FIELD TRIALS

SUMMARY REPORT AND EVALUATION

Project title: **ELDERHOP**

Project reference number: **AAL-2010-3-037**

Revision: Version 0.1

Main Authors:

Dr Antomarini, Marco (COOSS)

Dr Lupini, Lorenza (COOSS)

Dr Horvath Alexandra (MMO)

Elke Mattheiss (CURE)

Dr Attila Nemes (KIBU)

Date: 31/01/2014
Dissemination Level: Restricted

Table of Contents

Executive Summary

The ELDERHOP project aims to provide a complex solution to elderly people wanting to be able to keep up active participation in one of the decisive, important and social activities they like doing on a daily basis – shopping. Today many IT developers think about how to help people conduct their shopping from home and develop solutions and smart home appliances to enable this. Contrary, elderly people do not want to stay home in isolation - going out shopping is a decisive program in their life, for some one of the only left; therefore it is not to be substituted, but rather facilitated. The project's target group is elderly above the age of 65 considering themselves hampered in daily activities due to having vision impairment (farsightedness) and/or chronic disease and/or sensing a minor forgetfulness or dementia caused by ageing; furthermore such elderly are targeted who have only basic, low or no digital skills.

Thus, ELDERHOP proposes a combination of open-source mobile technology and TV based service that supports elderly wishing to go out and conduct shopping in each step of this activity process. The ELDERHOP service will help elderly get up-to-date information about discounts of stores in their local area, help them find their way to these stores, decrease their anxiety.

Field trials represent a key moment within any research and development initiatives aiming to break through the market with a usable and attractive product. In present project trials gave the opportunity to the Consortium to have its work evaluated in order to have inputs for further improvement and definition of a feasible business model (or more than one).

Abstract

Going out, making shopping, frequenting the local community and the neighbourhood represent essential activities for ageing persons. Such activities contribute to maintain an active life with positive benefits to the health status and the psychological conditions. The promotion, facilitation and the support to the outdoor activities are ways to prevent psycho-physical decline linked to ageing. The ELDERHOP system is intended as a tool, technology-based, to facilitate the shopping to ageing users, in the perspective to a positive impact on the wellbeing and the active ageing.

Therefore, the field trials to test the prototype system generate great expectations both for the users as well as for the developers: the contribution of final users within the whole ELDERHOP project has been relevant and important, so particularly in the final phase of the project life, with users asked to provide comments, feedback and recommendations toward the implementation of the final product and a business strategy. A number of users tested the ELDERHOP prototype in order to evaluate it and provide feedback to developers, followed by a team of researchers and experts aiming to describe if and how the system matches the given objectives. Here follow the results of the trials phase.

1 Objectives

ELDERHOP general strategy is based on the involvement of direct and indirect final users in the three key moment of the project life: the requirements analysis, the usability engineering and the evaluation tasks. As stated in D5.1, the major objectives are to (1) detect the conformance of services with the end-user-specific expectations and needs; (2) find potential ergonomic design strengths and weaknesses. So the main goal of the field trials were to match the users' requests and expectations, expressed within WP2. Also a contribution to the development of one of more business model(s) were expected to result from the tests.

Objectives concerning the system performances:

- Efficiency: the system functions should do what they are expected to in a reasonable time; therefore the prototype has to be able to support users during shopping as promised.

- Fixed bugs: any kind of technical issue should be studied and fixed in order to obtain, for the end of the project, a prototype as closer as possible to the final prototype.

- Performances: the system performances will be monitored in order to verify if it is usable, friendly, accessible and easy-to-learn.

- Interoperability and scalability

Objectives concerning the impact on users:

- Efficacy: the system proposed to the users really acts as a support during shopping activities; all its functions have to closely answer the users' requirements and needs.

- Benefits provided: the prototype has a positive impact on users' lives; in particular it is able to integrate into the users' usual lifestyle providing positive solutions without significant change in users' attitudes.

- Usability: the system interfaces have to be usable for the users, and particularly for those with specific impairments; the prototype has to be able to adapt itself to the users' capabilities.

- Attractiveness: the system should be attractive and should be perceived by the users as a useful tool to be purchased.

The Consortium planned to conduct exhaustive field-trials to gain information from end-users about modules, features and components of ELDERHOP. The results of the tests will provide useful feedback to the partners involved in the development In the final part of the project also end-to-end demonstrators will be launched where elderly can evaluate how ELDERHOP helps them in the complete process of a shopping trip. COOSS will involve the users for these testing.

