

Issues in the Development of AAL Systems: What experts think

Jean D. Hallewell Haslwanter
University of Applied Sciences
Upper Austria, Stelzhamerstr. 23,
Wels, Austria
jean.hallewell@fh-wels.at

Geraldine Fitzpatrick
Institute for Design and
Assessment of Technology, TU
Wien, Argentinierstr. 8, Vienna,
Austria
geraldine.fitzpatrick@tuwien.ac.at

ABSTRACT

Although the development of Ambient Assisted Living (AAL) technologies is being financed to support older people, there are not many systems on the market to date. Other studies have tried to understand this by looking at user acceptance issues. However, by looking only at the user acceptance, we may miss important aspects to explain why systems went wrong in the first place. To understand this, we consulted with people directly involved in the development of AAL. In this study, input was gained from experts through workshops and an interactive poster. We present the common issues reported across various AAL development projects that experts thought were most important to success or failure of projects. We also describe some ideas from people with experience in AAL for solving some of these problems.

CCS CONCEPTS

• **Software and its engineering** → Software creation and management; • **Human-centered computing**

KEYWORDS

Telecare; Older People; Human-Centered Design

1 INTRODUCTION

Europe is aging. It has long been discussed that the age pyramid is shifting – people are living longer and fewer are being born [8]. Through this there will be not only fewer people who can care for the older population, but also fewer people working to cover the costs [10].

Some see technology as a possible solution. The term “Ambient Assisted Living” (AAL) was coined in Europe to describe these systems. As the term implies, many of these technologies depend on pervasive technologies to assist people. These include, for example, systems to monitor if someone has

fallen, or to monitor blood sugar levels and generate alarms. These systems can save money, because not only can carers check on older people less often, but they can also enable older people to live independently in their own homes longer.

To help develop such systems, there has been substantial funding including that of the AAL Joint Programme (AAL-JP) of the European Union (EU), now called the “Active and Assisted Living Programme”. Despite the fact that funding started over 8 years ago and aimed to get systems on the market in just 2-3 years [9, p. 7], there are not many systems on the market today. This is demonstrated by the experiences of people looking for systems for family members, but also by the fact that the AAL-JP was extended in 2014 – this time with a stronger focus on getting products to markets.

Our research uses qualitative methods to understand issues that projects developing AAL technology experience. Most projects include users in the analysis and/or testing phases [9, p. 10], something, that though not sufficient on its own, is thought to contribute to success in software development more generally [3, 5]. Thus, since an effort is being made to understand the needs of users, it is also worthwhile to try to understand the issues developers working in projects face, how they are related, which they think are most important and what control teams have over these. To gather information from a diverse set of people with experience developing AAL technologies, workshops and an interactive poster were used.

2 BACKGROUND

Following on the EU report on aging in 2006, some companies became aware of the opportunities this expanding market could provide. To encourage investment, a number of funding schemes were introduced. This includes the AAL-JP mentioned previously, in addition to national programmes in various countries, such as, the British “Preventative Technology” Grant for telecare services, the German bmbf² focus on „Altersgerechte Assistenzsysteme“ and the Austrian bmvit³ programme “benefit”. Many of these were aimed at small and medium size enterprises (SME) that have less capital to invest in new development. The AAL-JP alone supported 130 projects with over 600 million Euros in the time frame 2008-2013 [9].

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PETRA '17, June 21-23, 2017, Island of Rhodes, Greece
© 2017 ACM. ISBN 978-1-4503-5227-7/17/06...\$15.00
DOI: <http://dx.doi.org/10.1145/3056540.3056554>

² German Federal Ministry of Education and Research

³ Austrian Ministry for Transport, Innovation and Technology

As the name implies, many AAL technologies are *assistive*. There is a wide range of systems conceived to support older people and the people who care for them, both medical professionals and informal carers, such as family members. These systems include pure software systems, systems with sensors and actuators, and also robotic systems.

There are many examples of systems intended to assist older people in their everyday lives [25]. For example, systems that help people to order groceries, or support them communicating with friends and family. In contrast to standard “apps” and web based systems, systems aimed at older people may have a simpler user interface or may be operated using remote control and screen from a television. There are also smart home type systems that help people with physical limitations e.g., to turn on the lights without getting up or open and close shades by just pressing a button. There are also robotic systems that can get things for people [11]. Systems that assist older people can improve the quality of daily living by reducing the effort to do things, especially for those with physical disabilities.

