2
Delayed recall	0 to 10	cf016tot
Received no home care or meals-on-wheels	0 yes 1 no	hc032dno
Household able to make ends meet	0 with great/some difficulties 1 (fairly) easily	co007 (meetends)
Social activities	0 at last one out of the six activities activities[6] 1 engaged in none of the six mentioned activities	ac002dno
Contact with child(ren)	1 living in same household 2 daily contact 3 weekly contact 4 less than weekly contact	ch014 (ch_contact)
Further variables used for description		
Marital status 1	1 with partner 2 single	Marstat
Marital status 2	1 married 2 partnership 3 separated 4 never married 5 divorced 6 widowed	marstatD
Highest educational level	1 to 6	dn010 (education)
Number of children	0 none 1 one 2 two 3 three 4 four or more	ch001 (children)
Distance to the child living closest	1 living in same household 2 less than 25 km	ch007 (ch_location)

[5] For further information on the exact wording of the question and the different possible answers we refer to Buber 2009.

[6] These activities are (1) voluntary or charity work, (2) providing care for a sick or disabled adult, (3) providing help to family, friends or neighbors, (4) attending an educational or training course, (5) going to a sports, social or other kind of club, and (6) taking part in a political or community organization.

	3 25 to 100 km 4 more than 100 km	
Number of chronic diseases	0 less than two 1 two or more	chronic2
Heart attack or other heart problems	0 no 1 yes	ph006d01
High blood pressure	0 no 1 yes	ph006d02
High blood cholesterol	0 no 1 yes	ph006d03
Stroke or cerebral vascular disease	0 no 1 yes	ph006d04
Diabetes	0 no 1 yes	ph006d05
Chronic lung disease	0 no 1 yes	ph006d06
Asthma	0 no 1 yes	ph006d07
Arthritis or rheumatism	0 no 1 yes	ph006d08
Osteoporosis	0 no 1 yes	ph006d09
Cancer or malignant tumour	0 no 1 yes	ph006d10
Stomach, duodenal or peptic ulcer	0 no 1 yes	ph006d11
Parkinson disease	0 no 1 yes	ph006d12
Cataracts	0 no 1 yes	ph006d13
Hip or femoral fracture	0 no 1 yes	ph006d14
None of these chronic diseases	0 no 1 yes	ph006dno
Number of symptoms	0 less than two 1 two or more	symptom2
Bothered by pain in back, knees, hips or other joint	0 no 1 yes	ph010d01
Bothered by heart trouble	0 no 1 yes	ph010d02
Bothered by breathlessness	0 no 1 yes	ph010d03
Bothered by persistent cough	0 no 1 yes	ph010d04
Bothered by swollen legs	0 no 1 yes	ph010d05
Bothered by sleeping problems	0 no 1 yes	ph010d06
Bothered by falling down	0 no 1 yes	ph010d07
Bothered by fear of falling down	0 no 1 yes	ph010d08
Bothered by dizziness, faints or blackouts	0 no 1 yes	ph010d09
Bothered by stomach or intestine problems	0 no 1 yes	ph010d10
Bothered by incontinence	0 no 1 yes	ph010d11

