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CCCiC 2014

Proceedings of the **ACM GROUP Workshop** on

Collaboration and Coordination in the Context of Informal Care

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Preface

This volume presents the proceedings of second edition of the workshop "Collaboration and Coordination in the Context of Informal Care" (CCCiC), held in Sanibel Island, Florida, USA, on the 9th November 2014, as part of the 2014 International ACM Conference on Supporting Groupwork (GROUP 2014). The proceedings list the papers and the demo proposals accepted for presentation in the workshop and the abstract of the opening keynote.

CCCiC GROUP 2014 is part of a series of workshops organised by academic members of TOPIC (The Online Platform for Informal Carers), a European project that aims to advance the understanding of the daily practices of informal carers and to design information and communication technologies to lower their burden, funded by the AAL (Ambient Assisted Living) Joint Program.

Studies on issues of informal care suggest that further research in the area is needed to better understand its demands and to figure out more effective ways for technologies to support people who deal with them. These studies recurrently stress that care work is often demanding and that the results of these demands are different types of burden (e.g. psychological, physical, and emotional), which can be higher or lower depending on variables like the age, gender, and type of illness of the person receiving care.

Following up the successful first edition of the workshop at the 2014 ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW 2014), held in Baltimore, Maryland, USA, this edition elaborates on the resulting roadmap for future research in the domain devised in it. Therefore this workshop focuses on contributions concerning, among other issues: conceptual frameworks that describe the coordinative nature of informal care; integrated platforms that serve all relevant aspects of caregivers' needs in form of adequate integration of products and services; computer supported learning for informal caregivers; accessible (mobile, tactile) ICT applications that might automate many tasks of general caregiving; social media for social support, such as online communities with special focus on social support for informal caregivers; and knowledge sharing among informal caregivers.

The contributions featured in the proceedings have been **peer-reviewed** by the members of the workshop Program Committee and selected on the basis of their quality, compliance with the workshop theme, and the extent (and diversity) of their backgrounds in design. They express points of view of researchers from both academia and industry and provide relevant insights in the design and development of technologies for informal care.

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Opening Keynote: Social Support for Health Decision Making in Diverse Populations

Erika Poole

Speaker's short bio: Erika S. Poole is an Assistant Professor of Information Sciences & Technology at Penn State University, University Park and an affiliate of Penn State's Centre for Healthcare Delivery Systems. She is the co-director of the Health Information Technologies (HINT) research group at Penn State. Her research focuses on consumer-oriented information technologies for physical activity promotion, foodrelated decision making, and chronic disease management, particularly for adolescents and young adults. Her research has been supported by the National Science Foundation, National Institutes of Health, Nokia, Intel, Pfizer, and the Tronzo Endowment. She holds a PhD in Human-Centred Computing and MSc in Computer Science from the Georgia Institute of Technology, and a BSc in Computer Science from Purdue University.

Workshop Papers

It Takes a Village: The Role of Community in Access to Learning Resources in Economically Disadvantaged Families

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Abstract

This study examines the role of technology in parents' knowledge and use of out-of-school learning resources for their children in economically disadvantaged communities. In this paper, we present the findings from two qualitative studies which provide insights into the collaborative process of information seeking among parents and hint at the potentials of hyper-local social networking platforms for increasing parents' access to informal learning opportunities for their children.

Author Keywords

Digital Inequalities; Informal Learning; Education; Social Capital; Hyper-Local; Online Community; African American; Marginalized Communities; ICTD

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Parents are important facilitators for informal learning among their children [1]. Studies show that how parents utilize technology to find resources and ideas

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee, provided that copies are not made or distributed for profit or commercial advantage, and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on server or to redistribute to list, requires prior specific permission and/or fee. CCCIC GROUP 2014, November 9, 2014, Sanibel Island, Florida, USA. http://group2014.cccic.org/ Copyright is held by the author(s). ISSN 1021-73643 for out-of-school learning impacts a child's exposure and interest in education [6]. However, little attention has been given to parents' use of technology in lowincome families and their role as resource brokers for their children. This is particularly important since while some audiences are able to navigate and critically evaluate online resources, the groups that may benefit from these resources the most, low-income and loweducational families, face problems finding appropriate and effective learning resources [5].

In this paper, we reflect on technology practices among African American parents in low-income neighborhoods in metro Atlanta, and reflect on the design opportunities to empower this audience to have access to a broader array of learning opportunities for their children.

Interviews with 28 parents in these neighborhoods, as well as the use of open-ended, exploratory tools such as medium probes [4], provide insight on parents' use of information technology, their everyday practices, cultural values, and the role of technology in finding learning opportunities.

While new design efforts and technological interventions are needed from information retrieval experts and educational technology designers to adapt current designs to meet the needs of marginalized groups, an equally important aspect of enhancing parents' access in low-income and low-educational families is achieved through community building efforts and developing a platform where parents can collaboratively find and share information on parenting. In this paper, we focus on the latter approach and present the findings that support the potentials of online social networking platforms for increasing parents' access to out-of-school learning opportunities.

Method

In order to study the detailed technology practices of parents, semi-structured interviews were conducted with 28 parents, or relatives playing the role of primary caretakers, in financially depressed neighborhoods in westside Atlanta. Of the 28 participants, there were 26 females and two males, all self-identified as African American. We wanted to examine parents' access to information technologies as well as their practices participating in their children's education. The interviews were transcribed and coded by two researchers, reaching .80+ inter-rater reliability on 20% of the interviews. More detailed description of the coding process is described in [8].

Moreover, to seed productive conversations about technology-use, we used medium probes with nine female participants, two of whom were among the participants of the previous semi-structured interviews. Medium probes are open-ended, provocative tools that provide researchers and participants with a set of shared experiences and artifacts that help overcome the imbalance in expertise that may hamper meaningful conversations about technology [4]. Using medium probes, and following up with participants through focus groups and follow-up interviews, we aimed to better understand the mediums of information that are most effective in communicating with parents.

Technology Practices

In this section, we reflect on some of the findings regarding parents' information technology practices.

Information Seeking and Education

Despite parents' familiarity and frequent use of search engines, only a few mentioned using these tools to find learning resources for their children. Based on the interviews, the number one source for finding new learning opportunities in this audience is either through teachers at schools or via informal word-of-mouth through interacting with other parents and parent liaisons at the parent center. For instance, Parent Portal, introduced by the Atlanta Public Schools system, is one of the tools for tracking children's performance at school. However, most of the parents seemed to lack motivation to use the portal. Alternatively, they preferred to monitor their children's performance through direct interactions with the teachers. While further research is needed to find the reasons behind parents' reluctance to regularly check the parent portal, one possible reason may be that the parent portal is a one-way channel from schools to parents, which hinders deeper in-person engagements; something that is highly valued by parents.

Social Networking Platforms

82.1% of participants used social networking websites, with Facebook being the most frequently used site. Social networking websites play an important role in expanding one's social capital and exposing them to new resources. Taking advantage of the ties in social networking sites expose individuals to a broader range of information [3]. Moreover, research on teens' use of social media suggests the same impact on their level of engagement with informal learning resources [9]. However, participants' use of these sites does not indicate that they are engaging in developing social capital. Many of the participants used social networks for passive consumption of information; which is linked to little or no impact on bridging social capital [2].

Identity as Not Skilled with Technology

In analyzing parents' technology practices, it is also worth noting that most of the participants in both studies described themselves as "not a tech person" at some point during the interviews or focus groups. This was in contrast to ways they demonstrated technical skills in their daily practices. Participants often explained that they did not use some of the popular social networking tools because they did not identify themselves as the type of person that uses these tools. Unpacking parents' feelings of incompetence is further complicated by the identity associated with some popular social networking brands such as Twitter, which parents associate with the younger generation, and therefore, were reluctant to use.

Technology and Trust

One of the most common trends observed among participants was the extent to which they limited their use of online services, because of the threat of unwanted viruses and malwares that could break their devices. These concerns were exacerbated via the high cost of losing a device for these families. However, we did find that participants would utilize resources introduced to them through other parents or trusted entities such as their children's school. Therefore, for educational resources to become embedded in participants' lives, future designs should consider this sensitivity, for instance bt modeling the design of online resources after the sites participants already use, or introducing them through local entities parents interact with and trust.

Parenting and Education: It is a Collaborative Process

One of the main emerging themes in the interviews was the degree to which information about educational resources was shared through one's strong and weak ties. In this section, we reflect on this theme from two different aspects: the communication dynamics between parents and the school system, and the interactions among parents within the community.

Dynamics of Parent-Teacher Communication Teachers are an important resource for finding about learning opportunities. Many parents described having regular communications with their children's teacher as a way to monitor their child's progress. However, a subset of parents indicated anxiety about communicating with teachers in the higher grades such as high school. One reason for this difficulty in communication is a perceived difference in educational background and the level of authority or knowledge compared to teachers. The anxiety caused by this perceived knowledge gap discouraged some parents from communicating with teachers directly.

Parent-to-Parent Ties

Participants repeatedly mentioned close ties among parents within the community. Several of our participants mentioned coming to or volunteering at the parenting centers at their children's school while their children were in class. Parents within the community put great value on support they received from their peers, to the extent that peer-support and informal interactions were the primary ways participants learned about new resources available to them. Moreover, parents were often eager to reach out to other parents to openly share their knowledge and expertise about issues that were of common importance to them, such as their parenting practices and the challenges they face. This level of sharing and openness among this audience provides great opportunities for platforms that connects parents beyond informal encounters in shared physical spaces such as parenting centers, and support parent-toparent communications in a broader, more structured format.

Opportunities for Social Networking Sites

In this section, we reflect on some of the opportunities provided by social networking platforms for parents' engagement in discussions around parenting in general, and finding educational opportunities for their children in particular.

