ALICE
Advanced Lifestyle Improvement system & new Communication Experience

A Project Case Study
www.aal-alice.eu

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Project
Elderly people often have limited mobility and may be house-bound, often living some distance away from their friends and family. They can lose touch with their loved ones and friends, becoming socially isolated and lonely.

The overall objective of ALICE is to enhance the quality of life, sense of well-being, social interaction and connectivity of elderly people in their home environments. ALICE focuses on the challenge of making these later years happier, more satisfying and socially enjoyable.

ALICE will research, develop and integrate a set of ICT based services into the existing TV set, allowing elderly people to enjoy experiences of communication and social interaction based on ICT. By doing this, ALICE will lead the way for elderly people to remotely share moments of enjoyment, laughter and fun as if they were face-to-face with their loved ones.

Objectives
- Investigate current communication practices of elderly people
- Simplify electronic communication based on novel and existing technology in fields like interactive TV and video conferencing
- Optimise visual user interfaces and related input devices for specific use by elderly people
- Develop, test and comprehensively evaluate pilot Web applications, focusing on social networking and “togetherness”
- Investigate economic issues to guarantee maximum commercial impact of the research results

Project Consortium and Responsibilities
AT4 wireless S.A. (www.at4wireless.com)
Integration of wireless personal health devices with the platform

Mens en Zorg BV (www.mezorg.nl)
User requirements, operation and evaluation of the pilot

JOANNEUM RESEARCH Forschungsgesellschaft mbH (www.joanneum.at)
Project coordination, development and evaluation of social interaction services for the platform

ThuisConnect BV (www.thuisconnect.nl)
Organisation and coordination of the pilot and development of the business model

telecare GmbH (www.zydacron.com)
Providing the platform solution and implementation of new services

Project Coordination
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Abstract: Elderly people have limited mobility and are often bound to their home, many times being geographically separated from their friends and family. They often lose connection to their beloved ones and friends, becoming socially isolated and lonely. This situation still bears an unsolved dilemma for Europe’s society. The key determinant of quality of life at any age is social engagement as impaired social engagement is linked with health problems including depression and suicide. The overall objective of ALICE is therefore to support the quality of life, well-being, social interaction and connectivity of elderly people in their home environments. The main challenge addressed within ALICE is to prepare these elder years to become acceptable, meaningful and socially enjoyable. ALICE will research, develop and integrate a set of ICT based services into the existing TV set, allowing elderly people to enjoy experiences of communication and social interaction based on ICT. By doing this, ALICE will lead the way for elderly people to distantly share moments of enjoyment, laughter and fun in a similar way as they were together face-to-face.

1. The initial situation of the home care provider (Mens en Zorg)

A home care provider is an individual or an institution that provides preventive, curative, promotional or rehabilitative health care services in a systematic way to individuals, families or communities. Any home care provider is responsible and therefore highly interested to provide high quality home care services.

Home care organizations like The Netherlands’ organization Mens en Zorg get paid for service including cleaning and washing the elderly, helping elderly with medication, cleaning bandages, helping to get dressed en attract stockings etc. All these kinds of operations are substituted by legislation (in the case of The Netherlands, the responsible law is the “Algemene Wet Bijzondere Ziektekosten – AWBZ”) via the healthcare insurance companies. There is basically a possibility/support for a tele-consult, which is not yet implemented in the AWBZ but currently used for a consult with a medical specialist (doctor).

Modern information and communication technologies (ICT) can contribute to provide high quality home care services. Such ICT-based services consumable via a set-top-box connected to the TV set (developed and assembled by the project partner telecare) have been researched and developed within the ALICE project. The ALICE project included the research and development of three types of services: services for video communication (developed by the project partner telecare), services for social interaction (developed by the project partner JOANNEUM RESEARCH) and services for the transmission of health data (developed by the project partner AT4 wireless).

- A care provider may be highly interested in providing video communication to its clients: Using video communication will enable him to save on travel costs, and in return to expand its (virtual) conversations with clients. In practice it is not always really required to physically meet a client. But a client may always be visited on demand or in the case of an emerging (health) problem.
- Moreover clients may have to opportunity to initiate a video call in case of an emergency by simply pressing a button. After doing so an operator (e.g. the responsible home care provider)
will answer this request immediately to assist the client. This will contribute to clients’ perceived safety and enhance its quality of life.

- Services to share with and deliver information to clients via ICT can show up to be very fruitful to a home care provider as such services will enable him to better manage its client as well as its information flow to them. This may save the costs of sending traditional postal letters and forms to the clients.
- Interactive services have the ability to generate additional benefits for clients, as they are able to motivate clients to use modern ICT. By doing so, clients may easily get familiar to use their set-top-box.
- Moreover, social interaction service will contribute to feeling good and will reduce loneliness when being adopted by clients. When actively embedded in social networks, people tend to enjoy better physical and mental health. This may reduce the amount of daily communication and treatment they usually demand from the home care provider to feel good – again saving costs of treatment.
- Finally, remote monitoring of health data (developed by the project partner AT4 wireless) can contribute to a better treatment of the client, as the home care provider is always up to date with a client’s health status and can engage in case of an emergency.