None of these symptoms	0 no 1 yes	ph010dno
Bothered by other symptoms	0 no 1 yes	ph010dot
Limitations with activities	0 not limited 1 limited	gali
Limitations with instrumental activities of daily living (IADL)	0 not limited 1 limited	iadl2
Difficulties in walking 100 metres	0 no 1 yes	ph048d01
Difficulties in sitting for two hours	0 no 1 yes	ph048d02
Difficulties in getting up from chair	0 no 1 yes	ph048d03
Difficulties in climbing several flights of stairs	0 no 1 yes	ph048d04
Difficulties in climbing one flight of stairs	0 no 1 yes	ph048d05
Difficulties in stooping, kneeling, crouching	0 no 1 yes	ph048d06
Difficulties in reaching up or extending arms above shoulder	0 no 1 yes	ph048d07
Difficulties in pulling or pushing large objects	0 no 1 yes	ph048d08
Difficulties in lifting or carrying weights over 5 kg	0 no 1 yes	ph048d09
Difficulties in picking up a small coin from a table	0 no 1 yes	ph048d10
None of these difficulties	0 no 1 yes	ph048dno
Difficulties in dressing, including shoes and socks	0 no 1 yes	ph049d01
Difficulties in walking across a room	0 no 1 yes	ph049d02
Difficulties in bathing or showering	0 no 1 yes	ph049d03
Difficulties in eating, cutting up food	0 no 1 yes	ph049d04
Difficulties in getting into or out of bed	0 no 1 yes	ph049d05
Difficulties in using the toilet, including getting up or down	0 no 1 yes	ph049d06
Difficulties in using a map in a strange place	0 no 1 yes	ph049d07
Difficulties in preparing a hot meal	0 no 1 yes	ph049d08
Difficulties in shopping for groceries	0 no 1 yes	ph049d09
Difficulties in telephone calls	0 no 1 yes	ph049d10
Difficulties in taking medications	0 no 1 yes	ph049d11
Difficulties in doing work around the house or garden	0 no 1 yes	ph049d12
Difficulties in managing money	0 no 1 yes	ph049d13
None of these difficulties	0 no 1 yes	ph049dno

Eyesight	0 fair, poor or blind 1 excellent, very good or good	eyes
Use of glasses	0 no 1 yes	ph041
Hearing	0 fair or poor 1 excellent, very good or good	hearing
Use of hearing aid	0 no 1 yes	ph045
Body mass index	1 underweight (below 18.5) 2 normal (18.5 – 24.9) 3 overweight (25 – 29.9) 4 obese (30 or higher)	bmi2
Taking drugs at least once a week	0 no 1 yes	drugs
Currently smoking	1 yes 2 no	cusmoke
Drinking more than 2 glasses of alcohol almost every or 5/6 days a week	1 yes 0 no	drinkin2
Physical inactivity	0 some moderate or vigorous physical activity 1 (almost) never engaging into moderate nor vigorous physical activity	phactiv
Depression scale EURO-D; number of depressive symptoms	0 to 12	eurod
Depression 'caseness' based on EURO-D	0 not depressed (0 to 3) 1 depressed	eurodcat
Sad or depressed during last month	0 no 1 yes	mh002
Hopes for the future	0 no hopes mentioned 1 any hopes mentioned	mh003
Feeling one would rather be dead	0 no 1 yes	mh004
Feeling guilty	0 no 1 yes	mh005
Excessive guilt or self-blame	0 no 1 yes	mh006
Sleeping problems	0 no 1 yes	mh007
Less or same interest in things	0 no loss of interest 1 less interest than usual	mh008
Keeps up interest	0 no 1 yes	mh009
Irritability	0 no 1 yes	mh010
Appetite	0 no 1 yes	mh011
Eating less	0 no 1 yes	mh012
Fatigue	0 no 1 yes	mh013
Concentration on entertainment	0 no 1 yes	mh014
Concentration on reading	0 no 1 yes	mh015
Enjoyment	0 no 1 yes	mh016
Tearfulness	0 no 1 yes	mh017
Having ever been depressed	0 no	mh018