2 Results

As planned, the system has been tested by 20 users within the targeted ageing group. A scheduled timetable of trials provided within D5.1 has been respected. Each user involved could deal with the system, go through the available functions, verify its efficacy and provide comment and feedback (via questionnaire and informal comments). Also care professionals and key informers have been enquired by the research staff to provide their views about the possible impact of the system in the users daily life (via focus groups). All kind of comments have been registered, because even a not positive comments has to be intended as a contribution toward further improvements; the system received both positive and negative feedbacks, and this has to be considered when implementing a business strategy.

12 women and 8 men participated as volunteers in the test phase; their age was between 63 and 75 years and, particularly they were quite familiar with smartphones and apps. 14 of them have a high school diploma, and 8 of them are still working (12 are retired from work).

Their fruitful participation allowed the Consortium to know the point of strengths and the weaknesses of the prototype providing comments, feedback, suggestions and recommendations. Their view has been collected by face-to-face interviews, leaded by structured questionnaires. Many additional inputs from end-users also arrived from informal speeches, collecting information while each user was using the system. All kind of comments have been registered, because even a not positive comments has to be intended as a contribution toward further improvements; the system received both positive and negative feedbacks, and this has to be considered when implementing a business strategy.

2.1 General view

The system, at present stage of development, looks to have a huge potential even if several steps have to be done to fix several technical issues/bugs, to improve and widen its functions and to better match the users' expectations. As resulted from the tests, the system looks quite accessible and attractive, even if the English version (only available) represents a key burden. the system, as it is, needs to improve the amount of real data (about both stores and products) made available in the database; also the personal profiles of each users need to be accessible and personalized in order to improve the experience of the system and make it more "social" and interactive.

If compared with "apps" available in the Italian digital app stores, the only functions "find a product", "find a store", "plan a trip" seems to be too few, and cannot allow the system to compete with them, even if the interoperability of the mobile system with the SmartTV set is a significant point of strength that has to be emphasized and improved. It seems that the system has a lot of potentials, but it is requiring more updates: in our opinion, agreements with the stores/groceries must be a priority, in order to have real offers in real time directly from them.

Non-functional requirements, particularly intended for ageing users, also must be reinforced: at current stage of development, the "app", both for smartphone and smartTV, looks usable

and accessible but it partially misses those “non-functional” requirements typically intended for ageing users, and properly described within WP2 (enlarge the fonts, show bigger photos, audio-translation of texts, etc.).

The app is in line with other existing solutions in terms of look, usability and functionalities; the fact that the system foresees to add further functions in the final product represents a clear point of strength and an element of distinction from the available standards. Users revealed to be familiar enough with apps on smartphones and this made tests easier.

During the trials, the mobile system showed the following issues and limits:

- When users were under wifi areas, the access to the ShopHop app works fine, while when they were under 3g connection the access often failed. Most of the time several attempts were required to access the app.

- When looking for special offers of a specific store, too often “unreal” offers appear.

- Too few real products seems to be available, and often they are not in real special offer in the stores.

- Every time users made access in the ShopHop application they were in need to update the profile, and list the preferred stores. This revealed to be annoying and time wasting.

- It seems that to add products to a shopping trip is quite complicated. A “drug and drop” solutions would be recommended or at least a button to “add product to the shopping trip”.

- The shopping trip requires a “map” and the possibility to plan a trip according to local public transport timetables. At the beginning of the project, in fact, a function dealing with public transport and “find the closer bus stop” was expected: it could significantly improve the attractiveness of the app.

- TV app and mobile app should have the same functions; also the TV app should be integrated with information requiring and justifying the bigger screen, like “show details about the product”, see a “big map” with groceries close to users’ home, “chat/call/video-call a parent/friend”. Interesting suggestion coming from a user, is to add in the tv set a function which allows the user “to make a shopping list and automatically show the better offer for each product added”.