For home care organizations like Mens en Zorg, the added value of using the ICT developed in the ALICE project is that the caretaker is not required to always visit client physically. This is feasible for helping clients with medication and other problems. It seems logical that not the client herself, but the care organization might take over the costs for ICT-based telecare, because financial savings are also at that party. The question of course is whether ICT-based telecare can really increase the quality of care for the patient since patients usually “like” to have visitors.

The best way of expressing the added value from ICT-based telecare for home care organizations like Mens en Zorg is in achieving a higher quality of care and health for clients, who are in need of special medical attention. For instance diabetic 2 patients require keeping a constant monitoring on their blood sugar level. By monitoring and measuring from the distance connected to a patient database, measurement can be done in a more frequent way and easily compared with the desired values. By doing so, the amount of insulin can be reported in time to the patient for the most effective treatment. The same kind of treatments can be applied for clients having chronic diseases such as COPD and to cardiologic patients.

Figure 1: Marta - the ALICE persona
2. The goals of the care provider

The goal of any care provider is to provide the best possible individual care to all of its clients. Of course, any care provider has financial restrictions and therefore has to generate revenues. Applying modern ICT must enable the care provider to be more efficient in providing its care (by saving costs) but nevertheless increasing the amount of treatment, care and conversation to its client. Travelling expenses might be cut as they are neither useful to the care provider, nor to its clients. Moreover, less travelling will have positive effects on the environment.

Home care organizations like Mens en Zorg are frequent car drivers to deliver care to their clients: Travelling differs from 5 to 50 kilometres and from one visit a week to five or six visits a day for instance for administering medication or taking care of complex wounds and special bandages after surgery.

The care provider perceives and experiences an increasing pressure on their care givers. There appears to be a growing lack of available personnel, since young people do not choose to work in the care branch anymore, mainly because of the negative image of this branch. On the other hand it is widely known that growth in the demand of care is the spectre for the whole care section, and therefore the urge of using new technology will rise day by day. The urge of using ICT is fact, not voluntarily chosen and becomes a necessity.

From the perspective of home care organizations like Mens en Zorg, there will be no extra revenues in the near future, but a more efficient way of giving care is feasible. It can also not be expected in the near future that the use of ICT in care will provide higher revenue. However, ICT will enable a more efficient way of working and possibly a better quality of giving care for e.g. chronicle diseases.

![Figure 2: ALICE - activities of home care organizations](image)

3. Implementation/introduction of the new system

The project proposal for the ALICE project included a rough specification of services. These services included video communication, basic social interaction and monitoring of medical data. The service descriptions from the project proposal were used in a first step.

After the project kick off, the project consortium decided for a pre pilot to evaluate whether and how elderly people are able to handle the set-top-box. This is fundamental to learn more about their technology acceptance. To select participants, a survey was prepared and sent to all clients of the care provider. This survey included questions on their demography, family and friends, social interaction patterns, internet usage and their perception towards modern technology.
About 140 clients responded to this survey and 20 clients stated their interest to participate in the ALICE pre pilot (ratio 20/140 = 14%). But the set-up of the pre pilot only included evaluating the video conferencing service as basic service of the set top box as other services had yet to be developed. Half of the participants already had internet connection in their home (this was one selection criterion) to ensure tests and evaluations to be started immediately.

A service provider (the project partner ThuisConnect) installed the set top boxes (and the internet) in the homes of the pre-pilot participants and instructed them how to use the set top box. The installation process of the set-top-box raised some challenges mainly concerning the connection to the internet (routing, port forwarding, landline troubles...).

During the pre-pilot, the participants had the task to communicate to their care provider and to their relatives. To communicate, relatives had to install special software on their PC, which also raised a lot of challenges (especially when an automatic update of this software failed). Many relatives were already very old and therefore not very familiar with their PC, and some of the relatives and elderly people dropped out of the pre-pilot.

The pre-pilot participants were interviewed by their nurses. They were asked questions on e.g. how much they would be willing to pay for services via the set top box (resulting in 10-15 €/month). Moreover the interviews were used to get more information on services elderly people would basically need. These included the demand for services increasing their feeling on safety (e.g. alarming services), enabling communication and information delivery (e.g. information on regional events/news).

Based on these interviews, the ALICE service-specification was elaborated. The following five services were developed in the ALICE project and provided via the set top box in the following order:

- Photo sharing service: Elderly people can watch photos of their relatives shared via the popular platform Picasa
- Greeting card service: Elderly people can send virtual greeting cards to others in a simple way
- Game service: Elderly people can play Tetris light. A number puzzle was also developed but never rolled-out.
- Information delivery service: Elderly people can read news edited and shared by the care provider.
- Social interaction service. Elderly people can read and like content from their Facebook-light activity stream.

To access these services, a browser-based user interface for the set top box with large symbols and a navigation concept were also developed. This allowed an easy roll out of the services without making changes in the operating system of the set top box.

