

## **HEREIAM – LESSONS LEARNED IN THE NETHERLANDS**

Rijnen, WIL<sup>1</sup>, Bierhoff, ILSE<sup>1</sup>, Nap, HENK HERMAN<sup>1</sup>

### **ABSTRACT**

*The Netherlands play a pioneer role in developing and using service platforms for long term care. To better understand success factors and barriers within this market a thorough analysis was performed of the Dutch market. This included a survey among the providers of service platforms, and an evaluation of 4 service platforms by user-system interaction experts and 26 older adults. Lessons learned were converted into requirements for the HEREiAM<sup>2</sup> platform.*

**Keywords:** service platforms, usability, TV interface design, heuristics.

### **1. Introduction**

The aim of the HEREiAM project is to help older adults to stay longer and independent at home by providing a set of services to support daily activities through a smart and user-friendly platform, accessible through their TV set at home. Besides prolonging independence, remote service and care delivery results in efficiency and flexibility gains for both care recipients and caregivers are expected.

In some countries the need for eHealth is more profound, for example because people live far away from a doctor. The US, Canada, Japan and Australia were the first countries who started to use remote care delivery. Finland and France were the European frontrunners in the field of cure technologies [1]. On the other hand, the Netherlands play a pioneer role in developing and using service platforms for long term care. Such an ICT platform is a well-integrated set of hardware and software components to support the execution of telehealth and telecare services [2]. No other country has more experience in this field. Large-scale exploitation, however, appears to be rather difficult.

To take a head start with the platform to be developed within HEREiAM a thorough analysis was performed of the Dutch market focussing on success factors and barriers within the market.

After an inventory of the service platform market, a questionnaire was sent out to 15 Dutch service platform providers, to learn more about the rationale behind service provision of different platforms, to abstract trends, to understand

---

<sup>1</sup> Smart Homes, e-mail: {w.rijnen; i.bierhoff; h.h.nap}@smart-homes.nl

<sup>2</sup> HEREiAM - An interoperable platform for self care, social networking and managing of daily activities at home, AAL-2012-5-064, <http://www.hereiamproject.org/>

technicalities and to gather an insight in what the future could bring. Next, multiple service platforms have been evaluated by both user-system interaction experts and 26 older adults from the Netherlands and Flanders. Experts evaluated the Graphical User Interface and interaction modalities based on Nielssen's heuristics. The older adults tested a variety of service platforms, to discover problems and shortcomings of the current generation service platforms, and to inspire them in thinking about how such a platform can enhance their lives.

## **2. Overview service platforms**

After 10 years of developing and experimenting in this field, the current Dutch service platform market consists out of a wide variety of systems to offer comfort, well-being, safety and/or care services, ranging from pure research projects to market ready products. Whereas some platforms focus on vulnerable older adults in general, other systems focus on specific target groups, each with its own selection of relevant stakeholders involved. Besides pure Internet-like services, more and more systems are linked with sensors and home automation. Some of these platforms make use of ordinary PC's and laptops, others are offered via touch PC's, tablets, television or even robots.

The questionnaire that was sent to 15 Dutch service platform providers focused on aspects like unique selling points, interface used, target group of the platform, link with other systems, applications offered, robustness and efficiency. As a result of this research we have found the following trends:

**Involve the social network around the client.** A service platform is often used as a tool to interconnect all relevant parties in the care network of the clients, living either intramural or extramural. Depending on the kind of target user, the network can vary as well. In the last few years more and more parties are motivated to hook up to the platform, ranging from formal and informal caregivers to municipalities and communities. But also schools, banking companies and local entrepreneurs.

**Offer a wide range of services.** Whereas in the beginning service platforms were simple and offered limited functionality, most of today's platforms offer a combination of comfort, well-being, safety and care services. To be able to provide all these functionalities, platforms are linked with external websites and systems from third parties. The user can choose for himself which services to install and use.

**Enhance interoperability.** As a service platform provider you cannot know everything and do everything yourself. By making use of standards and open software architecture it is easier to collaborate with third parties.

**Make your platform accessible on each device.** Users already have ICT equipment at home and/or they prefer to choose their own brand and type of device. Therefore, service platform providers make their systems accessible on each device.

**Take into account age-related changes and individual situations.** Besides large screens, large font sizes and large buttons, more and more attention is paid to overcome age-related restrictions. Certain touch screen interactions like right mouse click, double click and swiping are enabled on some platforms and even solutions like eye-tracking and speech input are applied to make systems usable for paralysed users.

**Allocate tasks to formal carers, informal carers and volunteers.** Professionals (home care or care institutions) can put services and information online for specific user groups. The informal carers – friends and family – can add extra enjoyable and personal content like messages, pictures, music and so on. One of the service platform providers talks about a new kind of voluntary work, where people provide content for others and help each other out.

### **3. User experience**

To find out how users experience these technologies, and whether their findings and opinions match the information gathered from the service platform providers is of emerging importance. Therefore, older adults were invited to evaluate the usability of existing service platforms and to give feedback that will be of interest for the development of the HEREiAM platform.

The user sessions were dedicated to the evaluation of existing platforms and to perform a number of pre-defined tasks and open tasks. The purpose was to find out what constitutes an obstacle to an effective and efficient interaction with the selected types of interfaces and to identify any usability problem. Furthermore, the study ended with a focus group in which the participants discussed their experiences with the service platforms and provided suggestions for future services and designs.

The sessions were within-subjects in which the participants performed tasks on all platforms – repeated measures – and the order was counterbalanced. Tasks were given on separate sheets of paper. Researchers were present during these trials, supporting the participants and noting down relevant observations and quotes.