There are also many systems designed to support carers working with older people. Some of these systems also have a part for the older people. In this category there are pill boxes that remind people to take their medicine, and also ensure they don’t take too much [23]. There are also sensor-based systems that increase security in the home [25], for example wearable systems to detect falls, ambient systems to detect if someone with dementia leaves a designated area or to see if there has been activity in the home. These systems may even include video systems to allow carers to check the situation before calling emergency services. The goal is to reduce effort, e.g. carers do not have to come by as often to check if the older person is okay, though evaluations do not show a clear benefit [4, 25]. This type of pervasive system can also be combined with pattern analysis of Activities of Daily Living (ADLs) that may identify changes in behavior, and support informed decisions about health care [18]. Systems like these may enable people to live in their own homes longer before moving into a care facility, something many older people express a desire to do.

There has been some research into the user acceptance of this type of system. Some barriers to adoption of assistive technologies for older people concern privacy, costs and usability; uncertainty about benefits and reliability; suitability for everyday use; lack of perceived need; stigma of using technologies specifically aimed at older people; and fear of dependence and loss of autonomy [27]. So while these systems allow older people to live in their own homes longer, people may also feel less independent or worry that carers will no longer come by [22]. In fact, it has been found that particularly with monitoring systems, there is a tendency to add functions that give control to carers and so actually reduce independence [20]. At the same time, these monitoring systems are valuable as they may be most acceptable to people who are not open to “care” per se [4].

However, by looking only at the user acceptance of these systems, we may miss important aspects that don’t explain why systems went wrong in the first place. For this, we need to consult another important stakeholder – the people involved in the

development. Others have investigated the perceived risks in software development more generally to understand why projects fail, in an effort to manage these issues in future projects [24].

Thus, it is valuable to look into the risks, problems or issues that teams face during the development of AAL systems specifically. There are some indications from the literature about the problems projects face. An evaluation of EU AAL-JP projects indicates some problems with integration and scalability [9, p. 16]. An evaluation of Austrian AAL projects indicates some of the biggest problems related to having unclear project goals, insufficient coordination, but also technical problems [13, p. 30]. Even though the AAL-JP report says that the majority of projects included users [9, p. 10], the Austrian report says that people in projects felt this inclusion of users was in many cases not sufficient [13, p. 30]. The problems could also relate to challenges of working with older people reported also elsewhere [19].

Contributing to this understanding, the authors have looked at two case studies of projects developing AAL systems understand in detail the problems teams face during the development. One was a system developed to run on Android tablets [16]; the other a more comprehensive smart home system [17]. In those we identified issues in applying user-centered methods and also issues with funding.

This research builds on these cases studies. Although, some of the issues from the cases studies have been reported elsewhere [6, 21], it is not clear whether these problems have been faced more widely. Since it doesn’t make sense for future researchers to focus on finding solutions to unimportant problems or those experienced only in single project, here a focus is put on problems reported by multiple people and those that were thought to be most important to the success of projects. Thus, the goal here was to get input from a broad range of people with experience developing AAL systems, to find out what issues they have faced, whether these have been faced by multiple people, which are thought to be most important, and how the issues are linked. In a final step, we asked about what ideas people with experience in the area see to solving some of these problems.

3 METHODS

The research included two workshops, followed by an interactive poster (see [Figure 1](#)). In accord with the constructivist approach and the goal of *understanding*, the methods were designed to allow rich stories and accounts to be discussed, from which participants could identify issues, even though these stories are not recorded. The categorization and discussion of possible solutions provide some information about the context.

Since the focus was on identifying issues as a first step toward finding solutions, the issues were rated by the participants using a scale like that used for project risks [24] and was based on two dimensions: a) how *important* these were thought to be relative to the others and b) whether these were in or outside their *control*. The latter is important to support finding solutions - literature supports that the key risks to consider are those over which we can exercise some control [24, p. 77].

In keeping with the goal of identifying issues faced by multiple projects, participants were provided with issues from previous studies and the analysis focused on identifying common issues.