Platform for Narratives

Participants in the medium probe study, continually expressed enthusiasm in not only discussing topics of parenting and education, but also a desire to share their experiences. The enthusiasm to discuss these topics revealed itself in our interviews as well, were interview sessions often went on to include stories about their everyday lives, reflecting on parenting, and the challenges of being involved in their children's education. These topics appeared to be of common interest among most parents, especially among older parents who viewed parenting as an expertise they could share with their younger peers and a value they

As we go through this thing called parenting, peer support is important... When it's another parent talked to a parent, we can relate on a whole different level. (Amanda) could contribute to the community. Social networking and blogging platforms can support this interest for experience sharing and create a unique incentive for continued engagement of parents.

Platform for Social Support

As described earlier, one unique characteristic in this community is the close bond among parents. Particularly the parent center we worked with fostered a feeling of family among visitors and even toward us as outsiders. Many parents come to these centers to use the computer facilities, participate in workshops addressing topics from education to everyday challenges of low-income families, or just informally interact with other parents and the staff at the center.

Based on parents' willingness to communicate with one another, we see a great opportunity for platforms like online networks. Such platforms can potentially reach more parents within the community who currently do not or cannot participate in parenting centers, and leverage the community ties by providing a ground for asynchronous and documented discussions that do not suffer from the shortfalls of informal encounters.

Platform for Information Flow

The design and deployment of a social networking site may overcome the shortcomings of current communications channels such as the parent portal. An online community provides a two-way, interactive communication channel where parents can actively engage in conversations around parenting topics and receive information from their peers. This may increase parents' motivation for participation as the online community augments their everyday interactions and what is already happening offline. Moreover, an online platform may overcome the issues of power dynamics in parent-teacher communications discussed earlier, by mediating indirect information flow from teachers to parents while allowing parents to engage in conversations choosing customized level of anonymity toward different group.

Format for Community Advocacy

As demonstrated in the quote on left hand side, realizing the issues of the community, several parents wanted to take on an activist role by starting discussions around the problems in their community and how they can solve them.

When asked about the use of social networking platforms such as Twitter and Tumbler in the medium probe study, even participants who rarely used these tools, realized the potential of such online platforms and expressed a desire to use these channels to have their voices heard and get more people motivated to make a change in their community. In this regard, social networking sites provide a unique platform for parents to engage in discussions around educational needs of the community and reach a broader audience.

The Need for Locality

In the design of an online community for parents, keeping the information technology focused to the audience community would be critical. Studies of hyper-local social networks show that these networks have a positive role in enhancing existing community engagements already present among members [10].

Two of the main issues that call for a local solution are the strong off-line bonds that exist among parents, and the issues of trust and the need for a safe space where

You look up the North cluster [a wealthier area of Atlanta], you have all these educated people who are saying what they want... But the difference is these people are educated. They go for what they want. In this demographic when you're not educated, you don't know what to do. (Laughter) You don't know how to fight, to advocate. (Yolanda) parents can have open and productive discussions about parenting. Research has suggested that the close match between the online and offline profiles in a hyper-local network provides a degree of accountability that may result in a higher level of trust among the members [9]. The locality of information in a hyperlocal network also helps parents to find information that is both culturally relevant and geographically accessible to them, which is particularly important for low-income families with limited means of transportation.

Finally, a local, specialized solution may overcome the chaos associated with general-purpose social networking sites. Although having access to a wide range of information through sites such as Twitter and Facebook is valuable and well-studied, the abundance of information in these more general-purpose social network may be "just too much" for many parents. Studies show that locally focused sites are both easier and more desirable for finding local information [7], and therefore, a specialized network may be more useful for parents.

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FIT2: Information Translations for Health Practices

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Abstract

The FIT2 project is investigating how to support health practices that gain their meaning by sitting at the intersection of a multiplicity of social worlds. We present our basic theoretical framework, early requirements based on a set of field studies, and our current prototype.

Author Keywords

health, health informatics, cooperative work, social computing, community health, patients, consumers.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI):

Introduction

The FIT2 research project aims to better support people when their everyday lives are disrupted by chronic illness. To do this, we needed to understand the practices that people rely upon to manage their health.

The project incorporates both technology and socialanalytic studies, focused around the following research questions:

 How is "health" incorporated or separated from the activities of people's everyday life? What do they do to garner "health" and when are these practices separate from, in conflict with, and augmenting medically-sanctioned practices?

- Are there distinct "health practices", and if so, in what ways might they be significant? If there are multiple meanings of health practices, how can we support people more fully understand their conditions?
- If "health" practices are seen as resources in people's lives, where do they come from?
 Furthermore, how might health practices differ among people from a range of social contexts? How do their different social worlds reinforce, bump up against, or argue with one another in terms of these practices?
- What practices do people believe will garner them "health" besides those sanctioned, directly or indirectly, by the medical community? In particular, how do people reconcile the social world of medicine (if it is even seen as one world) with their other social worlds and with their current set of practices? If they rationalize holding what would appear to be discrepant practices (in the view of medical or health professionals), how might we help them make sense of the "messiness" of their everyday health practices?

To understand these questions, we have engaged in a number of ethnographically-based studies and constructed application prototypes. We describe one line of studies and a system prototype briefly below. First, however, we describe our analytical stance.

Background

We base our analysis and understanding in symbolic interactionism and in Social Worlds theory, mixing in a Practice Lens perspective.

Social Worlds. In symbolic interactionist terms, people live in "social worlds" [6]. While Strauss is the person credited with "social worlds" as a conceptual construction, other second-generation Chicago School sociologists such as Howard Becker used similar constructions. The concept was present in even parts of the so-called first Chicago School with Parks' students, such as Cressey with his Taxi Dance Hall [2] and with Hughes' studies of work [3].

Because Chicago School micro-sociologists do not follow a strict distinction between process and structure, in the words of Becker:

Symbolic interactionists typically find that meaning is constructed in the process of interaction, and have always insisted that process is not a neutral medium in which social forces play out their game, but the actual stuff of social organization and social forces.... ([2], pp. 3-6)

People's actions in a social world, then, closely follow the definition of a practice. They are bound to the meaning created in the moment, contextualized by the apparent actions of others. The actions cannot be separated, except analytically, from their contexts, which are the social worlds and the interaction. Thus, a social world has many of the same characteristics of Bourdieu's habitus. People, of course, live in many social worlds simultaneously. Moreover, social worlds can share many overlapping characteristics; social world theory has the concepts of "subworlds" and "arenas" to provide a language for talking about the overlaps and distinctions.

Practice lens. Symbolic interactionism, while it examines human action at a micro-scale level and assumes that people's meanings are enacted in social interaction, has no construct for action-in-context. On the other hand, a Practice Lens perspective [5] focuses on action-in-context, but has no strong construct for context boundaries. We combine the two in our perspective. We follow others in the CSCW community, where there has been a growing interest in practice. Attention to practices can be found in a number of recent CSCW publications including research frameworks (e.g. [8]) and empirical work ([7]). Underpinning our work is a sense that practices are inherently social and represent collective patterns of action bound up within a range of contexts (i.e., social worlds), thus creating a useful framing for health practices that gain their meaning by sitting at the intersection of a multiplicity of social worlds.

Practices in Flint

We came to our theoretical perspective based on one of our ethnographically-based studies examining people living with chronic illnesses in Flint, Michigan, a largely impoverished community. In this study we conducted interviews with people living with diabetes, hypertension, and/or kidney disease, as well as conducted four focus groups with a variety of local health professionals (described in [4]). (While we talk below of 'patients' and 'consumers,' everything applies to the information needs of caregivers as well.)

One of these focus groups invited local diabetes educators (specially trained nurses and dieticians) to share their experiences regarding working with people living with these health conditions in Flint. Our findings showed there were a number of local contextual issues that impacted people's health management practices, including food preparation, exercise routines, and medication regimens.

A second study followed up with semi-structured interviews among seven diabetes educators, which used an early FIT prototype (below) as a design probe to unpack the design space around supporting health practices. We were particularly interested in localizing health information (presented in the form of short video clips) with the goal of contextualizing health practices. The design probe study in Flint revealed a number of insights, including:

 The importance of connecting patients to reputable national health resources and local resources. The health educators pointed out the importance or their patients:

"National resources [e.g. American Diabetes Association], the content of those is what we're teaching. So those are respectable; those are the best resources in my opinion...You're probably better off pulling YouTube videos and then tailoring these little lists and pathways to the local [P-01]

and

"I often recommend Diabetes.org. Its the American Diabetes Association website and everything on there is going to be evidence-based research recommendations." [P-06]

Strategies for integrating trusted health information from a variety of social worlds, such as local faith based communities. In Flint, in particular, churches are very important and central in people's lives. The diabetes educators focused on the patients' church-centered social worlds:

"And with the community experts, I like that the pastors are there. Maybe there is a list of pastors in the community who they can refer to and maybe what their contact information is, or ways to email them or contact them. Because they do a lot in this community and people rely heavily on their faith and religion and their church. They're big support systems for them." [P-03]

 An overwhelmingly positive view of the accessibility of video as medium to reach low-literacy populations, as well as particular demographics. The health educators noted:

"I love video. I think for this population [e.g. Flint] it it's really effective... It doesn't require reading." [P-01]

The educators also stated that video was more appropriate for younger patients, and that video was less daunting: "I think videos that show people of the community... is important....Movies are, I think, not threatening. So the video content I think is good" [P-02]

 The necessity of "action steps" or practices that are generated for and by the local community. Helping people determine their next actions a is critical, according to the health educators:

[Doctors] are trained to say, "This is the problem. This is the solution." And the part they leave out is how do you make that happen in somebody's life." [P-06]

• It is also critical to tailor and localizing the action plan to the patients' social context(s):

"We tailor our stuff and our education and our support based on what we have in this area, so we can give ideas and insight as to where to find resources in the county. And maybe that's not needed in some other areas." [P-03]

and

"Food was a scarce resource in Flint. And then sometimes I'd even learn from the patients coming in, sometimes they knew the system better than I did or the dietician" [P-07]

Overall, the health educators pointed out the usefulness of incorporating *some* community voices:

The dynamic I see between participants [in group classes] is that sometimes it will be a person who

has had diabetes for a long time...and that person with experience will kind of reach out and take them [new diabetics] under their wing. "Oh, have you tried this? Have you had this new breakfast cereal? Or tried exercising at your lunch break at work?" And I think it makes it more real to the participants when it's another person living with diabetes who's saying, "I struggled with that too. I didn't have time for exercise, but this is how I did it." [P-06]

A central challenge is to understand how and under what circumstances clinicians feel comfortable giving a voice to community members, while at the same time, preserving autonomy and some control for the community members. We are actively exploring this question in our FIT2 prototype.