2.4 user feedback from questionnaires

Demographic Data
Sex: - Woman (12) - Man (8)
Age: 2 63 years old, 3 65 years old, 5 68 years old, 4 72 years old, 2 74 years old, 4 75 years old.
Highest education: 3 Apprenticeship 14 High-school diploma 3 University Degree
Professional life: 7 working 13 retired

Questionnaire for User Satisfaction[1]												
1a. What's your reaction to the overall System?												
1.1. What's your opinion in general?	Terrible	1	2	3	4	5	6	7	8	9	NA	wonderful
		1	**8**	**7**	**1**	**1**	**1**	**1**				
1.2. Is it difficult for you to deal with it?	Difficult	1	2	3	4	5	6	7	8	9	NA	Easy
		3	**5**	**4**	**2**	**3**	**3**					
1.3. how do you feel while using it?	Frustrating	1	2	3	4	5	6	7	8	9	NA	Satisfying
		1	**3**	**7**	**6**	**2**	**1**					
1.4. Do you perceive it as adequate to your needs and attitudes?	Inadequate	1	2	3	4	5	6	7	8	9	NA	Adequate
		2	**5**	**6**	**4**	**2**	**1**					
1.5. Do you feel stimulated by it?	Dull	1	2	3	4	5	6	7	8	9	NA	Stimulating
				3	**4**	**6**	**3**	**1**			**2**	
1.6. Does it looks rigid or flexible enough?	Rigid	1	2	3	4	5	6	7	8	9	NA	Flexible
		4	**5**	**3**	**4**	**1**	**1**				**2**	

[1] Based on: Chin, J.P., Diehl, V.A., Norman, K.L. (1988) Development of an Instrument Measuring User Satisfaction of the Human-Computer Interface. ACM CHI'88 Proceedings, 213-218. ©1988 ACM.

1b. What's your feedback concerning the Smartphone look?												
1.7. Is reading on the screen easy or hard?	Hard	1	2	3	4	5	6	7	8	9	NA	Easy
			3	**2**	**1**	**4**	**7**	**1**	**2**			
1.8. Is finding tasks and functions easy or hard?	Not at all	1	2	3	4	5	6	7	8	9	NA	Very much
		1	**4**	**6**	**4**	**3**	**1**				**1**	
1.9. Are information well organized?	Confusing	1	2	3	4	5	6	7	8	9	NA	Very clear
		3	**5**	**6**	**4**	**1**		**1**				
1.10. Are sequence of screens well organized?	Confusing	1	2	3	4	5	6	7	8	9	NA	Very clear
		3	**6**	**4**	**4**	**3**						
1c. What's your feedback concerning the SmartTV look?												
1.7. Is reading on the screen easy or hard?	Hard	1	2	3	4	5	6	7	8	9	NA	Easy
		1	**3**	**2**	**1**	**4**	**8**		**1**			
1.8. Is finding tasks and functions easy or hard?	Not at all	1	2	3	4	5	6	7	8	9	NA	Very much
		3	**4**	**4**	**4**	**3**	**2**					
1.9. Are information well organized?	Confusing	1	2	3	4	5	6	7	8	9	NA	Very clear
		1	**5**	**2**	**4**	**3**	**3**	**2**				
1.10. Are sequence of screens well organized?	Confusing	1	2	3	4	5	6	7	8	9	NA	Very clear
		1	**4**	**4**	**4**	**3**	**1**	**1**			**2**	
1d. What's your opinion about terminology and system information?												
1.11. Are terms and words consistent for you?	Inconsistent	1	2	3	4	5	6	7	8	9	NA	Consistent
		4	**4**	**2**	**2**						**8**	
1.12. Can you understand the terms for each task?	Never	1	2	3	4	5	6	7	8	9	NA	Always
		1	**1**	**4**	**3**						**11**	
1.13. Do you feel confident with the position of info on the screen?	Never	1	2	3	4	5	6	7	8	9	NA	Always
				1	**2**	**4**	**7**	**1**	**2**		**3**	
1.14. Are Error messages helpful?	Unhelpful	1	2	3	4	5	6	7	8	9	NA	Helpful
				1	**1**		**4**				**14**	

1e. Did you easily learn to …?												
1.15. ..move through the functions/tasks?	Difficult	1	2	3	4	5	6	7	8	9	NA	Easy
				1	**4**	**8**	**7**					
1.16. ..look for new functions?	Difficult	1	2	3	4	5	6	7	8	9	NA	Easy
						4	**11**	**3**	**1**	**1**		
1.17. ..remember names and use of commands?	Difficult	1	2	3	4	5	6	7	8	9	NA	Easy
						3	**9**	**3**	**2**		**3**	
1.18. ..perform a task?	Difficult	1	2	3	4	5	6	7	8	9	NA	Easy
		1	**4**	**3**	**7**	**1**	**1**	**2**	**1**			
1f. Is the system reactive and adequate to your capabilities?												
1.19. Is the system fast?	Slow	1	2	3	4	5	6	7	8	9	NA	Fast
						4	**13**	**2**			**1**	
1.16. Does the system looks designed for all level of users?	Never	1	2	3	4	5	6	7	8	9	NA	Always
			5	**7**	**6**		**2**					

List the most NEGATIVE aspects?