Since a novel format was used to identify the key issues in a short amount of time, the individual steps to gather information from the experts are described in more detail in the following.



Figure 1 Methods used to derive issues (© Jean D. Hallewell)

3.1 The workshops

Two workshops were held, referred to as workshop 1 and workshop 2. Both had the same format, and consisted of a number of steps (see Figure 2). To ensure a broad range of participants, workshop 1 was held by invitation and in conjunction with an AAL meeting in Austria to make it easy for people to attend. Workshop 2 was held at an international conference on assistive technology [15] and was open. It was advertised through the workshop organizers, the mailing list of AAL Austria and the conference.

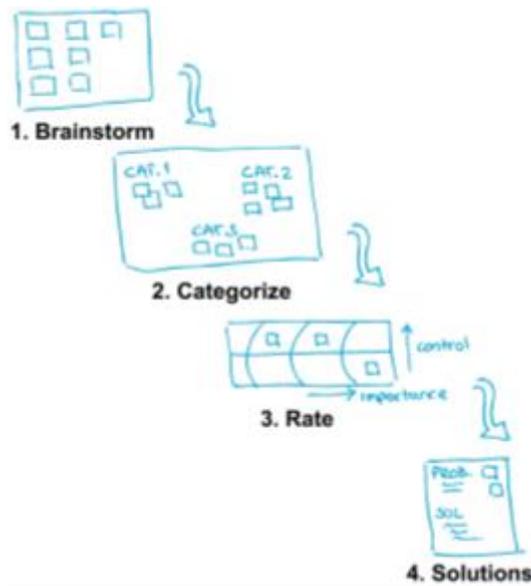


Figure 2 Steps during the workshops (© Jean D. Hallewell)

Step 1 of the workshop entailed having participants identify issues. At the beginning, a quick introduction was given to give people a common starting point. The participants were asked to work in pairs to discuss their personal experience in AAL and brainstorm issues. Each issue was put on a sticky note.

In step 2, the participants were asked to categorize the issues they found to make sense of how they fit together. To promote discussion, pairs were now asked to join in bigger groups of 4 or 5 people. The participants were asked to go through their issues, mark any duplicates, group the sticky notes with issues into categories inductively and then label the categories. At this point they were also asked to consider a list of issues from the aforementioned case studies, to support the goal of identifying those issues that are faced more widely. The list included issues such as needs of carers given precedence, reliability takes over – but usability important to acceptance, adding project partners adds complexity, technologies not financially supported – carers are, and developers stereotype older people. It was stressed that the participants “can” add issues from the case studies, but that it was not necessary to add any of these.

Step 3 of the workshop entailed rating the issues. The participants were asked to work together for this. The rating was set by the position of the sticky note with the issue on the poster and based on dimensions of perceived *importance* to “success” and the degree to which the issue was in their *control* (shown in Figure 3 in the results). Note that the term “success” was not defined. Other studies indicate that the perceptions of success may vary, but in many areas relate to having a working system and satisfied customer and not just being on time and in budget [5].

Finally, in step 4, the participants discussed solutions. They were asked to select an issue or cluster of issues of interest to them and explore possible solutions in groups of two to four people. As part of this, they were asked first to describe the problem in more detail and then add ideas about what could be done. These were then presented to the other participants, at which time additional comments were added.

Thus, from the workshops we were able to confirm some issues from previous research, to add further issues, see how these were categorized by the participants, get a rating for each issue and also get some proposed solutions to a few of the issues. Including people with a broad range of experience helped to ensure the quality of the results.

3.2 The interactive poster

The interactive poster was displayed at a conference relating to AAL in Europe [14] to ensure participation by a wide group of people with experience in AAL projects. In keeping with the goal to identify issues faced by different people, the poster was pre-populated with a series of issues, identified in the case studies and/or workshops. There were two ways to interact with the poster: people could add a sticky dot next to an issue to indicate they had also experienced this, or they could add new issues by adding sticky notes (see Figure 4 in the results). Instructions were provided on the poster, and sticky notes and pens were attached to the base of the pin board, so that people could participate at any time during the two days of the conference.

