Training course Senior Service Worker

Ambient assisted living services in home care and community based settings for the elderly

Using ambient assisted living services

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2. Using ambient assisted living services

Ambient Assisted Living (AAL) solutions have the potential to make their senior users live easier and more independently. While developing successful AAL solutions in the ICT area is an important and potentially very rewarding task, it can also be a daunting problem: rewarding, because AAL solutions offer their users independence or support and because the technology providers can reap economic benefits; daunting, because technologies are seldom easy to develop and the various user needs are too often hard to satisfy with single technologies. AAL solutions address many different user groups, sometimes called AAL end-users or AAL stakeholders, and the user groups can be categorized into primary, secondary and tertiary users.

1. Primary end-users are older adults who are using AAL solutions.

2. Secondary end-users are persons (families, friends, neighbours…), companies or organisations that are accessing or using AAL solutions for the benefit of primary end-users. This group benefits directly from AAL products or services when they use these (at a primary end-user's home or remotely), and indirectly when primary end-users' needs for care are reduced.

3. Tertiary end-users are institutions and private or public organisations that are not directly in contact with AAL solution, but who play a role in providing, financing or enabling them. This group includes the public sector service organizers, social security systems, insurance companies. They benefit from the increased efficiency and effectiveness that AAL solutions provide in terms of reducing costs, or avoiding increasing costs in the mid and long term.

However, the categorisation depends on the AAL solution; for instance, when the solution is software that connects doctors and seniors, both are primary users, but when software connects seniors to others, allowing them to socialise, they are the primary users. Analysing the requirements of all of these user groups very early on in the development process is very helpful to ensure an AAL solution's success. This can be done, for instance, by integrating users into the development process, but also through secondary data (there is no need to replicate work and to learn about user needs through qualitative research if others have already done the work). Without sound knowledge of specific users, important requirements might be neglected (e.g. when does an insurance company pay for technology?), which may later be a major obstacle during a system's market implementation.

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2.1. Seniors as the primary AAL service users

Ambient Assisted Living (AAL) solutions seek to enhance elderly persons' quality of life. They address seniors' age-related needs, ranging from health impairments to changes in their social lives, and from mobility requirements to caregiving. However, the perception that AAL is for older people is an often skewed picture of seniors – old, poor, and lonely people in need of care, but who refuse to use technology (except the TV). Although some seniors do suffer from age-related deficits, this is not the full picture of their lives. Elderly people (defined as between the ages of 65 and 85) can also be very active:

- 30% to 80% of seniors over 65 still travel.
- On average, seniors spend 5 of every 7 days outside their homes.
- 68% of seniors have their own cars.
- Two-thirds of seniors have a partner.
- 75% of seniors are grandparents.
- Approximately 70% of seniors with children see them several times per month or week.
- Only 4% of seniors feel lonely (correlation with health problems and single status).
- 45% of seniors engage in volunteering activities.
- 42% of seniors feel healthy or very healthy.[1]

Some seniors take care of their parents, their children's children, their neighbours, or friends. This means they not only need care, but also give care. It is therefore important to question stereotypical images of older people, and to make sure that AAL solutions' design is based on new empirical data instead of on unrealistic biases or sheer guesswork.

The data should be checked for nation-specific differences in any AAL projects, it is an initial starting point to understand the wide variety of seniors' lifestyles, their most pressing needs, and how AAL solutions can create added value for them. Also a very important point of view in our case is to take in consideration the life stages of the elderly people.

When designing products for elderly users, it is important to know that seniors cannot be treated as a homogeneous population, but comprise different subgroups. The basic

1 Becker (2007). Living conditions and everyday activities of the elderly and their requirements concerning ambient assisted living