FIT2

Based on these understandings, we designed FIT2. It is based roughly on the design of our FIT1 prototype, but FIT1's goal was to support a patient's understanding of his medical test results; FIT2 is more focused on enabling patients' and caregivers' coping practices. In FIT2, we redesigned the application to provide different views that highlight the perspectives and knowledge within different social worlds, i.e. groups of people around the patients, so that patients could see different practices within their everyday social contexts. Potentially, they could more easily find and incorporate the ones they feel would be beneficial. As with FIT, FIT2 is video-based. As was found in the Flint educator study, video is more appropriate not only for illiterate people but also relatively young people.

For FIT2, we felt that information providers might include family members, relatives, community members, religious groups, local health personnel, and health professionals. Each would speak as part of their own social world(s). These people might contribute videos, and a number of videos are generally available. As people use FIT2, they might also find that they have comments on practices shown on the platform or that their own practices could augment existing ones on the platform. They can then add videos or record video themselves to attach their practice or knowledge to 'translate' the existing practice into a (more) contextualized practice. The videos, over time, would become less general-purpose information and more contextualized. Other people with similar social contexts (e.g., diabetes patients seeking healthy food in Flint area, who has access to local church resources) can then learn to cope with their own health issues within their social worlds.

Scenario and prototype design

Jerry, a 30-year-old new father, lives in the Flint area in Michigan. He just got diagnosed with Type II diabetes and is trying to figure out what he should do for himself. His diabetes educator, Daphne, thinks sending him to the Internet would be problematic. There may be just too much text and too much jargon for his taste, but more importantly, there is too much wrong information out there. She gives him FIT2, instead, loaded onto an inexpensive tablet. She also preloaded a set of potential videos for him to view, as well as a path through them.

Upon opening the app, Jerry sees several health issues that he has: diabetes, hypertension, and general fitness. He chooses diabetes and is presented with a



Figure 1: FIT2's navigation will guide users from health issues (e.g., diabetes) to action steps (e.g., Monitoring Self) while providing a social worlds perspective (e.g., Church Fairs) with videos. Our plan is to have FIT2 use location detection on mobile devices to automatically set where users are currently located, making the browsing experience more localized.

graphical prompt "Learn about ...', along with several options surrounding the prompt: medication, nutrition, symptoms, and so on. (In subsequent versions, we will use video icons to supplement the text.) Jerry is concerned that the medicine he's been prescribed might affect his exercise, so he chooses medication. After he chooses, another prompt shows up, "Action Step", that will translate his information need into actionable goals. The prompt has the options Monitoring Self, the Usual Meds, Using an Insulin Pump, and so on. Because Jerry is trying to avoid medication, and thinks he may be able to control his blood glucose levels with diet and exercise, Jerry selects Monitoring Self, after which he is presented with several social contexts, including various churches, his Church Health Fair, community health groups, and so

on. As a regular attendant of a local church, Seventh Avenue Baptist, Jerry looks to find some information and help he can obtain from people who he trusts because they are affiliated with the same church.

After he selects the 'Church Fair' option, FIT2 shows him several sequences of videos in thumbnail form. In these videos, people from within a social world talk about their experiences or their views about getting health guidance at a church-based health fair, as shown in Figure 1's wireframe. He is particularly interested in finding out whether his church can give him A1C and Serum Creatinine tests, so he doesn't have to pay for a clinic visit. Jerry clicks on one of the thumbnails, and FIT2 presents video sequences for him.

Some of the sequences have videos added by other users of FIT2. After watching the first video sequence, Jerry sees that the last video is added by another user to document her opinion of what she has learned at his church health fair so to attach more localized perspectives to the original three videos that are general knowledge. Jerry decides to explore more.

Current implementation and future plans

FIT2 is being developed as a mobile application using Adobe Flex. It currently consists of approximately 2000 lines of code, and can be run on an Amazon Kindle Fire and other devices that support Adobe AIR. FIT2 is currently available in prototype form, and has been redesigned to provide the ability to: (1) add videos, (2) comment, in the form of videos, on video clips, (3) share video clips with friends, family, and communities (e.g., church members), and (4) annotate, either explicitly or implicitly, clips. We are currently designing several other views to examine the usefulness of highlighting a variety of perspectives for users about the different practices available. For example, a 'people' view will guide users, by highlighting the practices suggested by people in specific social worlds, such as health professionals, community health experts, people with similar health issues, or even family members.

We are currently examining the usefulness of a tool like FIT2 for caregivers of pediatric bone marrow transplant (BMT) patients. With pediatric BMT, caregivers have more limited information needs, but need to review recommended procedures and to understand what may be coming emotionally. Both are well suited for video. We are also exploring FIT2's usefulness in depression management. Once the work on FIT2 has advanced, we plan to test the application with users.

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Identification of Key Factors for Building a Support Network for Spousal Caregivers of Alzheimer's Disease Patients

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Abstract

Our research aims at informing the design of accessible and useful solutions to alleviate stress of daily caregiving tasks done by spousal caregivers of Alzheimer's disease. For so doing, we have conducted a qualitative study, observing and analyzing the different solutions that are offered by a healthcare network in the Aube region (North-East of France). We discuss the key factors that we have identified for building a support network that respects the preferences and values of family and in particular spousal caregivers while offering training and assistance needed to maintain the caregiving situation.

Author Keywords

Caregiving; spousal caregivers; respite care services; social support; support groups; Alzheimer's disease.

ACM Classification Keywords

K.4.2 Social Issues; J.3. Life and Medical Sciences, Health;

Introduction

The involvement of family in the care provided to their relatives is important whatever the disease is, but caregivers of people with Alzheimer's Disease (AD) are more likely to assist with any activity of daily living (getting in and out of bed, getting to and from the toilet, bathing, managing incontinence, and feeding). In addition, they have to manage administrative work with government agencies and service providers. And finally, caring for a person suffering from AD also means managing severe behavioral problems along the evolution of the disease [1]. The AARP public policy institute report [2] emphasizes the specific attention that spouses who are caregivers deserve. In fact, this report shows that spousal caregivers are at the same time more likely to provide assistance with medical and nursing tasks, less likely to receive support from friends or family and less likely to get support from health care professionals or aides.

In this context, providing support to spousal caregivers appears as a necessity. This is also an opportunity to think how Information and Communication Technologies (ICT) can complement institutionalized healthcare services. Our goal is then to contribute to informing the design of accessible and useful solutions to alleviate stress and increase independency of spousal caregivers. For so doing, we consider that a better understanding of the kind of support family caregivers are provided with in their daily life is of central importance.

In this paper, we present the long-term field study we have conducted on the practices of AD patients' family caregivers to cope with their burden. This study highlights the necessary combination of different forms of respite and support and how they are intertwined. We then discuss the key factors that we have identified for building a support network that respects the preferences and values of family and in particular spousal caregivers while offering training and assistance needed to maintain the caregiving situation.

Context – a Healthcare Network Taking Into Account Family Caregivers

"Réseau Pôle Mémoire" (RPM) was launched in 2001 by a group of healthcare professionals in response to the many problems arising in the diagnosis and management of AD patients in the Aube region (North-East of France). It became a broader network embracing gerontology and memory disorders (named RéGéMA) in 2010.

The main purpose of the network is to coordinate the work of the many professionals (neurologists, general practitioners, social workers, psychologists, etc.) involved in the care and support of elderly patients. Secondly, it provides care by performing neuropsychological screening activities (cognitive testing and diagnosis) and follow-up with patients and their caregivers. The network is also responsible for informing professionals and the public about memory disorders and their treatment.

RéGéMA [3] is coordinated by a psychologist who decided to tackle seriously the burden felt by the family caregivers. She then launched several activities dedicated to providing the family caregivers some support and respite: training sessions, support group meetings, daily respite care services and an innovative community respite care service named "the Bright Spell".

Data Collection

Since 2008, we followed twenty support group meetings, ran monthly by the RéGéMA healthcare network, in the city of Troyes. Each of the meetings was lasting two hours. All these observations have been recorded through field notes.

We have also conducted semi-structured interviews with family caregivers attending the support group meetings. We focus in this paper on five interviews of spouses acting as caregivers.

Our observation has been extended in 2013 through the evolution of the participants' practices. The development of the use of respite care services by spousal caregivers, especially through the creation of the Bright Spell day care solution in June 2013, led us to extend our observations.

We conducted 3 half-days shadowing sessions with three regular participants of the support group meetings, each session lasting at least 3 hours. The three spouse caregivers we followed are all female and take care of their husbands suffering from AD. These spousal caregivers are aged between 60 and 65 years old, one is suffering from back pain and another one has to go to a thermal cure each year to treat breathing difficulties. All are now retired and the care they are providing to their husbands is at the center of their daily life. Two of them live in the suburbs of Troyes and the other one lives in a small town, 40 kilometers from Troyes. The three couples are mobile and regularly drive to join the different activities of the respite platform. All these observations have been recorded through field notes.