Thus, issues with dots next to them were ones that had been experienced by other people. Putting this at a conference about AAL helped to ensure that people with experience in the area were included. However, since there was no control over who

participated, the number of dots is an indication only - having a high number of “support” dots does not necessarily mean that the problem is most common overall, and no dots next to an issue only means that the people who participated with the interactive poster had not experienced the problem and does not necessarily mean no one else has this problem. The dimensions people used to rate the issues were the same as in step 3 of the workshop.

3.3 Analysis

The two methods of gathering information complemented each other nicely. The workshops went in more detail and ensured participants with a broad range of experience were included; the interactive poster reached a larger number of participants.

The analysis focused on grouping. The issues were checked to see which were supported or duplicated by another participant. The categories from the workshops were compared to look for similarities. The issues from the poster were also analyzed to see if there were some that did not seem to fit in any of the categories from the workshops. For the rating, the lines from the poster were used (see Figure 3). For the dimension *importance*, the three color bands were distinguished: the most important being those in the dark band on the right and the least important in the paler are at the left. For *control*, during the analysis it was only distinguished if the issue was in or outside our control.

Note that two people who were in the case studies took part in one of the workshops. Thus, issues that these people confirmed from the case studies were not considered as confirmed, unless they were confirmed by another source, as well.

Any texts in German were translated by the authors.

3.4 Participants

In workshop 1 five people participated, of which four were invited and one asked to join in on the day. All participants were from Austria. However, the attendees worked at a diverse set of organizations: two universities, a research organization, a large international company and a start-up. All people had worked in at least one AAL project for a couple of years – one participant had been involved in a number of different projects over a period of eight years. Three participants had been involved in at least one EU AAL-JP funded project. The backgrounds of the participants included electrical engineering, computer science, sociology, and business. In all, workshop 1 identified 23 issues and developed two solutions.

Workshop 2 had nine participants, all but one of which were based in Austria. It included people from universities, Fachhochschulen⁴, a research organizations and a company. Again all had been involved in at least one AAL project and had diverse backgrounds, such as electrical engineering, software, healthcare, human service management and sociology. In all, workshop 2 identified 48 issues and developed three solutions.

The interactive poster was displayed during the entire conference and attracted a lot of attention over the two days.

⁴ University of Applied Sciences – cannot grant doctorates

Participants included at least 16 people from nine European countries: Austria, Belgium, Germany, Ireland, Italy, Luxembourg, Romania, Switzerland, United Kingdom. In addition to the backgrounds from the workshops, there were also people from funding agencies and gerontology. In all 28 new issues and 42 dots supporting other issues were added.

4 RESULTS

The results present the issues that were confirmed by multiple sources, how these are categorized and the solutions developed at the workshops.

4.1 Issues identified

Since issues from the workshops were included on the interactive poster, the results from the workshops are presented first.

4.1.1 Workshops

In total 71 issues were identified by the participants. Of these, sixteen were confirmed from multiple sources - nine issues from the list from the case studies and seven issues from other participants – the ones rated most *important* are included in the final results (Table 2). In workshop 1 most issues were rated either most important or of medium importance. In workshop 2 the issues were more distributed as can be seen in Figure 3. Both workshops identified issues that were in and outside of their *control*, with the majority of issues rated outside their control.

4.1.2 Interactive poster

The interactive portion of the poster included an area similar to the poster used for rating issues in the workshops (shown in Figure 3), in addition to information about the research and how to interact with the poster. An excerpt of some new issues and dots supporting issues can be seen in Figure 4.

In all 28 new issues were added. Thirteen of the fifteen issues printed on the poster, and fifteen of the new issues added by other participants were confirmed or supported with red dots.



Figure 3 Rating from workshop 2. The issues above the line are “in our control”; the issues to the right in the darker areas are rated more important. (© Jean D. Hallewell)

4.2 Categories

In step 2 of the workshops, when participants were asked to group the issues into categories and to give these a name, each group came up with between three and five categories, each containing several issues (see Table 1). Within each column, the list is ordered, with the categories containing the most issues at the top.



Figure 4 Excerpt from interactive poster. Yellow sticky notes were used to add new issues and red dots to support existing issues. (© Jean D. Hallewell)

Looking closer, we see that all groups identified categories related to *Users*, *Financing* and the *Product* (see Figure 5), although the wording used by participants was slightly different, e.g. “funding perspective” or “money” or “financing”. Furthermore, some groups had categories that were considered as multiple categories by others, e.g. “End-user / development”. The categories related to *Financing* and *Users* received the highest number of issues in all groups.