To test and evaluate the services, a pilot with about 100 participants was conducted. Some of them already participated in the pre-pilot. While most of the participants during the pre-pilot lived geographically separated (complicating tests and evaluations as well as service delivery), the pilot involved whole groups of elderly people living in service apartments for assisted living (e.g. buildings/areas with more than 20 elderly people). This eased the installation as a collaborative internet
infrastructure could be used to install the set top box, and therefore administrating the clients was more efficient. The developed services were rolled out step by step depending on their availability.

The developed communication system, the ALICE set top box, was systematically introduced during the pre-pilot and the pilot was following a three step scheme:

- Clients were informed by the management that they may participate in a pilot project (this concerned clients living in a complex of elderly people only)
- A technical installer makes an appointment with a client and installs the set-top-box including an instruction of the system and a test video call to the client
- In the first few weeks, the staff carried out many test calls to explain the basic functions and answered the questions of the clients. Instructions were also given by technical staff during installation of the system, but mostly during the video calls via the system.

The clients were extensively informed that participation is not a must and can always be stopped at any moment. They were also introduced to and aware of the three main functions of the ALICE service, calling the operator, calling relatives and friends and using the set-top-box for social interaction.

During the pre-pilot, 394 video calls were conducted and approximately 300 calls where actually from client to operator. All the clients connected to the platform used at least one of the services during the pilot. But not all of them were able to use the latest developed services including social interaction and photo sharing.

4. Technology adoption / results / lessons learned

From the perspective of the home care organization Mens en Zorg, by far the biggest challenge was the need for an absolutely stabile service platform and technology. This includes an “elderly-proof” user interface to the services, an “elderly-proof” hardware (especially concerning the used remote-control), and no disturbing flashing lights on the set top box (those are only useful for technicians and the elderly could not interpret the lights).

From the perspective of Mens en Zorg, the care provider learned a lot of the behaviour of elderly clients during this project with respect to the adoption of information technology, which was totally new to them. Lessons learned included that technology in general should be tested on small(er) groups first and then made ready for usage in the “real life”, and after making sure twice, tested on a larger group of participants.
From the perspective of the service provider ThuisConnect, a successful installation of the set-top-box was the biggest challenge, as the set-top-box was not a plug and play system. A trained expert was needed to install the system who still needed a few hours per client. This resulted in an increase of the system costs. Users of the system responded instability and many other technical issues (errors and malfunctions at the operator software). The project showed that the system was not fool-proof, but such a “fool-proveness” would have been crucial to getting elderly people to accept the technology.

From the perspective of ThuisConnect, lessons learned included the need of continuous explanations for elderly people. The project has shown that information and communication technology is never intuitive at all for elderly people and always needs to be explained exhaustively as otherwise elderly people will drop out of the pilot. The project has also shown that it is very challenging to develop a commercially successful business case as the fee-structure in The Netherlands does not at all cover social interaction. Only inclusion of medical data will make a feasible future business case.

For ThuisConnect, project results included direct insights into the behaviour of elderly people, which can be picked up in other projects, products and services developed by ThuisConnect. ThuisConnect learned much about the nature of tertiary users with regards to the development of information and communication technology for the elderly.

From the perspective of the technology provider telecare the biggest challenges was the remote support of the installation/maintenance team in the Netherlands from Graz. It was not always easy to detect the real issues within this distance. Lessons learned from the project included that the installation of the first ten or twenty boxes should have been done together with ThuisConnect to transfer implicit knowledge.

For telecare results of the project included the huge benefit gained from feedback given by Mens en Zorg concerning the usability and maintenance of the system. This mainly influenced the new generation of telecare’s solution. In addition, telecare took part in a project which is now serving as a valuable reference project, since pilot installation in ambient assisted living environments in general and pilot installations of the size of the ALICE project (with about 60 to 90 active clients) are rare.

For AT4 wireless, the technology provider developing the services for the transmission of healthcare data, biggest challenges during the project were building an application that has been developed according to Continua standards to define the communication protocol, is executed over an embedded system, a set-top-box that supports Linux as operative system, and connects to real medical devices using Bluetooth transport.
For AT4 wireless, the main project result was a software application, the so-called ALICE manager, collecting measurements (pulse rate, blood pressure...) from real medical devices. The ALICE manager module was designed to be interoperable with any Continua certified Blood Pressure Monitor.

For AT4 wireless lessons learned from the project were, mainly, the know-how acquired during the development. Different technical issues have been identified and solved, overall, regarding to the integration of the ALICE manager with the transport layer, Bluetooth transport layer and the Linux operative system. Also the experience of working with partners from different countries and the networking established was very valuable.

To monetize project results in the future, a positioning of the developed system as a high end product is feasible. The set-top-box can be sold for a price of approximately €800 - including hardware and installation. After the installation, a monthly fee for the consumer will show necessary. Marketing activities are to be aimed directly at the relatives of elderly people and at care organizations. As soon as the technology is stable enough, care organizations are to be contacted to support roll-outs in complexes of elderly people. A future goal of the consortium is to achieve an installed base of set top boxes as soon as possible and to attract commercial companies to deliver own services via the set-top-box.

Figure 5: ALICE - functions and benefits at a glance