- Language (16 answer)
- Few products (17 answer)
- Unreal prizes (19 answer)
- Quite difficult to learn (12 answer)
- The SmartTV is too expensive (9 answer)

List the most POSITIVE aspects?

- Nice to see! (9 answer)
- I like to look for discounts! (10 answer)
- It's useful to make shopping lists (8 answer)

Perceived Usefulness and Ease of Use[2]										
2a. Do you perceive the System as Useful?										
2.1 Would the use of the system in your shopping trip enable you to accomplish tasks more quickly and easily?	Unlikely	1	2	3	4	5	6	7	NA	Likely
			1	**3**	**9**	**4**			**3**	
2.2. Would the use of the system facilitate your shopping?	Unlikely	1	2	3	4	5	6	7	NA	Likely
		3	**3**	**4**	**8**	**2**				
2.3 Would the use of the system increase your will to go out for shopping?	Unlikely	1	2	3	4	5	6	7	NA	Likely
			1		**2**	**6**	**7**		**4**	
2.4. Would the use of the system enhance your self-confidence while shopping?	Unlikely	1	2	3	4	5	6	7	NA	Likely
		1	**6**	**8**	**3**				**2**	
2b. It was easy for you to learn the use of the system?										
2.7. It was easy for you to learn how to use it?	Hard	1	2	3	4	5	6	7	NA	Easy
		2	**8**	**4**	**3**				**3**	
2.8. Would you easily get the system to do what you want to do?	Not at all	1	2	3	4	5	6	7	NA	Very much
		1	**4**	**5**					**9**	
2.9. Would it be easy for you to become skilful at using the system?	Confusing	1	2	3	4	5	6	7	NA	Very clear
					7	**6**	**5**		**2**	

FREE QUESTIONS

- *What do you think about the overall system?*

"I like but it needs more functions" is the most frequent answer. Even some initial incertitude and perplexity, users trained and motivated declared to expects more from the app, in the sense, mainly to add more information about products and prizes. The language is a big burden for quite all interviewees, but the words used seems to be commonly known.

In general the system seems to partially match the users expectations.

- *Which additional functionalities should the system include?*

Enlarge fonts (12 answer), facilitate the procedure to add a product into the shopping plan (7 answer), the interaction with a list of contacts is very important (9 answer).

- Which are the main difficulties that you faced?

The system looks quite hard to learn for most of the users, but fortunately only in two cases users refused the system at all. Other difficulty registered during interviews is the fact that some users couldn't understand how the app could improve their shopping experiences.

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

- *How much would you be willing to pay for it?*

Most of users declared to be available to pay for it as the app will be available for download. Generally, not more than 1 euros, and only if more functions will be included. They would like a trial period before deciding to pay for it. For those who are not using smartphones already the system seems to be not accessible, but their younger relatives or caregivers could purchase it.

- *Would you suggest the system to friends/relatives? Why/Why not?*

Most of users declare to need more information and significant improvements before deciding in this sense.

- What would you change at the system?

The system, for most of the interviewees, needs to be easier, in Italian, with simple words and more images. The functions dealing with special diets and food attitudes need to be significantly reinforced, i.e. by excluding from the product lists those dangerous or unwonted for the users. The list of contact must be available and tested further, but it seems to be appreciated by most. Users want to be able to see map or road indications after a shopping trip is planned. Those using classes would like to be able to enlarge fonts and images.

Some users, using the system for the first time, firstly were looking for their preferred store to see which offers would be suitable for them; but often the list of preferred store disappears and too many time the system fails to save the selection did by the users. So this aspect needs to be improved in further development.