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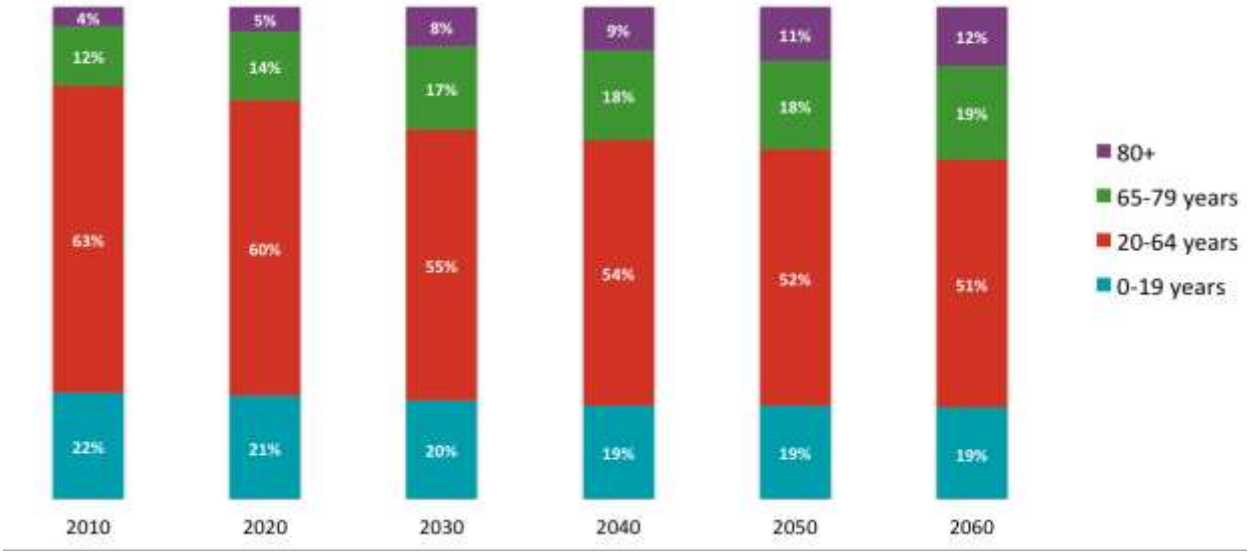
differentiation is between their third and fourth ages, as presented in Laslett's (1991) stage model:

The third age (young old) describes older adults' healthy and active life phase, which is characterised by the continuation of their former lifestyle after retirement (approximately from 65 to 80). The implications of this era are rather positive and are defined by personal achievement and fulfilment.

The fourth age (oldest old), beginning roughly at 80, is associated with fading health and independence. High age often leads to weight loss, slower movements, tiring sooner and diminished physical activity. Comorbidity (i.e. simultaneously suffering from several medical conditions), institutionalisation and the need for medical and care services increase. In contrast to the third age, this life stage is characterised by biological and psychological dysfunctions, dependence and approaching death. Figure below shows that the ratio of these two age stages (corresponding approximately to the green and purple age groups) will rise continuously in the EU states within the next decades.



Another approach to differentiate between senior subgroups is to focus in detail on the age ranges that correlate with specific life themes (or life course events / LCEs) with which people deal, for instance, children leaving home, retiring, or becoming grandparents. Figure 2 shows a basic model developed for the German population, which may differ slightly in other countries, depending on specific historical events or retirement rules.

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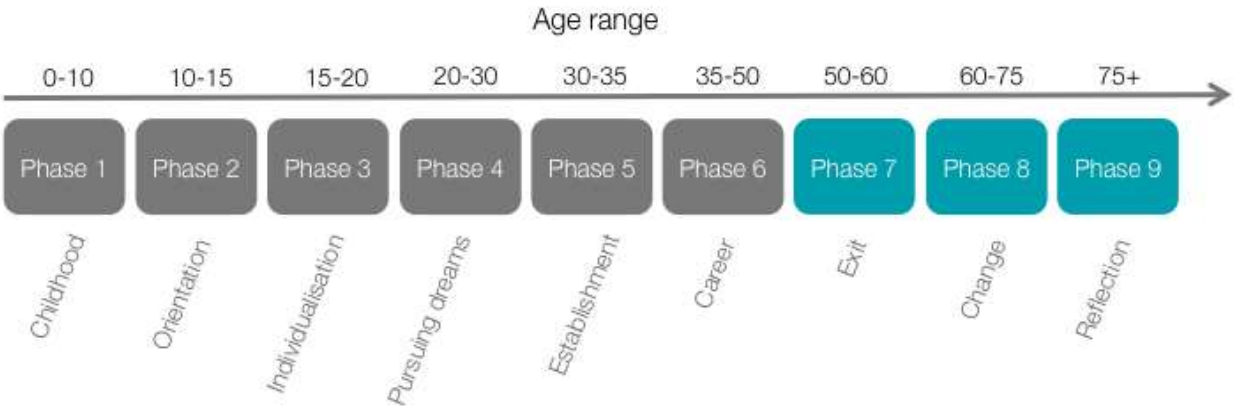