Along these observations, we have joined the "Bright Spell" two times, one morning and one afternoon, conducting observations of the activities of the participants. The participants were composed of 5 couples and one spouse caregiver who had recently placed her husband in an AD care unit. All but one of the caregivers were women. They were aged from 60 to 65. All these observations have been recorded through field notes.

We finally conducted three individual semi-structured interviews with the spousal caregivers we followed during shadowing sessions. These three interviews lasted from one to three hours, were recorded and transcribed.

Findings

In what follows, we describe the different aspects of support and respite the spousal caregivers we met receive from the healthcare network and its partners.

Training

RéGéMA organizes training sessions for family caregivers where the different health and social professionals who intervene in the disease trajectory (neurologist, psychologist, general practitioner, geriatrician, physiotherapist, speech and occupational therapist, social worker, lawyer) present their role, explain how they work and give practical advice about how to deal with patients and solve caregivers' everyday problems. Each session gathers around ten family caregivers.

The training courses also provide an opportunity for meeting other people in similar situations. RéGéMA offers to interested caregivers to continue the discussion between peers through the monthly support group the network runs under the supervision of a psychologist.

This training is also generally the entry point for caregivers to use support and respite services.

Support Group Meetings

RéGéMA runs monthly support groups for spouses and children who act as caregivers in order to provide them with a space where they can talk about their experience and discuss their problems. Two support groups exist for these two kinds of family caregivers, which correspond to common practices.

The spousal caregivers' support group exists for about eight years, and mainly includes caregivers who have attended at least one session of RéGéMA training. The participants are 71 years old on average [4] and the patient they care for is approximately the same age.

The way these support group sessions are organized is roughly the same each time: the caregivers meet around a table at the RéGéMA office, where they are served with cakes and drinks, which are sometimes provided by the caregivers themselves. The ensuing discussions are led by the network coordinator. She gives everybody an opportunity to speak in turn and dispenses accurate medical information.

Day Care Respite Service

For people living around the city of Troyes, a respite platform is available through the nursing home "la Roseraie". Apart from providing day care services, the respite platform also offers several activities like dance course, yoga, gym and since this year computer literacy course. These activities are weekly organized. When possible, the care receiver can also part to the dance or the gym sessions.

Besides, the respite platform also offers in-home respite care services which consist in professionals' visits for half a day in the home of the patient. During these visits, the professional proposes activities and cognitive stimulation programs to the person suffering from memory disorders. During this time, the caregiver can go outside with confidence or just stay at home to do all the things she/he had not the opportunity to do because of caregiving activities (for instance one of the person we met was sewing during this time). The respite platform also organizes several times by year a journey for the family caregivers and their relatives. For instance, the platform members have been visiting a painting exhibition in an old city of the region for a day.

Community Respite Care Service

The Bright Spell started in June 2013. It is a respite day care service which has been initiated at the demand of four "young" AD spouse caregivers (aged 60-65). They met while taking part in the support group meetings organized by RéGéMA. These four "young" spouse caregivers expressed their frustration regarding the available day care service. They thought it did not fit their situation (even if they managed to use it). In fact, some of them are just retired, and their ailing spouse is still mobile, so they find that the activities offered by the existing day care service (mostly at retirement home) were not adapted. They were worried about their spouse being "alone" with older patients (80-90) with heavier conditions, and having difficulties to develop relationships with participants and having interests in the very quiet activities offered (e.g. painting, coloring pictures).

The Bright Spell is used in conjunction with the respite platform by the family caregivers we met. It is organized twice a month on Monday at a local retirement home reception and dining room. The couples arrive nearby 10:00 am and start with a coffee, waiting for each other to arrive. They are welcomed by two employees of the retirement home who help them to watch over their ailing spouse and for the activities. At the difference of classic day care services where family caregivers are supposed to leave their spouse for the day, here they stay for the day.

Discussion

In this section, we discuss the key factors that we have identified to build a support network that respects the preferences and values of family and in particular spousal caregivers while offering training and assistance needed to maintain the caregiving situation.

Developing relationships with persons sharing a similar situation

The link between the support group members is their experience of Alzheimer's disease from the caregiver's point of view, especially because they feel no-one else can understand what it is like unless they have been confronted with this disease: "If you have not been through it yourself, you cannot understand what it involves" was an expression which cropped up frequently when we met family caregivers.

Besides being a spouse of an AD patient, the spousal caregivers emphasize the specificity of their situation as "young" family caregivers. They complain about their

husband's need for physical and outdoor activities that classical day care services scarcely organize. Among the other possible afternoon activities at the Bright Spell, they mention they appreciate to go outside for a walk when the weather allows it. They exchange news from session to session and they feel understood by the group. One of the family caregivers calls the members of the Bright Spell her "disease friends"

Sharing Experience and Problems

Support group meetings provide a privileged opportunity for sharing practical advice with others. The tips and advice were about problems such as what to do when the patient is wandering around at night, or why, at a certain stage in the disease, it is important to keep the main doors locked at home and sometimes to close the shutters. The support group constitutes an ideal place for caregivers to exchange tips and advice with each other. These exchanges of good practices were often referred to when discussing a specific topic or talking about the problems encountered since the previous support group meeting. These exchanges occurred in fact when caregivers were invited to speak in turn on a topic proposed by the support group coordinator (e.g. How did your holidays go? Has your husband or wife ever run away?).

The time shared at the Bright Spell is also an opportunity to tell the daily problems they encounter in caring for their ailing relative to persons who can understand their situation. They provide advices to each other on how to deal with the care they provide. If nobody has been confronted to a situation, they discuss to try finding possible solutions.

Participating in organized activities with the care receiver

At the difference of most of the currently available respite care services, the Bright Spell offers shared activities among the family caregivers and their ailing relatives. Spousal caregivers then contribute into the definition of the activities organized by the Bright Spell as they assume they know which kind of activities could please their ailing relative. This allows them to enjoy respite through a careful balance between activities with and without the care receiver.

Counting on the group

The distributed watch-over provided by the group which meets at the Bright Spell makes possible for spousal caregivers to enjoy respite in presence of the care receivers. They can count on the group to manage the situation if their ailing relative tries to go outside or seems to be in trouble. For instance, one of the Bright Spell spousal caregiver even had a nap while the other participants were doing handwork. She felt confident in leaving her husband to the care of the group members.

Going out of the home

Even if some of the family caregivers we met have to drive a long way to join the Bright Spell (e.g. 40kms for one of the couple), they appreciate to do things outside of their home. They appreciate it so much that they are used to organize trips together between two sessions at the Bright Spell. For instance, the interviewees mentioned they have done picnics during summer; they went to the bowling and invited each other for dinner. They have also managed to coordinate their busy schedules in order to join yoga and dance courses offered by other local respite care services. They also planned a journey to a historic town in order to attend a painting exhibition.

Conclusion

Through the observation of actual support and respite practices and interviews with spousal caregivers of patients suffering from AD, our goal was to develop a better understanding of when and how these caregivers experience relief in their overwhelmed everyday life.

Our findings highlight that the possibility to meet peers and to share the burden and experience of living with a person suffering from AD is key. In fact, the benefits from taking part to a group were emphasized as a core source of support.

These elements suggest insights for designing ICT systems that answer the needs for respite and social support of spousal caregivers, that we propose to explore in future work:

(1) Taking into account the participation of the care receiver. The spousal caregivers we met are valuing and looking for activities to do with their ailing relatives. Thus, we identify as an important aspect for technology and software design to provide ways to enable the participation of the care receiver, even in the context of cognitive decline like with AD. For instance, designing games which rules can be tailored by the caregiver to fit the ability of their spouse appears to us as a promising direction.

(2) Taking into account the specificities of the caregiving situation. The important level of exchange and social support found at the Bright Spell is related to the participants' feeling of sharing a similar caregiving

situation. The sole pathology of the care receiver does not appear as sufficient to develop this common understanding. The relationship with the patient and their age are mentioned by the "young" family caregivers from the Bright Spell as important dimensions to take into account. When developing social networking features, this raises several issues related to the self-presentation and recommender system (for family caregivers to find peers).

(3) Easing the search for appropriate respite and support services. Some of the success factors we identified in the local support network that is available for the family caregivers of our study cannot have any direct translation in features of a digital platform. However, designing relevant information format to describe and search for local organizations and services appear as a promising way to enable users to build such a support network. Besides, taking part to a same care service appeared as an entry point for social support exchange among users.

(4) Enabling participation into collective activities. The Bright Spell family caregivers appreciate joining activities outside home with peers. This leads us to a promising research challenge related to the mutual benefits between online activities and face-to-face interaction: how could online interaction foster face-toface activities, or how could support group meetings find an online follow-up for some of the crucial issues debated during the meeting?

However, making sense of all the support and respite services and appropriating them is demanding for spousal caregivers and not all of them whished or have the courage to use them in their daily life [5, 6]. A deeper study on the access and barrier to the use of respite and support service at our local level is needed in order to measure the potential risks for the deployment of ICT-based services.

Acknowledgements

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WatchMeWork: A Ubiquitous Physical Therapy Monitoring System

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Abstract

WatchMeWork is a ubiquitous computing system that has been developed to help a community visualize the physical improvement of a patient. The system is composed of three components: an embedded physical therapy monitoring device, a mobile application and a web application. The physical therapy monitoring device is able to use an array of sensors to measure real time data about a patient. The patient syncs the monitoring device to a mobile device to view the collected data. The web application allows for the patient, patient's doctors, and patient's family members to monitor the progress of the treatment and provide informal communication.