2.5 Experts feedback

2 professional caregivers, working in daily centres for elderly people, provided significant comments and helpful information to identify limits and bags of the prototype; by their feedback, the Consortium could learn that, as it is, the system shows several key burdens to a wide and effective diffusion; accessing and providing real data concerning offers, availability of products and their real costs are essential for a successful impact; for this, an agreement with the groceries and the supermarkets (who could provide directly to the system their offers) can facilitate real time updates and so let the system be more attractive. "A dedicated server collecting local information, could improve the system information update, even if it would be difficult to manage".

The installation process is for ICT-skilled persons only; therefore, for the future, the app should be available on the web stores, and be installed only by a simple download procedure.

The personalization and the customization is very limited in the prototype, while those possibilities are very appreciated by app-users in general and would be particularly indicated for ageing users, who need, for different reasons to intervene on fonts, icons, colours, sounds, etc.: adding more functions, but also and particularly improving the non-functional requirements is strongly recommended. In this way ageing users will feel more confident with the app and will be more happy to learn to use the system and introduce it in their daily living.

The procedure to move products to the "shopping list" should be easier and simplified; also sometimes the chosen product doesn't appear in the list, even if the procedure is followed properly. Also, when a shopping trip is planned, the system should provide at least a map or a guide in order to facilitate users walk outside (would it be possible to integrate the GPS within the app?).

A part of the system that couldn't be properly tested is the management of personal profile and the interaction with a list of contacts: according to experts view, it seems to be a crucial element for success, because the social interaction, the possibility to invite friends/relatives to go out for shopping, the sharing of shopping list with relatives in case the user cannot go out (i.e. for very bad weather conditions) are all elements very diffused nowadays and they would facilitate users in being socially active and feeling included, with a consequent positive impact on the safeguard of their active life.

In order to identify feasible and reliable business strategies, 2 ICT experts particularly recommend, first of all, to improve the list of functions, then to make the app available on the web stores (even android? Apple?) free of charge and "Beta Version" and collect as more feedback as possible from real users; after that to provide two different version of the app, first one for free with reduced functions (i.e. without the management of a profile and the social interaction) and a second "Full version" to be paid. According to the existing set of apps similar to SHOPHOP, there seems to be that the maximum price is 2,00 euros, at least in Italy.

2.6 Comparison with existing apps

According to experts suggestions, the app have been compared with some of the existing app with similar functions or targets. Firstly, after a research within the three main web stores (Google Plat Store, Apple Store and Win8 Store), it seems that there are not so many app which can offer all the functions that the SHOPHOP app is potentially offering within the same app. It is possible to say that competitors apps are related to single functions, and such a condition can represent good news for the definition of a business strategy. Secondarily, there seems to be no app clearly devoted to ageing users or intended to be used by an ageing target group; also in this case, Consortium is recommended to investigate further how to tailor the app to an ageing segment of users, with the perspective of being a "pioneer" in the market of apps for ageing individuals (an experts said "Think to the Smart Grandparents of the future").

On the other hand, existing apps devoted to facilitate the shopping of users are a lot and also can be downloaded mainly for free; so if a customer is expected to pay for an app, such an app has to be significantly different from the competitors; that's way a specific characterization of the app for a specific target of users should be a pathway to be investigated further. Also, the apps met during the survey within web stores, seems to be very easy-to-use and very friendly in terms of accessibility and usability (most of them are available in several languages, for instance). Which means that the SHOPHOP app should be significantly improved in terms of easiness of use and accessibility. Here follow the list of potential competitors considered:

From the Google Playstore:

- *MyShopy* – https://play.google.com/store/apps/details?id=com.agilys.myshopi
- *SHOPPING LIST 1* – https://play.google.com/store/apps/details?id=ru.grocerylist.android
- *SHOPPING LIST 2* – IT language https://play.google.com/store/apps/details?id=com.slava.buylist
- *FIND IT!* – https://play.google.com/store/apps/details?id=com.match2blue.findIt
- *CRAZY FOR OFFERS!* – IT language https://play.google.com/store/apps/details?id=it.klikkapromo.pazzixofferte
- *DISCOUNT AND OFFER* – IT language https://play.google.com/store/apps/details?id=com.vnapps.enfoccate
- *OFFERTECITY* – IT language https://play.google.com/store/apps/details?id=com.descuentocity2

From the Apple Store:

- *SHOP EASY* - https://itunes.apple.com/us/app/shop-easy./id646490156?mt=8
- *SHOPPING LIST FREE* - https://itunes.apple.com/us/app/shopping-list-free/id460415441?mt=8

From the Win 8 app store:

- *FOUR OFFER* - http://apps.microsoft.com/windows/it-it/app/af4ee32c-bc0c-4237-b487-044ed83f0694

3 Research Staff comments and recommendations for a reliable business model

3.1 Evaluation of Research staff

The Research staff involved in the field trials (2 researchers from COOSS and the COOSS' Manager) monitored the tests, followed the installation processes and also trained and supported the final users. Their monitoring allows the provision of a feedback for the developers, based on scientific standards, already existing and exposed in the scientific literature.