	1 yes	
Orientation to date, month, year and day of week	0 bad 1 2 3 4 good	orienti
Numeracy score	1 bad 2 3 4 5 good	numeracy
Memory, based on a list of ten items	0 to 10	cf008tot
Self-rated reading skills	1 excellent 2 very good 3 good 4 fair 5 poor	cf001
Self-rated writing skills	1 excellent 2 very good 3 good 4 fair 5 poor	cf002
Concentration problems with TV, radio or reading	0 no 1 yes	m_conc
Self-rated reading skills	0 fair or poor 1 excellent, very good or good	reading
Self-rated writing skills	0 fair or poor 1 excellent, very good or good	writing
Special features in accommodation that assist persons with physical impairments or health problems	0 no 1 yes	ho033
Admitted in a hospital overnight during last 12 months	0 no 1 yes	hc012
Times admitted in a hospital overnight during last 12 months		hc013
Reason hospital: inpatient surgery	0 no 1 yes	hc015d1
Reason hospital: medical tests or non-surgical treatments	0 no 1 yes	hc015d2
Reason hospital: mental health problems	0 no 1 yes	hc015d3
Reason hospital: other than inpatient surgery, medical tests or non-surgical treatments or mental health problems	0 no 1 yes	hc015dno
Kind of surgery (based on a list)		hc018
Received home care for nursing or personal care	0 no 1 yes	hc032d1
Received home care for domestic tasks	0 no 1 yes	hc032d2
Received meals-on-wheels	0 no 1 yes	hc032d3
Received neither home care for nursing or personal care, for domestic tasks or meals-on-wheels	0 no 1 yes	hc032dno
Voluntary or charity work	0 no 1 yes	ac002d1
Cared for a sick or disabled adult	0 no 1 yes	ac002d2
Provided help to family, friends or neighbours	0 no 1 yes	ac002d3
Attended an educational or training course	0 no	ac002d4

	1 yes	
Gone to a sport, social or other kind of club	0 no 1 yes	ac002d5
Taken part in a religious organization	0 no 1 yes	ac002d6
Taken part political or community organization	0 no 1 yes	ac002d7
None of the mentioned activities	0 no 1 yes	ac002dno
How often done voluntary or charity work	1 daily 2 weekly 3 less than weekly	ac003_1
How often cared for a sick or disabled adult	1 daily 2 weekly 3 less than weekly	ac003_2
How often provided help to family, friends or neighbors	1 daily 2 weekly 3 less than weekly	ac003_3
How often attended an educational or training course	1 daily 2 weekly 3 less than weekly	ac003_4
How often gone to a sports, social or other kind of club	1 daily 2 weekly 3 less than weekly	ac003_5
How often taken part in a religious organization	1 daily 2 weekly 3 less than weekly	ac003_6
How often taken part in a political or community organization	1 daily 2 weekly 3 less than weekly	ac003_7
Life satisfaction	1 very or somewhat satisfied 0 somewhat or very dissatisfied	q1
Age prevents me from doing things I would like to do	1 often or sometimes 0 rarely or never	q2a
Out of my control	1 often or sometimes 0 rarely or never	q2b
Feeling left out	1 often or sometimes 0 rarely or never	q2c
I do what I want	1 often or sometimes 0 rarely or never	q2d
Family responsibilities prevent me from doing what I want to do	1 often or sometimes 0 rarely or never	q2e
Shortage of money	1 often or sometimes 0 rarely or never	q2f
Looking forward to each day	1 often or sometimes 0 rarely or never	q2g
Life has meaning	1 often or sometimes 0 rarely or never	q2h
Looking back with happiness	1 often or sometimes 0 rarely or never	q2i
Full of energy	1 often or sometimes 0 rarely or never	q2j
Full of opportunities	1 often or sometimes 0 rarely or never	q2k
Future looks good	1 often or sometimes 0 rarely or never	q2l
Pursue goals with energy	1 (strongly) agree 0 (strongly) disagree	q3a