After performing tasks, participants were invited to complete the Post-Study System Usability Questionnaire to provide an overall evaluation of the system they used. The questionnaire contained 19 items that are 7-point Likert scales, anchored at the end points with the terms "Strongly agree" for 1, "Strongly disagree" for 7, and a "Not applicable" (N/A) point outside the scale.

The user sessions took place at the Smartest House of The Netherlands, a home-like test and demonstration facility from Smart Homes equipped with the required hard and software. Several service platforms were presented and used during the user sessions with a variety of input and control possibilities. Besides touchscreen-based systems (Viedome, Vicasa and MiBida), also a Digital TV with set-top-box and dedicated remote control was available at the location to demonstrate

and use a service platform (ABC TV). Figure 1 shows some pictures taken during the user sessions.



Figure 1. Older adults evaluating current service platforms

The results of the user sessions are structured based on Nielsen's heuristics.

#### Navigation

The major challenge with TV interfaces is that people are used to the TV as an output device, and pressing virtual buttons on the screen is for many of them an unfamiliar concept. Keeping this in mind, it is easy to explain that people look for a solution on the remote control first; they start pressing randomly all buttons on the remote control while the solution is displayed on the TV. Touch screen interaction seems to be instinctive behavior: just point to what you want to use. Once used to work with the touch screen, it was hard to make the change for using the keyboard to type a message. Most respondents were looking for an on-screen keyboard.

#### Visibility of system status

In terms of menu structure the major menu items are clearly displayed and basic actions work fine. With more complex actions (deeper in the menu) feedback is sometimes insufficient. When operating a service platform preferably textual as well as graphical feedback should be provided that a certain action was registered and could or could not be performed.

#### Match between the system and the real world

Service platforms use a lot of icons in their interface. Although the majority of icons are understood by the participants not all of them are clear. Sometimes one single icon represents several services that are not all self-evident. Participants often literally describe what they see when they are asked to explain an icon. However when presented a task participants often succeeded in performing the task even when they gave another explanation of the icon. In some platforms the mismatch between the icons and the real world was too big for users to understand its meaning. It is important to find a balance between expert and novice users. Use icons/concepts that

are in line with daily (off-line) life but that are not in contradiction with icons and concepts used in computers and mobile phones.

#### User control and freedom

It wasn't clear in every tested platform how to go back to the main menu. This was mainly due to the fact that participants couldn't locate the correct button or chose the wrong button. For users to feel in control it is necessary to build a system that can be adapted to the grade of experience of the user.

#### Consistency and standards

Within the service platforms both good and bad examples are encountered. In general, consistent methods are used, but each method appears to have exceptions, especially when external websites come into play.

#### Error prevention

In general, participants could undo most of the mistakes quite easily. When choosing the wrong service, they could just pick another, and there was always the option to go back. When using a service that requires input from the user, like filling in the agenda, it is important that already entered information can be retrieved after making a mistake.

#### Recognition rather than recall

Users can be assisted by instructions in the interface on how to use a service or how to navigate. These instructions should be clearly visible and easily grab the attention of the user.

#### Flexibility and efficiency of use

It is important that the system is easy to use for novice users. They take their time to find their way and to do what they want. Experienced users may be interested in speeding up the process in selecting services and browse through content, by making use of so called accelerators. In the studied platforms no options for more advanced users were available.

#### Aesthetic and minimalist design

On the interface only the items that are needed should be shown, additional items would be ballast. Make sure that the right things attract the attention of the users. When too much useless information is presented, it makes the important things – like buttons – vanish. When pop-up boxes with messages are used it should be clear whether or not an action from the user is required. When a question is presented it is no problem to ask for confirmation or an answer. When only a confirmation message is shown this message should disappear automatically.

#### Help users recognize, diagnose, and recover from errors

In general except for choosing a wrong service, or pressing a wrong button, no errors occurred. Some participants expressed that they would like a bit more error messages to be able to solve issues themselves. The help functionality should be offered in the same screen as where the error occurred.

#### Help and documentation

In this test scenario, no extra documentation or paper-based user manuals were provided. The idea was to evaluate the system itself and its intuitiveness. Most of the participants needed some minutes to figure out how to interact, but afterwards they were quite able to perform the tasks. They reported that the systems were clear, simple and easy to use.

### **4. Conclusions**

The trends in relation to service platforms clearly show that today's service platforms play a central and dominant role in the life of older adults. The platforms are the tool to communicate, to have entertainment, to take part in the community, to be socially active, and so on. Many functionalities, communication channels and network members are combined in one single screen. Easy to have everything in one place, but the question is whether all older users are able to handle the quantity and complexity.

Whereas many people, organizations, communities and entrepreneurs see added value in this new medium, healthcare professionals are a bit reluctant. For them the available data and functionality seems to be insufficient.

Overall, the older adults found the service platforms easy-to-use, although all platforms can still be enhanced in respect to usability. A number of the older adults questioned the benefits of some services and provided ideas for future additional services.

The study provided an overview of the strengths and weaknesses of the service platform market. Technology providers and older adults tend to move closer to each other, leading to an increase in user-friendly products and services. Additionally, alignment of secondary and tertiary stakeholders is crucial for future valorisation. Continuous alertness and fine-tuning are crucial to bring AAL to a success.

### **REFERENCES**

- [1]. *J. van Lier, and C. Willems, C. (2009). "Zorg op afstand door gebruik van E- technologie". Vilans.*
- [2]. *J. Krijgsman, H. Eertink, J. van der Leeuw, and R. Zondervan, (2012). "Praktisch model voor ICT-platformen bij welzijn en zorg op afstand".*