Table 1 Categories from workshops. The number of issues for each category is displayed in parentheses afterwards. Note that in workshop 1, one issue was in two different categories, thus the ½.

Workshop 1	Workshop 2, group a	Workshop 2, group b
Funding perspective (8)	Users (9)	End-user / development (9)
Commercialization / Marketing (7 ½)	Money (7)	Financing (5)
User perspective (5)	Product (5)	Solutions (5)
Product perspective / Usability (2 ½)	Project / Organization (5)	
	Other Stakeholders (3)	

4.3 Most important issues

Not counting issues confirmed by both the workshops and the interactive poster, 35 different issues were found that were confirmed from multiple sources. Of these, nine were rated by participants to be most *important* to success (i.e. were placed in the dark ring). These are shown in Table 2 grouped by the categories identified in the workshops. Those issues shown in **bold** here were rated by participants to be in the *control* of projects, and so are most important to consider if we want to address them. Here again the categories *Users* and *Financing* appear. The category *Product*, though mentioned by all groups (i.e. in center of Figure 5), included no issues rated with the highest importance and so is not included in the list.

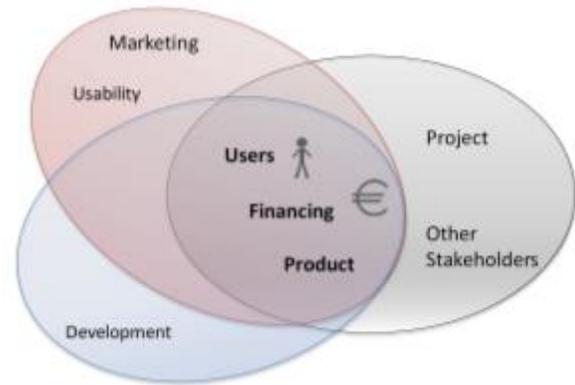


Figure 5 Overlaps in categories. Each oval contains the categories identified by one group. The categories in the middle were identified by all groups. (© Jean D. Hallewell)

Table 2 Issues confirmed from multiple sources that were also rated most important, grouped by categories. Issues formatted in bold were rated to be in our control, the others were considered to be outside our control.

Users
• Don't really understand needs of the user group
Financing
• Problems finding funding for new projects
• Partners chosen to get funding, not expertise
• Project ends with only a prototype
• Adding partners adds complexity
Marketing
• Lack of overview of the players / which projects have been developed
• Technologies not financially supported – carers are
Project
• Communication problems between project partners / stakeholders
• Product definition driven by research topics and tech push (not user input)

4.4 Proposed solutions

In each workshop, the participants were asked to choose one or more issues and consider solutions for these in smaller groups. The issues chosen and results follow – note that some of these are also in the list of most *important* issues (Table 2). In all, there is at least one solution from each the categories included in the table.

Workshop 1:

- **Financing:** Several different issues (all highest level of importance and outside our control)
Here the participants focused on funding programmes and suggested increased flexibility is needed, including thematic flexibility during the initial phases and more flexibility with deadlines during development. Furthermore, additional support for getting to market and coaching for partners was suggested.

- **Marketing:** “Lack of overview of the players” & “Lack of overview of which projects have been developed” (highest level of importance, but in our control), considered to be a single issue by the group. Here the participants developed a list of the players, including end users, sources of financing and also organizations involved in the development (Figure 6).

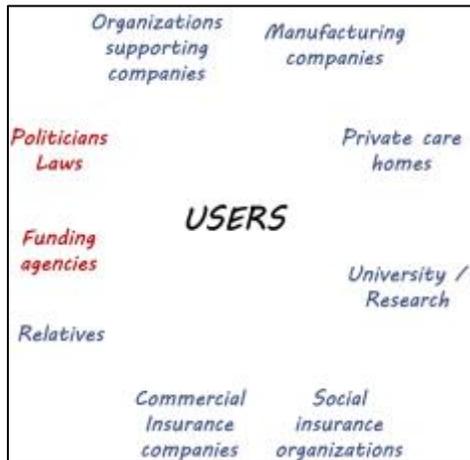


Figure 6 Overview of the players developed in workshop 1 © Jean D. Hallewell)