Usually expect the best	0 none or some of the time 1 most or all of the time	q3b
Optimistic about future	0 none or some of the time 1 most or all of the time	q3c
Not expect things to go my way	0 none or some of the time 1 most or all of the time	q3d
Find ways to solve problems	0 none or some of the time 1 most or all of the time	q3e
Rarely expecting positive things	0 none or some of the time 1 most or all of the time	q3f
Felt prepared for future	0 none or some of the time 1 most or all of the time	q3g
Felt depressed	0 none or some of the time 1 most or all of the time	q4a
Everything is exhausting	0 none or some of the time 1 most or all of the time	q4b
Sleep was restless	0 none or some of the time 1 most or all of the time	q4c
Was happy	0 none or some of the time 1 most or all of the time	q4d
Felt lonely	0 none or some of the time 1 most or all of the time	q4e
People were unfriendly	0 none or some of the time 1 most or all of the time	q4f
Enjoyed life	0 none or some of the time 1 most or all of the time	q4g
Felt sad	0 none or some of the time 1 most or all of the time	q4h
People disliked me	0 none or some of the time 1 most or all of the time	q4i
Couldn't get going	0 none or some of the time 1 most or all of the time	q4j
Didn't feel like eating	0 none or some of the time 1 most or all of the time	q4k
Had lot of energy	0 none or some of the time 1 most or all of the time	q4l
Felt tired	0 none or some of the time 1 most or all of the time	q4m
Felt rested in the morning	0 none or some of the time 1 most or all of the time	q4n
Balance within partnership	0 none or some of the time 1 most or all of the time	q5a
Received adequate appreciation	0 none or some of the time 1 most or all of the time	q5b
Balance in major activity	0 none or some of the time 1 most or all of the time	q5c
Seriously disappointed	0 none or some of the time 1 most or all of the time	q5d

Appendix 3: Example of two SHARE_PERSONAs aged 80 years and more

Adelheit HÜFTLEID

Grandma with osteoporosis – Vienna

Age: 84

Household | Social contacts | Income

Cognitive:
Memory:
Diseases:
Symptoms:
Limitations:

About & Family:

Adelheit lives together with her children since she lost her husband. She is the oldest family member and has three children and six grandchildren. They have no economical problems. She has been a housewife for the most of her life. She was able to stand on her own feet for a long time, but now she is getting old and not capable of doing some daily tasks like cooking or shopping.

Diseases
heart problems,
stroke,
osteoporosis,

Symptoms
pain in joints,
heart trouble

Health

Adelheit has many health problems and is gradually losing her ability to keep her head up. This year she needed hip replacement due to osteoporosis. Her bones are getting fragile and she is overweight. She cannot walk for a long time or stand up, which is why she mostly sits or lies down at home. It is embarrassing for her to suffer from incontinence. She is cognitively active but she cannot calculate anymore and sometimes confuses the day of the week. She has also difficulties in remembering past occurrences.

Limitations
difficulties in walking 100m,
getting up from chair,
climbing stairs, kneeling,
lifting more than five kilos,
dressing incl. shoes & socks,
bathing,
shopping,
doing work around house,
using map in a strange place

Social

Adelheit is a modest person and does not have high expectations. She enjoys spending time with her grandchildren, however she feels melancholic and sometimes sad thinking about the past and missing the people she has lost.
She keeps herself busy however she can by doing housework or in the garden, since she does not want to just sit in the corner without doing anything.

Psychographics
positive,
happy,
melancholic,
hardworking,

Drugs
yes

Hearing
aid

Eyesight
glasses, cataracts

Educational level
basic

Risks
overweight,
inactive

Technology Usage

Adelheit mainly stays at home and watches TV. She is not interested in computers or the internet and cannot understand how they function, even though her grandchildren keep trying to explain it. She does not want to put effort into trying to learn how the mobile phones or computers work. She thinks that she does not need to use them.

General Attitude towards Technology
negative

Media - Communication
TV

SHARE Personas

Luise INSEL

Diabetes patient - Berlin

Age: 88

Household | Social contacts | Income

Cognitive:
Memory:
Diseases:
Symptoms:
Limitations:

About & Family:

Luise lives alone in her small flat. Her son visits her a couple of times a week to check if she is doing well or need anything. She has no financial problems. However, Luise cannot take care of herself alone anymore. She receives nursing for personal care at home and meals on wheels.

Diseases

diabetes

Symptoms

fear of falling down,
dizziness,
faints or blackouts

Health

Luise is a diabetes patient and needs someone to remind her to take her drugs and to make the injections she needs. She has a very bad memory. Because she is very overweight she cannot move easily and has a tendency to let herself go and stay passive.

Limitations

difficulties in sitting for two hours,
getting up from chair,
climbing up stairs, kneeling, stooping,
pulling or pushing large objects,
carrying weights more than 5kg,
shopping for groceries,
doing work around the house

Social

She is socially isolated and has no friends left. Her son calls her on the phone every other day. She doesnot have any routine activity. The only contacts she has are the nurses and her son.