Author Keywords

Group collaboration; mobile device; health care;

ACM Classification Keywords

H.5.3. Group and Organization Interfaces: Web-based interaction

Introduction

According to the Bureau of Labor Statistics, between the years 2012 to 2022 the need for physical therapists will increase by 36% [1]. The demand for physical therapy services will increase due to the number of aging baby boomers. Beyond adding more physical

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Figure 1. High-level Overview



Figure 2. Different EWSD Devices



Figure 3. Design of Mobile App

therapist professionals, this need can potentially be filled with modern technology to allow these professionals to have remote access to monitor as many patients as possible.

A key component of physical therapy is the daily treatment the patient is expected to perform absent of the presentence of a certified physical therapist. To aid in motivation and monitor the treatment that's being done, mobile technology can be used to gather realtime data.

The WatchMeWork system expands upon the current technology to build a monitoring system to support a community. WatchMeWork is a three-part system that is comprised of an embedded wearable sensor device (EWSD), mobile application (mobileApp), and web application (webApp). The general overview is that data is collected from the EWSD that interacts with the mobileApp. The mobileApp then communicates with the webApp. The webApp allows the patient and patient's doctors to view all the current progress of the patient. The doctor can adjust treatment to the patient by adding daily goals to alter the treatment plan. To aid the patient's motivation and accountability the patient is able to add family members to view a limited set of data. The family members can aid the patient since they can view up-to-date progress.

WatchMeWork Objectives and Design Decisions

At the beginning of the project we met with a physical therapist to discuss how they feel technology could be used to motivate patients. The therapist talked about monitoring actively, being able to provide support, and check for proper execution of exercise. With the feedback, WatchMeWork was design to address the following requirements:

1. Create an EWSD that reads sensor data and transmits it wirelessly using Bluetooth.

2. Create a mobileApp that communicates with the EWSD and the webApp through a network protocol.

3. Create a webApp that communicates with the mobileApp via a web service and display graphs of patient data in real-time.

The WatchMeWork system is designed using PIC microcontrollers, Android SDK, JavaScript, Google Charts, and Apache Tomcat. The EWSD used is a basic prototype. There are a number of EWSD research that could be used in our system found in [2, 3, 4, 5, 6].

High-Level Design

Figure 1 shows the high-level design of the system. Figure 2 shows the different possible EWSD, Figure 3 the actions of the mobileApp and Figure 4 the uses of the webApp.

EWSD Prototype

To generate a EWSD prototype to test the system, a PIC microcontroller was used. This example had a heart rate sensor that connected through an ADC peripheral. The microcontroller sampled the data and transmitted through a Bluetooth module. Figure 5 shows the prototype EWSD.

mobileApp

The mobileApp is built for the Android platform and was implemented on a Nexus 7 tablet. The mobileApp could also be used on any Android smartphone as well. The application polls the EWSD using the Bluetooth module



-Analytics: Provide Statistics -Alerts:Notify Events -Social Media: Motivation -Comparison:Patient vs Others -Goals:Track Progress

Figure 4. Design of Web App



Figure 5. Prototype EWSD Circuit

and displays the current result on the real-time display. The tablet then will send data to a web server where the webApp will pull the data from. Figure 6 shows the UI of the mobileApp.

Web Application

The webApp is used to provide the data analytics of the EWSD data. The webApp also is used to register a patient with a physical therapist and family members. The analytics will allow the data to be viewed in 10 second intervals. Figure 7 shows the overview of the webApp construction show how all the views connect with the DB. The webApp is communicating using the RESTful style architecture. The data is sent via a valid uniform resource locator patter to the server. The RESTful example is as follows:

http://192.168.1.137:8084/ResearchProject/mobilecomm? request_type=2&user_id=1&sensor_id=1&sensor_data=15 6&sensor_date_time=2014-06-24%2023%3A09%3A00&sensor_data_unit=BPM&sensor_l at=222&sensor_lon=111

The webApp connects with a DB that stores all of the information from all users. The DB is setup to support three different User Types: patient, health professional, and community member. Figure 8 shows the Entity-Relationship (ER) diagram of the DB.

The patient is the one that produces data and is associated with a number of EWSD devices and EWSD data. The patient type has a 1-to-1 relationship with users and a 1-to-many relationship with EWSD.

A health professional type is linked to final report of multiple patients. The health professional is a 1-to-

many relationship with the patient type and no relationship with the EWSD.

A community member is someone outside the health profession the patient allows access to reports, it is possible for one community member to be connected to multiple patients. Our current implementation is a 1-to-1 patient but it could be modify for a 1-to-many patient implementation. Since every EWSD device has an entry in the DB it is possible to retrieve aggregate data on the benefits of certain EWSD. This can also provide the developers of the EWSD devices with the data necessary to make improvement in their products.

Figure 9 shows the webApp UI for a patient view of data.

Future Work

There are still many aspects to the WatchMeWork system that still need to be expanded on. There is still a need to design EWSD devices that are specific to physical therapy. The data transfer from EWSD needs to be evaluated to make sure it can support a wide range of devices with data of different data types and sizes. The webApp still requires analytics to be performed on the data received to allow health professionals to gage if the patient is improving. There are also social aspects that can be included in the webApp such as goal markers, badges, and awards that can help motivate the patient. A haptic system to provide feedback is also required. A sample trial must also be conducted to show if the system will have acceptance in the rehabilitation process.



Figure 6. Mobile App UI



Figure 9. Web App UI

Conclusion

We have presented the WatchMeWork system that allows for a ubiquitous physical therapy monitoring system. The system is designed to allow for informal care as a patient is rehabilitating outside the presence of a health professional.

Our system shows the proof of concept of how a web application can be used to share real-time information between a patient, health professional, and community members.



Figure 7. Web App Construction



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Elaborating on Interaction Mechanisms for TOPIC – The Online Platform for Informal Carers

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Abstract

This paper introduces some initial design ideas for TOPIC *CarePortfolio*. TOPIC, The Online Platform for Informal Carers, is a European Project under the AAL Joint Programme that sets out to develop an array of integrated solutions to support informal carers in both the care and social dimension of their lives. In this paper we discuss the design of a few features for the platform, which has been informed by findings from the pre-study performed in the first phase of the project and different design patterns found in the literature. The pattern approach used for the project is an attempt for increasing the likelihood of designing solutions whose interfaces are intuitive and demonstrate good usability levels.

Author Keywords

Informal care, carers, cargivers, elderly, on-line platform, design, interaction mechanisms, touch-based solutions, user-centred approach, ethnographic study, qualitative research'

ACM Classification Keywords

H.5.2. User Interfaces: User-centred design; H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

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Introduction

Aging society is a reality and has been addressed by research within diverse fields of study, such as social, health and computer sciences, as well as by different government entities and policy makers [1]. One of the recurrent observations from these studies is that in this society the demands for care have been increasing considerably and further research and developments to meet them are necessary [2].

Although much has been said about the design and development of technologies for care receivers, much less has been done for informal carers [3, 4]. Being aware of this gap in the literature and in the current developments, and attempting to reduce the chances or attenuate the intensity of the burden potentially stemming from care work, TOPIC sets out to investigate and understand the daily life of informal carers, identify their needs and, finally, translate them into requirements for the design and development of technological aids that can provide them emotional, informational, and tangible support [5, 6]. The project has a strong focus on user-centred design and has been using a pattern approach for elaborating the system interfaces and defining the appropriate interaction paths, aiming at achieving a good level of usability in the system.

In this paper, we introduce and discuss the design of some interaction mechanisms for the platform. We start by discussing the elaboration of the interface for the landing page of the platform. Then we move on to some specificities regarding one of the relevant features identified during the pre-study conducted to understand the users' context and identify their needs. The remainder of the paper is organised as follows: Section 2 briefly refers to existing technological solutions for informal care; Section 3 presents the TOPIC project and provides a few details about its methodological approach; Section 4 introduces the design of the abovementioned interaction mechanisms, presents preliminary results from focus group discussions with the project participants and illustrates how they fed into the design of the mechanisms herein presented – this section also refers to the patterns that informed the design of some interface and interaction elements; finally, Section 4 presents our conclusions and points towards the next steps in the project.

Technological solutions for informal care

For the past number of years many and various technological solutions have been thought, designed and developed for informal care. A number of them have been conceived within relevant projects that acknowledge the importance of user-centred and participatory design approaches for devising solutions that can actually meet the end-users' needs and expectations.

In terms of solutions for the elderly, focus of the TOPIC project, we can find assorted technological aids focusing on, among others, social support in health care contexts (e.g., VERA, an application based on Virtual Environments for Raised Awareness [7]), communication between informal carers and their care receivers (e.g., the videophone designed within the ACTION project [8]) and independent living support (e.g., MAPS, the Memory Aiding Prompting System for informal carers to design scripts to support people with cognitive disabilities that want to live more independently [9]).



Figure 1. Overview of the TOPIC methodological approach.

Findings from all these projects stress the relevance of user-centred design approaches and the design of simple solutions – both in terms of interface and interaction design – that objectively address the endusers needs and can be effectively and efficiently used. However, although these projects commonly address informal carers at some stage of the research, they usually focus on the wellbeing of the care receiver and how the informal carers can contribute to it. TOPIC, on the other hand, focuses on the wellbeing of the informal carers, by looking for ways to support them to better provide the care work under their responsibility, as well as to engage in a lively social environment where they can share their experiences and/or burden with peers going through similar situations.

TOPIC and its approach to design

In TOPIC we have been using a user-centred and participatory design approach combined with evolutionary development, aiming at the design and development of a system that is above all useful and usable for informal carers. The project has been organised in several phases, as illustrated in Figure 1, all of them, except for the development phase, with the inclusion of end-users.