Workshop 2:

- **Financing:** Several different issues (all highest level of importance and outside our control) Here the participants focused on the market perspective and concluded that rather than specific AAL solutions, smaller add-ons to existing products such as robotic vacuums may be more successful, at least for established companies.
- **Project:** “Too little value - AAL technologies” & “Benefit difficult to prove” (medium level of importance, but in our control), considered to be a single issue by the group. Here the solution was two-fold. On one hand, developers need to be less technology focused and look at the true needs. On the other, more data is needed to support the value in order to encourage investment, also from the end-users.
- **Users:** “Developers are young -> older people stereotyped” (lowest level of importance, but in our control). Note this issue was one on the list from the case studies provided by the workshop organizers. Here the group concluded that we have basically failed – the information about older users is out there, but poor methods and project management need to be remedied to ensure this information is better integrated into the project and that developers talk to the older users.

5 DISCUSSION

Our goal was to understand issues from the perspective of people involved in AAL-related projects as to why and how they can be problematic. The most important issues identified were related to the categories *Financing*, *Users*, *Marketing* and *Project*. Those that were rated to be in our *control* indeed seem to be things that can be fixed: by creating a list of the players (something that was done for Austria in workshop 1), ensuring there is regular communication between project partners/stakeholder and finding out the needs of the users. Problems with communication in projects may seem surprising coming from experts, as it points to poor project management. Others have found that the lack of formal project management skills is more generally a risk for software development projects [24].

Since the categories *Financing* and *Users* were identified by all workshop groups and included some of the most important issues, these will be discussed in more detail below. Finally, some methodological aspects will be considered.

5.1 Financing is an important issue

In both workshops the issues related to *Financing* were given a high level of *importance*. In workshop 1, *all* issues in the *Financing* category were rated of highest importance and most issues given highest importance (8 of 13) were about *Financing* (with 3 more about *Marketing*). In workshop 2, more than half of the issues related to *Financing* were given the highest rating (7 of 12), and *all* issues given the highest rating were from this category. Looking at the issues, it is not just placing the blame on funding agencies – some issues also show reflection, such as the need to make smaller steps or “Unrealistic project expectations/goals”.

The level of importance may also help to explain why at both workshops someone chose to look at solutions for issues related to financing, even though these were thought to be outside our *control*. At the same time this gives us hope, as there are things that can be done – both by funding agencies (workshop 1) and companies (workshop 2).

Particularly the issues in the category *Marketing* may point to unrealistic expectations on the part of the developers – the funding agencies aim only to “foster the emergence” also through “localization” [1]. Issues from the poster indicate that in practice, going to market is in some cases an add-on and not considered from the start. For example some items from the poster: “Taking into account commercial aspects from the very first moment of concept” or “Product definition driven by research topics and tech push (should be user demand driven)”. Both of these were rated in the control of projects. It is interesting to note, that the person who added the issues was from a funding agency, so the developers may not be sufficiently aware of these issues.

If we want to get AAL to the market, funding issues are of primary concern. Funding problems can result in entire projects being stopped, which has been demonstrated also in the area of AAL [16, 17]. But it can also lead to people changing the focus. One of the case studies that led to this study being done, found that due to costs associated with installation and maintenance a

company switched from focusing on people in their own homes to those in care homes; this in turn affected the needs to be addressed in subtle ways and ultimately may have affected the success [17]. Thus, funding agencies may want to reconsider funding guidelines to better support this phase. For example, by providing more flexibility, as suggested by the participants of workshop 1.

5.2 Better design practices as one solution

As expected, several issues related to *Users* were confirmed, though only one was rated most *important*, and hence in Table 2. Despite this two of the five “solutions” specifically concluded that teams are not really user-centered enough. This indicates part of the *solution* may lie in better user-centered design (UCD) practices.

Just as the solution to one issue in another category ended up with a solution related to UCD, several of the other issues indicate UCD practices of teams warrant more reflection.