From an AAL perspective, it is especially interesting to consider the issues with which people deal from the age of 50 onward:

Phase 7 – Preparing a work-related exit (50 to 59 years): From the age of 50 onwards, people start planning their retirement (starting at about 60 to 65 years, even though the official retirement age is usually higher)[2]. At this stage, people become more aware of growing old and that they will start losing loved ones: not only are seniors' children leaving home, but their parents are aging, and their roles might change from being a recipient of care to that of a caregiver. In addition, the divorce rate is comparatively high in this group (about 25% of all divorces). In line with these changes, their living environment is often changed, for example, by moving to a new (smaller) home, new furniture, or by utilising their home space differently.

Phase 8 - Change and experience (60 to 74 years): In this phase, when seniors retire, they reorganise their new leisure time for hobbies or events for which they did not previously have enough time, and that make them feel good or needed: travel, cultural activities, learning new skills, or volunteer work. Their spending power is usually higher than before, since their homes have been paid and their children are independent. The focus of this age group is enjoyment and activity.

Phase 9 - Reflection and reduction (75 years and older): As long as seniors are still healthy in this phase, they try to prolong the conveniences of the former phase as long as possible, while trying to compensate for age-related or health-related limitations as far as possible. The focus is increasingly on social contacts and activities deemed most important.

2 EUROSTAT: Retirement age of EU-27.

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Since they value their remaining time very highly, they are less able to tolerate irrelevant issues, failure, or disappointment. If ailments and illness dominate their lives, support from others becomes very important.

These life themes provide a basic idea of the different AAL solution target groups and their needs, which AAL solutions can support.

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2.2. Secondary and tertiary AAL service users

Seniors are usually not the only users of Ambient Assisted Living (AAL) technology: their relatives, professional caregivers, medical doctors, staff from resident homes, and real estate managers, etc. are often also affected by the installation of an AAL solution. These additional stakeholders and their interests and needs should therefore also be integrated into the developmental process. The following sections provide information about these user groups to help ensure that their requirements are included in the technology design.

2.2.1. Relatives and informal carers

Seniors aged 50 and over are mostly cared for by their children or spouses (see table below); two-thirds of these carers are women. In central Europe, a spouse provides 42.3% of intensive care, as opposed to only 3.4% of non-intensive care. In southern Europe, however, children and other relatives provide intensive care more frequently. If carers can no longer care for their partners, their children (or children-in-law) usually take over. These children are on average 25 years younger than the care recipient, and – depending on their age – might also have moderate health problems.

Country	Spouse	Children	Relative	Friend
Austria	36.3	34.7	14.7	16.8
Belgium	33.7	40.4	16.6	23.4
Denmark	39.7	41.3	15.9	20.9
France	31.8	40.5	19.6	13.7
Germany	34.9	44.2	13.0	21.5
Greece	33.2	35.2	14.9	14.7
Ireland	28.5	35.2	22.4	18.8

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Italy	23.1	36.2	22.6	24.1
Netherlands	27.4	46.9	17.2	24.7
Poland	33.8	10.6	27.9	8.0
Spain	28.0	39.9	20.6	10.9
Sweden	26.5	48.5	19.0	18.1
UK	34.1	32.2	5.4	27.4

Percentage of carers by relationship to the care recipient and by country (OECD, 2011).