Psychographics

depressed,
inactive,
sad,
withdrawn

Drugs

yes

Hearing

good

Eyesight

glasses

Educational level

basic

Risks

overweight,
inactive

Technology Usage

The only technological device she uses is the TV. She needs to use medical devices at home for measuring her blood sugar for example, but these are not devices that she uses herself. There is always a nurse or her son to do things for her.

General Attitude towards Technology

negative

Media - Communication

TV

SHARE Personas

Maria JUNG

Well aged - Linz

Age: 85

Household | Social contacts | Income

Cognitive:
Memory:
Diseases:
Symptoms:
Limitations:

About & Family:

Maria has always been independent and likes being able to make decisions alone. Although she has some financial problems she is doing fine. Maria got never married and has no children. Her younger sister is alive as well but her older brother died last year. She also has contact to his family.

Diseases
high blood pressure

Symptoms
none

Health

She is both physically and cognitively quite healthy in comparison to her friends. She does not have any diseases except for high blood pressure. She uses drugs to keep it under control. She takes care of herself and does not neglect any symptom she notices and sees a doctor immediately. She goes regularly to the hospital for an annual check-up.

She needs glasses but can see and hear very well.

Limitations
none

Social

Maria is a very positive, faithful and communicative person. She is regularly active in religious organisations and attends events. She does not think that her age limits her that much and she is full of ideas and wishes for the future.

Psychographics
happy,
positive,
full of life,
joyful,
communicative,
religious,
hopeful

Drugs
yes

Hearing
good

Eyesight
glasses

Educational level
medium

Risks
none

Technology Usage

Maria has a mobile phone that she uses passively, so that her friends or family can reach her wherever she is. She likes watching TV and listening to radio.

General Attitude towards Technology
neutral

Media - Communication
TV
radio
mobile phone

SHARE Personas

Karl-Heinz RUHEND

Physically inactive - Leipzig

Age: 85

Household | Social contacts | Income

Cognitive:
Memory:
Diseases:
Symptoms:
Limitations:

About & Family:

Karl-Heinz worked in the same factory until he retired. Now he receives a small retirement salary, which is not enough for his needs. He is married and lives with his oldest daughter and her family. His daughter takes care of him and his wife. She tries to provide for comfort as best as she can. Recently they renovated the bathroom by adding support bars and cabinet knobs.

Diseases

high blood pressure,
arthritis,
hernia

Symptoms

pain in joints,
breathlessness,
fear of falling down

Health

Karl-Heinz is both physically and cognitively not a healthy person and has difficulties in daily activites and mobility limitations. He is also diagnosed with cataracts. He is normal weight. Last year, he fell down and caused an abdomen hernia while trying to hold on. After that he required urgently surgery. Now he is very careful but also afraid of falling down again. He is forgetful and cannot cope with numbers anymore, cannot think in detail about on an issue and loses his orientation.

Limitations

difficulties in walking 100m,
climbing stairs, kneeling, pulling or pushing objects,
dressing incl. shoes and socks,
shopping,
preparing a hot meal,
managing money

Social

Karl-Heinz is a religious man and, although he cannot walk long distances, insists on going to the church sometimes. He is aware that he has serious health problems that are preventing him doing things he wants, but he still looks forward to each day and is happy with the life he has lived. He feels supported and loved and not lonely.
He needs special care at home, as he cannot take care of himself anymore. His wife and daughter help him a lot.

Psychographics

satisfied,
positive,
passive,
forgetful,
religious

Drugs

yes

Hearing

good

Eyesight

cataracts, good

Educational level

basic

Risks

inactive,
mental fatigue

Technology Usage

Karl-Heinz likes watching TV, however cataracts annoys him sometimes. He is at home most of the time and sleeps in his armchair. He likes being in the garden and looking around when the weather is good.