One area of concern relates to lack of access to older users. Issues from the workshop point to some of the problems. “Finding people for long-term tests” may relate to why there is “Still little inclusion of users beyond testing”. Instead other stakeholders are included, and then “Needs of carers take precedence”. Also others have found that users are not included sufficiently in AAL projects [13]. For this, as a community we need to find ways of organizing access to older users for both needs analysis and tests. For tests, living labs with access to user groups may be a good resource. For the needs analysis, it may help to use existing resources to reduce the amount of access to older users needed, such as the set of personas developed in Austria to help raise understanding and empathy with older people [7].

The methods being applied may also not be optimal for older user groups. Studies find that most AAL projects include users [2, 13], but the issue “Don’t really understand needs of the user group” indicates success may be wanting. Furthermore “Technical prototypes too complex for field tests”, indicates problems with the methods applied. At this early phase field tests may not be appropriate with older users, some of whom have less experience with technology. Instead methods recommended for AAL [26] could be applied first, such as storyboards, paper prototypes, wizard of oz or co-discovery. Furthermore, if, as indicated previously, access to older users is limited, there may also be a need for methods that use the time with them more effectively to really understand their needs. For example, by using methods like shadowing that provide richer information and are specifically recommended in the toolbox for AAL [26] rather than interviews, that at least in Austria are used more widely [12]. It is worth noting, that despite their experience, most participants were unfamiliar with the AAL toolbox.

Even if UCD methods are being applied, teams may be distracted from user issues because technical issues arise, as in the case studies leading up to the workshops [16]. The issues from the workshops, e.g. “High reliability needed in diverse situations” and “Reliability takes over – but usability important to acceptance”, support that this may indeed be happening. For this, good project management is needed to ensure the users remain in the forefront.

Finally, there may be difficulties due to project structures required by funded projects, as indicated by “Communication problems between project partners / stakeholders” and “Adding partners adds complexity”. In practice, one partner may be responsible for collecting user information. Thus, the user researchers and even designers may know the needs of the users, but the information may not be reaching the developers, who make design decisions during the project. Also other studies of AAL projects found that there are communication problems between user researchers and developers [12].

Thus, it is more complicated than just being ‘more user centered’. These issues related to *Users* are complexly entangled with a number of other project-related issues and indicate the need to understand more precisely what is happening in projects, for example through case studies, to gather information about successful methods. Finally, we need to spread information about appropriate UCD methods in the AAL community.

5.3 Methodological aspects

Input was gained from at least 30 participants with experience in the development of AAL systems. Although this is not a large number in comparison to more general studies collecting issues [24], we are dealing with only a small field. The specific invitations to workshop 1 ensured that a wide variety of participants and people with a lot of experience were included.

The participants may not be representative of the community as a whole. Thus, the results only say whether another participant had the problem, *not* that no one else did and *not* how frequent it is. However, since most participants in the workshops were from Austria, it may mean that some of the issues from the workshops and solutions are specific to this context. But this may have less importance than it first seems, as Austria has been one of the top four countries involved in AAL-JP projects [13].

In workshop 1, all issues were assigned either the highest or medium level of *importance* – none were included in the lowest “band”. In the second workshop, both groups had issues in all bands of importance. Thus the participants in the workshop 1 may have simply given things a higher priority, but they may also have focused on those things that were most important, because they were invited specifically to share their knowledge.

From the text on a sticky note alone, it can be hard to know what participants meant with some issues, particularly with the interactive poster, where no categories were available to help interpret. If an author was nearby, in some cases additional information could be gained, which was also useful when for checking for duplicates.

6 CONCLUSION

When asked, people with experience in the development of AAL systems identified issues about users, financing and products that affect whether the development of AAL systems is successful. Many of the issues rated most important related to monetary aspects – both funding/grants and marketing. Many of these issues were felt to be outside of the control of the teams.

One area of concern is that despite users being included in the development, experts feel that developers in AAL projects are not successful. Workshop participants suggested that both different methods and better project management are needed to remedy this. Further study is recommended. As a community, we also need to spread the word about information about older people and appropriate methods for working with them that is available, so every team doesn't start from scratch. Additional flexibility in grants, such as thematic flexibility in the early phases and more flexible deadlines during development may also support success.

ACKNOWLEDGMENTS

We would like to thank all the people who participated in the workshops and poster for their valuable input.

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