By now we have already finished our pre-study in the three countries participating in the project, identified the main requirements of our users, and defined relevant use cases. We have also mocked-up a few interfaces for the platform and started evaluating our intermediate results with our users by means of usability studies and focus groups. Currently we are prototyping our system and heading for the development of the actual features that will compose the platform. Our pre-study featured 11 participants (9 woman and 2 men) recruited by the Austrian end-user organisation participating in the project, according to the sampling criterion established for the project (55+ informal carers). 3 of the participants care for their mothers, 3 for their (step)children, and 5 care for their spouses or partners. Each informant has participated in 3 to 4 shadowing sessions, in which they have been observed in their homes, managing both their care and non-care related responsibilities - collecting situated data is particularly important to deeply understand the user contexts and the competing forces in it [10]. At the beginning of the pre-study, the participants have filled in a questionnaire with information about demographics and the care situation they handle; they have also filled in the Zarit's Questionnaire [11], which allows assessing the level of burden experienced by informal carers. During the pre-study, the participants have worked with cultural probes prepared to collect extra information on the dynamics of their everyday life and how informal care is part of it. In the end of the prestudy, they have granted us an interview (length varied from 1 to 2 hours), in which we have clarified issues arising from the data collected in the shadowing sessions and the cultural probe items produced by them (diaries, social maps, picture cards, etc.). In total we have had 47 interactions with them. The audio data collected during these interactions have been transcribed and is currently being analysed following a Grounded Theory approach. The findings stemming from this analysis have led us to a number of desirable features that a platform to support informal carers should have as well as implications for design to be considered, as we discuss in [6].

In regard to interface and interaction design, we have

been using a pattern approach to inform the elaboration of our interfaces and interaction paths. Design patterns have proved to be a productive way to design useful and usable interactive systems. As wellestablished solutions for recurrent problems, they enable users to transfer their knowledge about the interaction mechanisms between contexts and, therefore contribute to improve the intuitiveness of the interface [12].

Since TOPIC set out to design an on-line platform to be available on different mobile platforms and since there is a trend towards the use of mobile applications in aging societies [1, 13], we have decided to focus our efforts on designing touch-based solutions. Kobayashi et al. [14] observed and measured the actions of Japanese people in their 60s and 70s using touchscreen smartphones to assess the practical use of mobile touchscreen interfaces. Their users had to perform basic operations with gestures (e.g., taps, drags) and to use interactive components such as software keyboards. The authors measured task completion times, observed behaviours, and asked for user comments in a post-experiment interview. They found that, indeed, even participants who never had used touch screens before could perform gesture-based operations reasonably well. Also, practice did improve the performance of dragging and pinching operations but had no significant effect on tapping.

Taking account of our current focus on touch-based solutions, we have been using a selection of Design Patterns from Neil [15] and Saffer [16] to inform the interface and interaction design of our platform. The design of the interaction mechanisms presented in the next section covers some of these patterns.

Interaction mechanisms of TOPIC

Based on our pre-study and initial ideas, we have identified several areas for *TOPIC CarePortfolio*, e.g., a safe social network area dedicated to informal care; an area for experience sharing and collaborative problem solving; an easy way of planning events by scheduling face-to-face or online meetings and sharing their details with others; several coordination mechanisms for communicating and sharing care responsibilities with other (in)formal carers; surveillance mechanisms to check on their care receivers' status when they need to be absent; access to official and validated information about different types of services, resources, and (financial) support; among others. Common to all these areas and features is the intuitive user interface and easy interaction mechanisms for our users.

Although the aforementioned areas are arguably common to some solutions from other projects referred to throughout this paper, TOPIC brings innovation in three different levels: *social*, by seeking to lower the burden/stress of informal carers through the use of an integrated platform (user's perspective) and offering new services opportunities to organisations and associations (market's perspective); user interaction, by integrating different input/output devices (e.g., wearables, smart watches, etc.) which seamlessly communicate with each other through the platform; and *technological*, by aiming at a lightweight client for text/audio/video communication and organisation that is easy to work with and reduces complexity of available care-related information, has nothing to install and maintain, adapts the functionality based on users' configuration and location, and integrates available systems that are relevant to support care giving in an ambient environment. Furthermore, the need for all



Figure 2. Initial proposal for the TOPIC landing page.



Figure 3. Right side of the TOPIC tree - Features by action.

these features have been grounded in empirical data collected in the project. Moreover, we strongly consider the critical aspect of their care situation as well as their technology literacy in the search for solutions that meet their needs and expectations.

In this particular paper, we explore our design ideas for the starting page of the platform. Additionally, we present the use case of checking over the care receiver.

The TOPIC Tree

In the project proposal, TOPIC has been thought of as an online platform with assorted virtual corners where informal carers could go and engage in some types of activities. For instance, we have initially thought that a *Learning Corner* could be relevant for people to interact with knowledge and information about care procedures and processes to get financial help when taking care of somebody. We also thought of a *Fun Corner*, which would be an online space for informal carers to escape from the everyday care work by engaging with humorous content or online games. However, taking user-centred design seriously, ideas from the proposal have only been pursued when they were observed in the findings from our pre-study data analysis.

In preparation for the prototyping phase of the project, we started with sketching a couple of interfaces for our users. We discussed these in a series of focus groups conducted across the countries participating in the project, aiming at identifying implications for design for the platform. In the focus groups, we promoted cognitive walkthroughs [17, p.230] based on several use case scenarios based on the pre-study data analysis results. Paper-based sketches have been prepared, printed out and used for the walkthroughs. Aware that the starting interface of a system is very relevant for a successful interaction and user experience, we have carefully thought of how to organise our starting page, beginning from our initial idea of organising the platform in terms of corners. Figure 2 illustrates our initial proposal, which was based on the Springboard pattern – a landing page organised in a grid-layout¹ [15, p.3]. During our first round of focus groups we found out that the corner-based organisation was not as intuitive as we previously expected. Participants questioned not only the icons assigned to each corner and their names but also features that populated them. Therefore we reconsidered our design.

First, we decided to use the Metaphor pattern [15p. 22] for the landing page. We used the tree as a metaphor to represent our reaching out to informal carers, connecting them to each other and providing a strong link between them, i.e., making them part of the tree. Second, we decided to replace our initial idea of separating the features by corners with hiding these features behind actions a carer might take and behind stakeholders to whom they are related and can interact with. The right half of the tree (Figure 3) presented the different actions that the user could take in the platform, like checking. Using action verbs is considered a good practice to enhance the system usability, since they invite the user to interact and help the users make sense of what can be done in the system [18]. The left half of the tree (Figure 4)

For more details about this and the following patterns referred to in this paper, e.g., the contexts to which they are applicable, the competing "forces" related to them, etc., please check the full pattern description in its original source.



Figure 4. Left side of the TOPIC tree - Features by actors.



Figure 5. Mr Sorgsam's video surveillance app.

introduced the different types of stakeholders. Providing an alternative for the action-based navigation appealed to us as a possibility to enhance the usability of the system and to span a larger user group – users can decide which of the two options makes more sense to them and fit them better.

Interaction mechanisms for the use case "Check the status of the care receiver"

Most of the informal carers mentioned the relevance of being able to leave the care receiver for some time – depending on her/his health status or disorder – alone at home, e.g., to go shopping, to go for a coffee with a friend, or just to go for a walk around the block, whilst keeping an eye on them to make sure that everything is all right. Video surveillance and sensors with individual alarms can potentially support this need. This feature is even more relevant for carers who are not living in the same household as the care receiver.

In our pre-study Mr Sorgsam was in this situation. He lives in a flat that is 30 minutes away by public transport of the flat of his partner. He is the only one responsible for shopping and arranging a lot of things outside her flat. Therefore, he cannot always be at her place. This often makes him feel concerned, because he is not sure whether everything is going well with her. Sometimes, when this feeling is very strong, he calls her. If she picks up the call and says that everything is okay, he feels better. But from time to time it happens that the battery of his partners' phone is empty or she is on the toilet when he calls. Other times she is deeply sleeping and fails to hear and pick up the phone. This increases his insecurity to the point that he would go to her house, even late in the night, in case he cannot reach her after a few attempts.

Somewhere during our pre-study Mr Sorgsam installed a video surveillance device in the room where his partner lies in bed. He bought a device where he can have a look at her via tablet and/or smartphone (see Figure 5). But with these tools he can just see her – he cannot talk with her. He says that talking with her would be useful for him as well as receiving information from sensors located in other rooms of the flat to know where she actually is.

During our first round of focus groups users suggested that the system should be intelligent enough to directly connect them with the care receiver through a video channel or show them an emergency notification received from her/him. They mentioned that they would like to have the option to call the care receiver straight away, when an emergency situation is identified by the system.

After the focus group, we have revised the use case "Check the status of the care receiver", which has the informal carer and the care receiver as main actors. The use case has taken into consideration the informal carers' suggestions made during the focus group (e.g. the ones mentioned above). In the use case, the following would be possible:

(1) The carer can check the status of the care receiver at any moment from the TOPIC starting page (Figure 3 "Check" and Figure 4 "Care receiver"). This makes the system to look for a video streaming from a surveilled room with a person in it.

(2) If the system identifies only one surveilled room with people inside, the system displays the video streaming from that particular room immediately.



Figure 6. Mosaic with video streaming from all surveilled rooms.



Figure 7. Full screen mode of a video surveilled room.



Figure 8. Calls menu reached from surveilled room video streaming.

(3) When more than one surveilled rooms have people inside, the system takes the user to an interface that shows a mosaic with the video streaming from all rooms being surveilled (Figure 6). Once in this interface, users must select the room they want to see. When they do so, they can see the video streaming from the room in full screen mode (Figure 7) and can quickly start a phone call of video communication, by tapping the phone button and selecting which type of call they want to make (Figure 8).