General Attitude towards Technology

negative

Media - Communication

TV

SHARE Personas

Helmuth SCHLINGEL

Well aged - Bregenz

Age: 88

Household | Social contacts | Income

Cognitive:
Memory:
Diseases:
Symptoms:
Limitations:

About & Family:

Helmuth is living with his wife outside of the city and their daughter is living in the city center. They are frequently in contact over phone or meeting at weekends.
Helmuth and his wife have no financial problems. They live in a country house with a big garden.

Diseases
hearth problems

Symptoms
none

Health

He has heart problems but does not need drugs yet. He does not have limitations in his daily living and he is active in their garden, which is good for his heart. However, he is overweight and likes eating fatty meals such as steak.

He uses a hearing aid and glasses but he is not satisfied with them. He says that he cannot hear or see well.

Limitations
none

Social

He is satisfied with his life and is generally a happy person. He feels free and able to do what he wants. He and his wife like travelling and go on trips together with friends. Helmuth has a good communication with his grandchildren.

Psychographics
happy,
positive,
joyful,
communicative,
eager

Drugs
none

Hearing
less than good, aid

Eyesight
less than good, glasses

Educational level
basic

Risks
overweight

Technology Usage

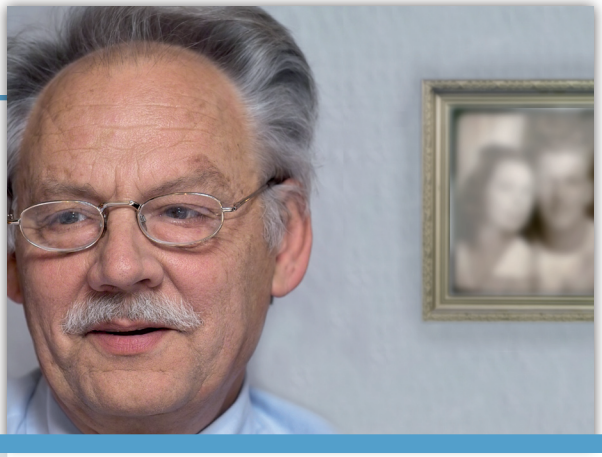
He does not like mobile phones and is generally sceptal about technological devices. But he has a mobile phone which they use rarely when they are on a holiday or trip. It is otherwise turned off.
He likes watching TV.

General Attitude towards Technology
negative

Media - Communication
TV
mobile phone

SHARE Personas

Siegfried TRAUER



Mourning – Euskirchen

Age: 82

Household | Social contacts | Income

Cognitive:
Memory:
Diseases:
Symptoms:
Limitations:

About & Family:

Siegfried was a salesman and he has enough savings for the rest of his life. He does not want to be alone but he does not want to leave his flat and live in a nursing home. He receives nursing care at home and meals on wheels service.
Siegfried lost his wife recently. They had been together for almost 60 years. Since they didn't have children he is now alone without any living family.

Diseases

none

Symptoms

heart trouble,
dizziness,
blackouts,
depression
sleeping problems,
breathlessness

Health

He does not have a physical disease but he suffers from psychosomatic symptoms such as heart trouble, blackouts, dizziness, etc. He receives psychological treatment.

He uses glasses but cannot see well or hear well.

Limitations

difficulties in getting up from chair,
lifting or carrying weights over five kilos,
using a map in a strange place,
preparing a hot meal,
doing work around the house or garden

Social

Siegfried thinks that he has gotten old and it is preventing him acting freely. He is actually a satisfied and social person but feels depressed and sad.
However, he is regularly visits the local seniors club and meet friends there.

Psychographics

depressed,
sad,
introverted,
sentimental,
needs support

Drugs

yes

Hearing

less than good

Eyesight

less than good, glasses

Educational level

medium

Risks

none

Technology Usage

He likes listening to music, but he has an old LP player. He is interested in technological devices but he does not see himself as competent enough to be able to learn using new devices. He does not like watching TV but it is the main information source for his daily life.

General Attitude towards Technology

neutral

Media - Communication

TV

SHARE Personas