While caring does not seem to affect work decisions at low care intensity levels (below 10 hours per week) and for extra-residential caring, it does for the providers of intensive care and co-residential carers. Providers of intensive care are more likely to be homemakers and are less likely to be employed. If they are still working, they usually reduce their working hours or stop working. The reason for this is that providing personal care can be a very demanding task that is not compatible with a full-time or even part-time job. To date, available jobs are often not flexible enough in terms of working hours, or they do not leave enough options to accommodate caring responsibilities. Caring duties can also be unpredictable at times regarding their intensity, which could lead to short-term absences from work. Hence, caregiving is associated with a higher probability of experiencing poverty across countries (except in southern Europe), especially for women.

The intensity of the provided care varies with the activities of daily living (ADL), the limitations of the cared-for seniors, as well as between countries (see Figures 5 and 6). Caregiving relatives usually support those requiring care with virtually all of their daily activities such as:

- Healthcare and/or rehabilitation: wound care, medication control, health and mobility exercises and memory exercises.
- Activities of daily living (ADL): preparing meals, assisting with toileting needs, dressing and undressing, feeding, taking care at night.

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- Instrumental activities of daily living (IADLs): financial affairs, shopping, laundry, cleaning up, providing social interaction.

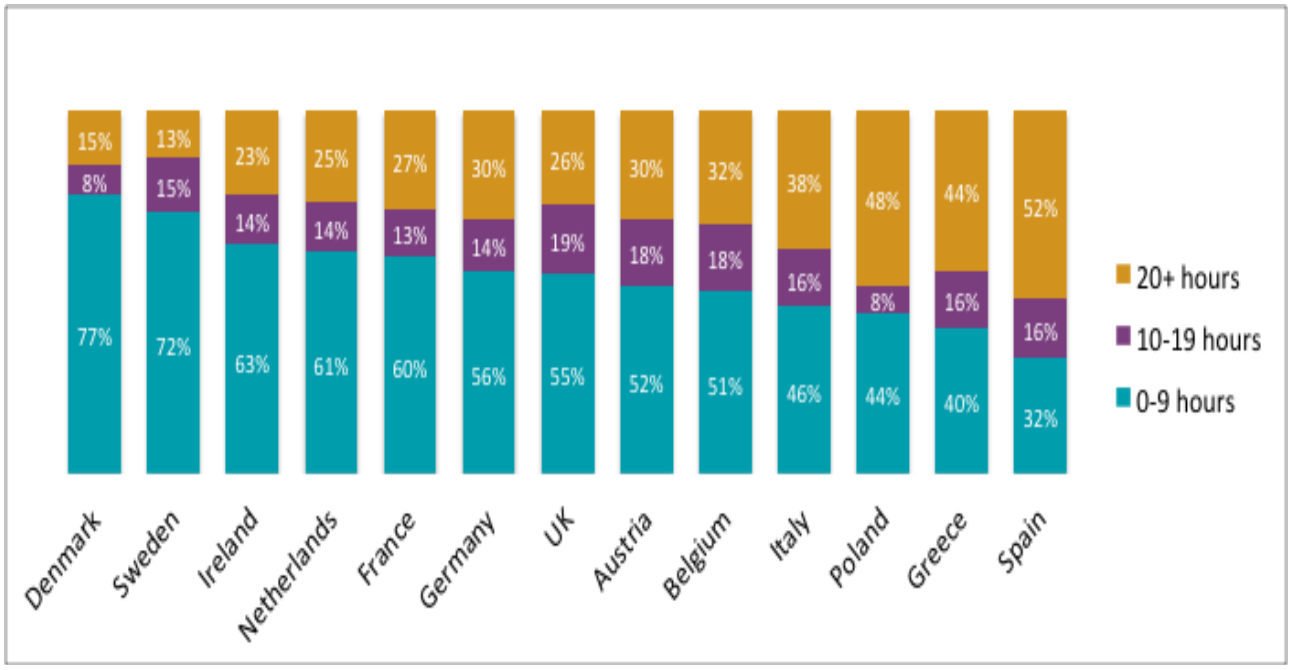

Figure 5: Percentage of weekly hours of informal care by country (OECD study, 2011).