(4) If the sensors inform the system that there are no people in any of the surveilled rooms, the system informs the user (Figure 9), who can quickly try to start a (video) call with the care receiver or try to find out where s/he currently is, by tapping on "Find care receiver". Nonetheless, the latter is only possible if the care receiver is wearing a GPS enabled device connected to TOPIC. If so, TOPIC shows the care receiver's location on a map.

(5) In situations in which the sensors integrated to the platform identify a (potential) emergency case or the care receiver issues an emergency notification, the different devices connected to the platform display such a notification. The notification can be visual, auditory, or haptic. When the user notices one of the notifications, s/he can either go to the Android's notification centre (Figure 10), by sliding down the notification drawer, or to the platform notification centre (Figure 11). The coloured squares on the top right appear as soon as a notification is logged in the TOPIC notification centre and remain there unless the informal carer dismisses the notification after checking it. Each square shows how many notifications from a particular type the user currently has: *blue* represents notifications from the social network feature; green

represents notifications issued by the care receiver when asking for the informal carer's attention; *yellow* is issued by the platform sensors, when a potential emergency is identified by the system; and *red* represents an emergency situation identified by the system or issued by the care receiver.

In terms of patterns used one can see among others the application of the Gallery pattern [15, p.18] (Figure 6); the Page Carrousel pattern [15, p.31] (Figure 7); the List Menu pattern [15, p.9] in the Calls menu (Figure 8). The touch-screen patterns from Saffer [16] can also be consistently found across all the system (like "Tap to open/activate", "Tap to select", "Flick to nudge", "Fling to scroll", etc.).

Conclusions and future work

In this paper we presented the user-centred and participatory design of some first interfaces of TOPIC. We illustrated how empirical data collected from our users have informed and shaped our design ideas. In particular, the paper draws attention to the carers' need for straightforward access to the platform features, especially the ones to do with checking on the care receiver. Furthermore, it shows that user-centred and participatory design approaches are not sufficient to lead to the design of flawless solutions at first hand, which reinforces the importance of iterative and evolutive approaches for devising useful and usable interfaces. Considering the several areas to which we want to provide support, we are aware that there is still a long way ahead of us: our focus is to offer a hybrid and integrated technical networked environment for our users. For that, we will create several prototypes, which will be evaluated in a series of usability tests and a longitudinal study which, again, will shape our design and interaction ideas, aiming at the most usable and accepted (social) platform for informal carers.



Figure 9. "No persons in the house" interface.



Figure 10. Red notification in Android's notification centre.



Figure 11. Red notification in TOPIC notification centre.

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Demo

Live Video Streaming Technologies as an Opportunity for Caregivers and People in Need of Care

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Abstract

Within the scope of this workshop, this paper is thought to show the possibilities we have in using the live video streaming platform MVP (Mobile Video Platform) for elderly people. The main idea is to support caregivers as well as people in need of care. We wish to portray

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the requirements of both, caring people and people receiving care. Moreover, we want to show how to fulfil these requirements. The intention of the presented project is to link industry, research assisted by different scientific faculties, and operating business towards a future market within a constantly changing society.

The Federal Statistical Office (ge. Bundesamt fuer Statistik) carried out investigations regarding the German care market. On the basis of these surveys, it is shown that the people in need of care - who live at home - are an important group for the Ambient Assisted Living (AAL) field. This group has to face different challenges as well as problems. We wish to provide a solution for these difficulties with the help of the Mobile Video Platform.

The next part of the paper deals with the presentation of three case studies taken from the TOPIC project (The Open Platform for Informal Caregivers). These cases shall be used to illustrate some requirements AAL has to meet. The technical conditions to be met by the Mobile Video Platform are described upon these cases.

The concluding section is thought to display the benefits of the MVP solution with respect to the AAL field. The three aforementioned case studies are used to explain these benefits. Subsequently, several tasks are listed which we subdivided into different themes. These tasks shall be discussed within the scope of the workshop together with the different experts.

Author Keywords

Ambient Assisted Living; Communication; Information Sharing; Mobile Video Platform (MVP); Caregivers; People In Need Of Care; TOPIC; Privacy; Live Video Streaming

ACM Classification Keywords

H.4.3 Communications Applications, Computer conferencing, teleconferencing, and videoconferencing

Introduction

avinotec GmbH currently operates the Mobile Video Platform MVP for live-video-streaming to mobile phones and computers from anywhere to everywhere.

This Mobile Video Platform is a portal, both for private individuals and for companies providing video resources which can be accessed from a remote location. This access is possible with different devices. A user of this portal uses a camera for example that captures and streams a situation, a circumstance or some location live. Afterwards, they may share this live video with another user who has been given access to the video source. The viewer may use different devices for watching the streams, e.g. smartphones or PCs. This is possible either web based in the browser of the computer or the mobile phone or by uusing an Android application (offering bidirectional chat) called avinoChat app. It is possible to set up the access authorisations to the video streams via the web based MVP site. Each camera as well as every user has to be registered and authenticated in order to guarantee the privacy of the people involved. This is also important for adhering to the liability laws for the production and distribution of content. Nevertheless, if a camera is thought to be performing publicly, there will be a pseudo login deposited on the special access pages for the viewer.

At present, there are several works on AAL carried out by universities and companies in ongoing research programmes.

One result of the discussions during the presentation in this workshop is to collect information concerning an age-appropriate life seen from the point of view of a commercial enterprise. A dialogue without predetermined results between sociologists, IT specialists and commercial enterprises for the development of an IT platform for senior care is wished for.

The introduction of a live-video chat application taken from another field of application may serve as an appropriate suggestion. It may also be a starting point for approaches for the workshop group. avinotec already succeeded in creating products and services with the MVP. This platform may function as creative source for ideas and as a voice for experience but it needs information on the AAL specific requirements. Therefore, a discussion shall arise following this lecture. Particular attention should be given to the tasks and questions that arose from our practical work. We cluster these tasks into different themes.

The technical requirements partially arise from the

analysis as well as the experience gained from the TOPIC project and the latest avinotec applications. Additional technical conditions come from talks with people in need of care and their relatives. Moreover, the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ) [5, 6], the Statistical Offices of the Federation and the States [1, 2] as well as the Federal Office for Information Security (BSI) [3] make information available related to the requirements of seniors.

The German market

The latest published surveys on the German market for nursing care carried out by the Federal Statistical Office date from 2011.

The groups of people above retirement age are of interest as they form the point of reference for considering the target group in Germany. Comprising 21 million people above the age of 60 years, this potential corresponds to one quarter of the German population. This "senior group" may be subdivided into the following:

- people "without" handicap
- people with "administrative" support
- people with an increased demand for medical care who do not utilise a nursing service

Within these three groups, there are people without any need for care neither through relatives nor through nursing services. In Germany, dependants are divided into the four care levels 0, I, II, III (Note: We left the so-called care level 0 for people with permanent

significant disabilities affecting their everyday life out of consideration with respect to this paper). In order to find the appropriate care level, it is determined to what extent the person is in need of external help. The official decision for one of these care levels of course has an influence on the amount of the care benefits provided for. Care level I means that the person needs assistance with managing the basic care as well as the daily housekeeping. People classified in care level II need help in general care more frequently during the day and they are in need of housekeeping assistance more often per week. The difference between levels II and III is that the people require round-the-clock care both for basic personal care and for household chores in the latter. Please note that there are further regulations concerning the amount of time necessary with respect to each care level. [13]

The statistics provided by the Federal Statistical Office have the focus of consideration on clear nursing cases in the care levels I, II and III. This view excludes those groups with only minor health impairments like disabilities in motor functions, hearing or visual impairments which are not registered within the care levels I-III.

The people in need of care who live in their domestic environment are an important market potential in Germany. These people need some different kind of support due to the lack of skilled workers to care for them around the clock. Thus, they form a conceivable group for a technical solution for example by using the MVP. In contrast, people with full-time institutional care in nursing homes are deeper involved in a complete network of specialist staff. Moreover, a round-the-clock care is much more likely for people in homes. It is worth considering to what extent the video platform may be applicable e.g. for staff savings as it may for example be used as an additional help for night duties. One may also think about using the MVP for patients who are "more needy" than others. However, this group of people inside homes is not subject of this presentation. According to the Federal Statistical Office, these dependants living in their domestic environment amount to approximately 1.7 million people at present.

	In 2011	Care level I	Care level II	Care level III
Information	on mobility rest	trictions is miss	ing	
People in need cared for at home	1.758.321	1.086.751	518.786	152.784
cared for by relatives (out of the afore- mentioned)	1.182.057	762.366	329.912	89.779
cared for together with outpatient care	576.264	324.385	299.404	151.952
Full-time institutional care in nursing homes	743.120	283.266	299.404	151.952
In total	2.501.441	1.370.017	818.190	304.736

Table 1. Market for nursing care in Germany 2011 – FederalStatistical Office [1, 2]

The "people in need cared for at home" as mentioned above in table 1 are divided into two subgroups. The first group is receiving care by relatives while the second care group is formed by relatives plus

outpatient care.

Further market conditions are influenced by:

- structurally weak area (urban-rural divide)
- the shortage of skilled professionals within the nursing service sector cannot be covered
- the demographic factor of general practitioners (GPs) leads to a lower density of GPs in rural areas and thus, higher requirements in terms of mobility are imposed on the ageing patients
- the public transport as well as its infrastructure are continuously thinned out due to the structural change within the urban-rural divide and also because of the constant cost pressure through the public authorities
- Moreover, technical infrastructure shortcomings within the German market have been ascertained in the meantime. This is due to the fact that infrastructure companies like Deutsche Telekom or Vodafone do not set up the broadband communication needed across the country. [14]

Requirements concerning technology

Both, demographics and technical as well as marketbased boundary conditions are changing.