Also, researchers, coming from end-users organization (COOSS), provide their view about the impact, effective and potential, of the system in the users daily living, and its effects in facilitating active and independent living

So, researchers evaluation is based on standards of usability, already used in previous project experiences, and standardized since 1990 by Jakob Nielsen[3], and on social criteria to evaluate how an app can positively impact on users wellbeing.

3.1.1 Heuristic evaluation

The 10 most general principles for interaction design. They are called "heuristics" because they are more in the nature of rules of thumb than specific usability guidelines[4].

Visibility of system status: The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

Such an aspect seems to be sufficiently covered by the SHOPHOP application: there seems to be no possible confusion about "What's going on" in the app while using; what generates confusion is the fact that some actions, i.e. adding a product to a shopping trip, are not confirmed by the system with a confirmation message (i.e. "product successfully added"); so users had to go through the app screens to check if their action was properly performed. That's an aspect that has to be developed and improved.

Match between system and the real world: The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

According to the users' feedback that's represent a weakness of present prototype: the English language can be easily substituted by native language. Concerning the use of terms, concepts and phrases, the system has successfully matched this requirement.

User control and freedom: Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

[3] http://www.nngroup.com/articles/ten-usability-heuristics/ for a general overview of the method.
[4] *Ibidem*.

Users sometimes made mistakes (reach a wrong or unwanted screen, put thumb in a wrong area, etc.) and too often the only solution for the user was to come back to the home screen using the "button" available in the phone. The system should be improved in the future with easier way for problem-solving.

Consistency and standards: Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

That seems to be not a problem for SHOPHOP application.

Error prevention: Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

Due to the peculiarities of the targeted category of users, developed are recommended to take in duly consideration such an aspect; a confirmation message after any action in the app is clearly an advantage for any user.

Recognition rather than recall: Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

In line with above comments, it is recommended to introduce confirmation messages in order to facilitate the users' experience. Visibility of products are quite satisfactory but several users asked for an option to enlarge fonts. Concerning the stores and groceries, the use of logos will facilitate the identification and the decision processes.

Flexibility and efficiency of use: Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

Aesthetic and minimalist design: Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

SHOPHOP interfaces are in line with minimalistic design and properly satisfy this issue.

Help users recognize, diagnose, and recover from errors: Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

Not applicable.

Help and documentation: Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

For the future, researchers suggest, finally to provide documents or "guide" describing in details the use of each single function of the system.

3.1.2 SHOPHOP impact on users' quality of life.

At this stage of prototype development it is hard to say if the system can improve the users' quality of life and facilitate their independent living. Potentially it is, as most of users confirmed, but several additional functions should be added.

The system should facilitate the outdoor activities with a positive effect on the active life, the social interaction and the feeling of inclusion: from this point of view, researchers have seen that the system only partially match these goals, due to lack of additional functions to be developed, and due to the fact that the system of collecting information about products and groceries need to be improved. Users demonstrated to be curious and full of expectations toward the system, and so demonstrating the existence of a potential large basin of market.

Even if the SHOPHOP has not the intention to be an "assistive technology", nevertheless it is intended to impact the wellbeing of users; as it is, the system poorly demonstrated such an impact but it has been appreciated by those users who are most ICT-friendly: which means that the Consortium went in the right direction but further steps need to be done.

What researchers would like to underline is that the system would be a very significant integration to traditional homecare; we can imagine, for instance, a homecare service carried out by a professional caregiver who integrate his/her work with the SHOPHOP app: users can share food preferences with the caregiver, caregivers can suggest products and diets, they can plan together shopping trip directly and simply from the TV (it can be a possible business to be developed). Also relatives can benefit from it: when a user shares his/her shopping plan with the relative, child or daughter, informal caregiver or anybody else, the relative can know where the older relative is, what's s/he is going to buy, can suggest to add a product or plan a date. The social interaction is a potential function that researchers suggest to insist on.