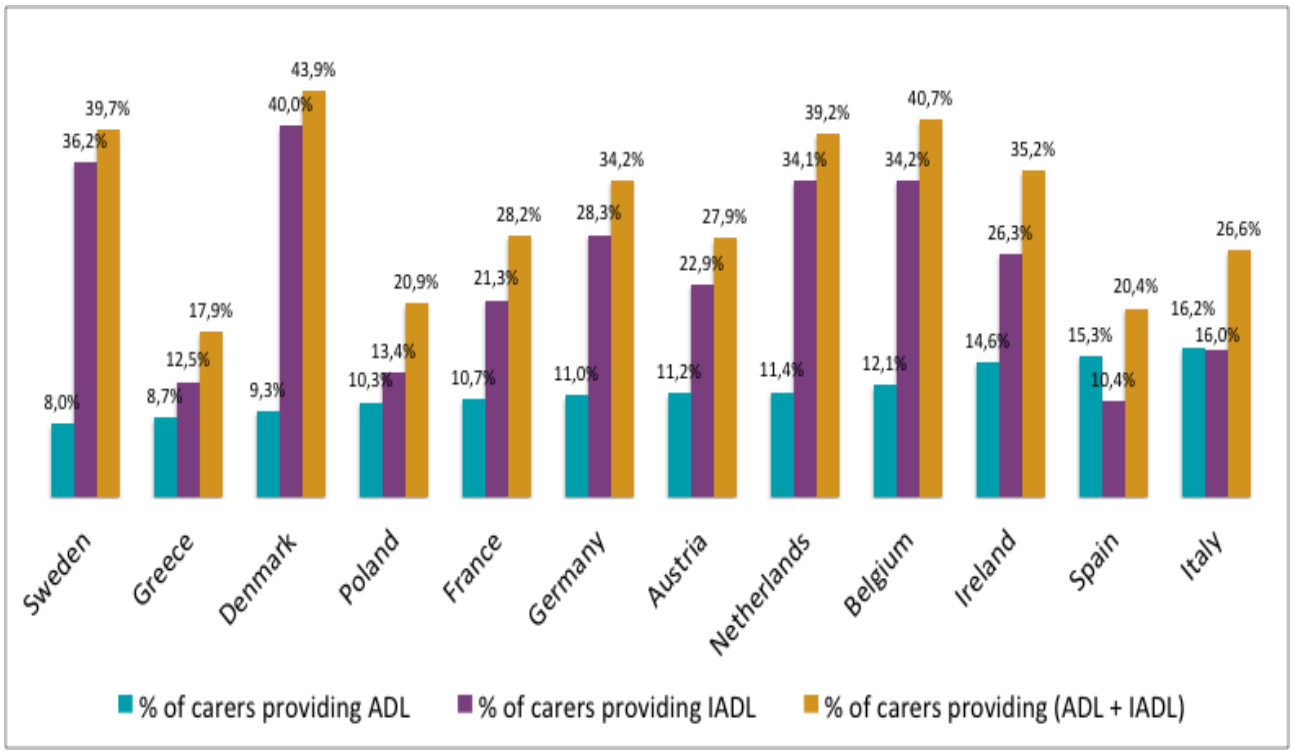

Figure 6: Percentage of informal carers by type of help and country (OECD study, 2011).

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On one hand, taking care of another person can be a source of satisfaction, fulfilment and personal growth. But intensive care can also be especially stressful and straining, potentially leading to burnout and stress. Drug consumption increases with caring activities, especially the intake of sleeping pills, tranquilisers and painkillers. Overall, the prevalence of mental health problems among carers is 20% higher than among non-carers. Relatives are often torn between their responsibilities towards the cared person and their own needs. Among the issues with which informal caregivers struggle are:

- The burden of guaranteeing the cared person's well-being and safety, even when they cannot be with that person.
- Feelings of guilty when unable to take care of the recipient of care, or not as often as is presumed necessary.
- Crises of conscience when relatives are institutionalised, because it is interpreted as abandoning them.
- The need for information about their relatives' diseases (e.g. dementia) and their potential progression.
- The need for practical advice on and support strategies for treatment or coping strategies; sharing with other affected people.
- The need for information on support services (e.g. meals on wheels) or facilities, and the financing of this support.
- The organisation of caring time, and coordination with the workplace and own family.
- The need for leisure time for oneself in order to revive.
- The changes in the demented persons regarding their diminishing independence and/or their personality (e.g. aggression, lack of orientation).
- The psychological effects of being confronted with age-related decline ("Will I be the same when I'm older?").
- Conflicts with the recipient of care, other relatives, professional caregivers and/or insurance companies about care measures, responsibilities or financial matters.
- Conflicts within the family over preparation for the cared person's increasing dependence (e.g. cost sharing for care facilities) or death (inheritance issues, funeral arrangements, etc.). These issues are a good starting point to provide secondary users with useful support, i.e. AAL solutions. Since relatives are often the decision makers regarding the purchasing of AAL solutions, their requirements should also be addressed.

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Caring persons are predominantly women and spouses. Care giving can provide positive experiences, but can also lead to severe stress and health complaints. Provide information and support that correspond to the needs of the care givers, and make sure that these fits into daily routines.

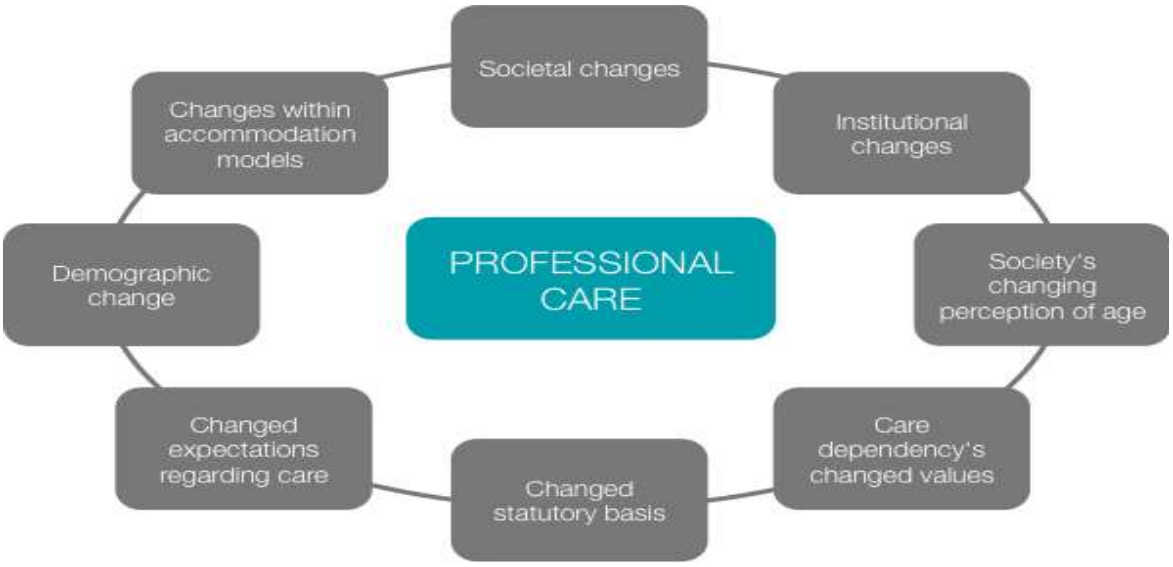
2.2.2. Professional caregivers

The employment of professional caregivers is more likely in the following cases:

- For caring activities that require medical competence (e.g. changing wound dressings)
- For seniors with a higher level of care dependency or intensity
- For single seniors without permanent informal care
- For male seniors (about twice as much as for female seniors).

Professional caregivers are influenced by many different and changing factors and requirements (see figure below): societal issues such as the increasing need for mobility in the modern work environment, institutional motivations to reduce seniors' length of stay in hospitals, and changes in ethics towards technology use in order to remain independent. Professional caregivers are expected to meet the requirements resulting from these influencing dimensions: they have to be friendly, empathetic and active with elderly recipients of care, have to take the latest scientific findings into consideration, while complying with a facility's current quality standards, rules and routines.