Thus, the demographic change is accompanied by a structural change. Our society needs some technical support for maintaining and optimising communication especially with respect to nursing care in order to maintain the quality of life of elderly people (>60 years) mainly in rural areas.

Possible scenarios

In order to give an overview of the groups involved, these are described briefly in the following.

Furthermore, figure 1 shall display the functions of these groups graphically. On the one hand, there are people with handicap under domestic care. They are in need of a more intensive support for administrative tasks, they need assistance with respect to social contacts or they require a more intensive medical attendance.



Figure 1. Functional scheme of the groups and technology (source: avinotec)

On the other hand, there is the group rendering the necessary support and services for the person "in need". These are particularly family members as well as friends and neighbours. In the course of further processes it is supposed that handicapped people need to see the doctor more frequently. This probably mostly takes place at times when family members or neighbours are not easily available as many of them are employed for example.

Consequently, service providers like taxi operators, "meals on wheels", outpatient nursing services and so on are consulted. Nowadays, these services are mainly settled by the public and private health insurances. In subsequent stages the doctor or the medical service often discover that the involvement of further social services is necessary. However, in order to maintain the quality of life especially in rural areas other services such as shopping services or hairdressers are needed.

As a consequence of market trends, we think that it is necessary to develop an IT system which supports the groups involved like nursing services, doctors, family members and service providers. Moreover, this system should establish a communication with the caring person being quick, secure and based on assured information which is case-related as well as personal.

Problem definition

The aforementioned requirements result in problems that the acting groups need to communicate closely with each other. Thus, the following demands are ensured for the handicapped people:

- An adequate supply (with food [15]) must be secured.
- No additional complications shall arise with respect to health.
- Changes in health [16] should be forwarded quickly and target-oriented to the acting people.
- The mobility inside their own home should be maintained as long as possible.
- Consideration of data privacy [17] concerning the caring person as well as the dependant

Non-technical case studies

In order to describe the following case studies practically, these are oriented towards real scenarios of the nursing market. The examples chosen originate from the experience and expertise of the TOPIC project [18]. Moreover, they are combined according to the requirements of nursing people. The Vienna University of Technology also contributed a case study from the Austrian market for nursing care to the ongoing TOPIC project.

The following nursing case studies comprise the generalised and accumulated experience of several individual nursing cases. From our point of view, these studies reflect the representative selection of requirements for the AAL area with market products to be developed accordingly by avinotec.

Case study A:

A married couple, both of them highly limited with respect to their motor skills, lives in a structurally weak area. Shopping facilities, doctors as well as service providers like banks or authorities are approximately 20 km away from their home. Their children live in a neighbouring town and/or at a distance of 100 km. The father (80) is highly walking-impaired and also limited in hearing. He needs assistance with many daily activities like for example personal hygiene. Many activities such as driving a car are no longer possible for him. His wife (75) as well as his working son (45) do the nursing. Furthermore, a physiotherapist and a mobile care service come over to their home as a further support. The daughter (49) can only help sporadically due to the distance from her parents' home. The father is on care level I and he suffers from typical age-related diseases like hypertension. If his wife wishes to visit somebody or if she has to do errands out of home, she needs to take her husband with her. Aloneness puts him into states of fear. An emergency call function installed into an alarm bracelet caused multiple false alarms. Such events often lead to talks within the village in rural structures. This is something the couple is ashamed of. Especially the husband is ever afraid of causing false alarms.

Case study B:

Several elderly ladies (>70 years) live alone in a multifamily residence. They provide entrance to each others flats by handing over their keys to one another. This group of ladies meets daily in order to support each other with different tasks. Together, they do the shopping, the gardening, visits, cooking or help each other dealing with official business. This way of life corresponds to a seniors' flat-sharing community. Nevertheless, one has to bear in mind that their own privacy is maintained. External help is only called for by the community if difficult situations arise. The relatives living outside of the home environment are included into the communication.

Case study C:

Daughter (42) and mother (72) do not share the same household. The two households are more than half an hour drive away from each other. The mother has big problems in hearing and the two women agreed that the daughter calls her mother every day at 5:00 pm. The mother knows that she should be near the telephone around that time so that she is able to hear it. However, it often occurs that the daughter wants to know if everything is still okay with her mother before going to bed. She would like to call her then but she does not do so as she knows that this will excite her mother. Everything happening out of her normal daily routine does so.

Solutions

To begin with, it has to be said that the solutions presented here are only approaches. Thus, they will not go into great depth. avinotec is still searching for further ways to support caring people and dependants with the help of the MVP.

Technical specifications

Due to the close interaction in communication between the groups involved, it is necessary to provide a platform that complies with the following conditions:

- A simple intuitive user interface is wished for. This should be able to display a qualitative transmission of sound and image.
- It should automatically converse speech into text and vice versa as the application is thought to be usable for people who are limited in hearing and in seeing, too.
- The acceptance of a technical application means ensuring that some user with motor difficulties is able to operate the product.
- The technical platform needs to be accessible for all groups involved which means that every person needs to have a broadband web access (note: provide availability).
- The current end user devices (smartphones, tablets, PCs) serve as mobile communication platforms. Thus, it is ensured that the web-based MVP platform may process these services.
- The apps required for this purpose should be simple and intuitive as well.

- Sociological restraints are to be prevented meaning that for example unintended observations of people must be avoided (privacy protection of the country concerned).
- All communication is to be indicated immediately to the people involved.



Figure 2. Technical communication component (source: avinotec)

The benefit of an MVP solution for the aforementioned case studies A-C is the following:

- Case study A: A possible solution would be to create a visual and communicative interface between the caring person and the relatives. Thus, wife and son could directly establish contact, evaluate the situation and calm the husband/father down. In case of a serious medical situation, the doctor in charge could be connected.
- Case study B: The communicative visual networking of the different groups and relatives can

bring the information chain onto a realtime level of information. Requirements of the people in need of care can be distributed specifically to the relevant contact person.

 Case study C: It will be relieving and helpful for the daughter if a camera is installed in her mother's living-room being equipped with a live-stream via app. She simply needs to have a look at her mother without making her uneasy.

With respect to privacy, the MVP solution sets a good example. The data protection of both the caring person and the person receiving care is observed. First of all, the cameras as well as the front ends are password protected. Therefore, all cameras and sessions are not publicly accessible. The access to each camera needs to be authorised actively by the operator of the camera. It is possible for the user to log off or to switch their camera off at any time. This is true for both the dependant and the caring person. Moreover, you may set operating times for the camera. This means that the camera stays switched off automatically. People may do so for example during the times an external caregiver is present. However, this is possible at any other time of day or night, too. Snapshots are not taken during these periods but an active use of the chat remains still possible.

Show Case Mobile Video Platform for TOPIC

The present MVP solution forms a good basis. The tasks required could be handled by making additions to the technological platform MVP (e.g. "apps"). avinotec plans to present the recent implementation of this application on the specialist conference.

This application is an example of the feasibility as well as the variety of the technical requirements to be met by a system. The following figure 3 gives an overview.



Figure 3. Technical design of the possible approach (source: avinotec)

The following parameters need to be taken into consideration for the user side/video station and for the counterpart side:

- handicapped people: hearing impaired, visually impaired and motor impaired
- carers: relatives, nurses, neighbours and so on

Outstanding issues/tasks to be discussed

After a short demonstration of the system as it is at present, an exchange shall arise during the workshop. The age-specific and the nursing-specific requirements shall be part of this talk. Several outstanding tasks to do with the MVP are raised by practice. A scientific assistance through specialists may be helpful to work on these issues. We devided these tasks into the following thematic blocks:

Commercial themes:

- How shall a failure of infrastructure be dealt with? System security also has limits and costs! To which extent shall emergency systems go?
- Which business case conditions are applicable?
 Until when shall Return on Invest (ROI) be carried out?
- Which operating costs are acceptable and who will pay these?

Technical topics:

- A clear definition or selection of the use case is absolutely essential for the technical implementation.
- How shall locations with an inadequate mobile network supply be handled?
- Which of the use cases described shall be used for developing or adjusting the technical solutions?
- Shall the use cases be used only for the case study or should the IT implementation/programming also use them?

Sociological tasks:

- Does a chat communication via smartphone/tablet PC make sense? Note: Acceptance for technology is only limited with elderly people – see operating of cash machines/money.
- What degree of simplification does the system need for target group-specific application user interfaces to be accepted (e.g. hearing-impaired people)?
- Is a close and direct communication of

family/neighbours and service providers (e.g. nursing care, doctors) necessary?

- Are there any ideas on alarming schemes and if so, for which target groups or cases are these?
- Which use cases are to be chosen for a pilot application?

Appendix

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Backup/Attachment

Year 2011	Household s	People	>60 years
1 person	16.274.000	16.274.000	6.429.00
2 people	13.898.00	27.795.000	13.151.000

>2 people	10.143.000	37.409.000	1.685.000
Total	40.315.000	81.478.000	21.265.000

Table 1. Number of households [1, 2]

Age	Population	People in need of care	Cared for at home	Inpatient care
~60	60.064.952	336.306	302.038	34.268
60-65	4.898.241	85.761	66.192	18.777
65-70	4.039.543	114.504	88.192	26.312
70-75	5.001.255	238.292	180.531	58.451
75-80	3.438.528	337.058	248.762	88.296
80-85	2.367.684	484.818	338.705	146.113
85-90	1.372.711	522.001	326.791	195.210
>90	660.829	381.911	206.318	175.593
Total sum	81.843.743	2.501.441	1.758.312	743.120

Table 2. Need for care according to age and type of care [1, 2]

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