Figure 7: Factors of professional care for the elderly (adapted from Engels et al., 2007)



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The following are examples of issues with which professional caregivers deal on a daily basis:

- Strenuous labour due to having to lift or turn elderly people.
- Psychological stress due to experiencing sickness and mortality.
- A high workload, many organisational duties (e.g. documentation) and little time for personal contact.
- Strong time pressure due to a shortage of personnel and many patients.
- Conflicts with the recipients of care, their relatives or within the team/hierarchy.
- Keeping relatives informed about demented patients' status, or financial support they can receive.

Accordingly, caregiver goals involve the following aspects:

- Enhancing the healthcare of aged care residents by monitoring/managing their chronic condition.
- Providing early healthcare assessment, detection and prompt treatment of symptoms/conditions that would ordinarily lead to a medical emergency and the possible (re)admission to the acute care sector.
- Providing enhanced communication, coordination and monitoring of care to other healthcare providers, the client and/or their carers
- Reducing hospital admissions (to casualty or as an in-patient; the frequency and length of hospital stays).
- Enhancing the safety of care recipient, for instance, lowering the risk of demented persons disappearing or running away.
- Delegating minor organisational tasks and focussing on personal care activities
- Using an intuitive and appropriate documentation system.

Similar to informal carers, professional caregivers have the power to suggest or decide on access to ICT technology, which means they should be kept in mind regarding AAL solution development.

Professional caregivers have to deal with many different groups (e.g. relatives, managers, care insurance, doctors) and tasks (caring, monitoring, documenting, housekeeping, etc.). Thus, caregiving is a very demanding job with high stress levels. Make sure that the wishes and fears of professional caregivers are appreciated in the developmental process. Keep the time required to include caregivers, but also to learn to handle a technology to a minimum.

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2.2.3. Other stakeholders

While senior end-users and their caregivers are often involved in AAL development, other stakeholders are mostly neglected. AAL projects should also consider involving the following groups (at least in terms of keeping them informed):

- Medical doctors
- Physiotherapists / occupational therapists
- Rehabilitation centres
- Real estate developers
- Housing cooperatives
- Architects
- Insurance companies
- Social services
- Municipalities
- Ministries.

Depending on the specific secondary and tertiary AAL users involved, the following issues should be considered regarding AAL solution:

- The interoperability with the systems in use
- Proof of the AAL solution's (financial) benefits
- The financial costs of installation and the running expenses
- The effort and time required for installation (in terms of effects on ongoing operations, renting, occupancy)
- The usability of the AAL solution (influencing learning effort, user compliance)
- Ethical considerations: privacy issues but having to monitor, support but not paternalism
- Links to additional services (i.e. service providers)
- The quality and costs of the provided service (e.g. support, repair)
- The correlation with existing (quality) standards and practical requirements (e.g. wireless, cleanable, robust, adaptable, modular, energy-saving, etc.)
- Attractive design

It is often much easier to convince seniors and their relatives to participate in the development process, because their personal gain is clear. The stakeholders mentioned in this section are much more difficult to recruit for interviews or group discussions. In fact there

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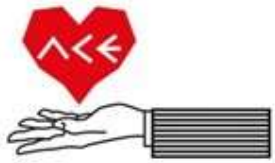

are many more crucial decision makers in the field of AAL solutions than seniors and their relatives. In fact, stakeholders like real estate developers or insurance companies may be the ones who will decide about the market success (or access) of AAL solutions, even if it is user-friendly and beneficial for the primary users.

AAL systems involve many different aspects such as mobility, safety, and social inclusion. One of the first tasks within AAL solutions development is to identify application scenarios or services that support the users in their daily lives. They represent the additional benefit of an AAL solution from the user's point of view.

Favourite AAL application scenarios of primary end-users:

- Saving energy/costs
- Enhancing comfort
- Improving health status
- Preventing hazards such as smoke damage /a fall/water damage detection
- Acting as an alarm (to prevent burglary)
- Supporting everyday activities, for instance, shopping, remembering appointments, housework
- Electronic devices switching off automatically, for instance, when users leave the house

Favourite AAL application scenarios of secondary users:

- Monitoring the primary user's well-being
- Supporting communication with the primary user or other stakeholders
- Supporting demanding caregiving labour
- Supporting administrative activities (in the context of caregiving)

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