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Perceptions, Preferences, and Acceptance of Information and Communication Technologies in Older-Adult Community Care Settings in Ireland: A Case-Study and Ranked-Care Program Analysis

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Abstract As the Irish population ages, the potential role of information and communication technologies (ICT) to assist with community care has gained prominence, as it has in many Western nations. However, little is known about how the perceptions and preferences of older people (as current care users) and the general population (as prospective care users) are constructed for ICT within the context of existing community-care provision and orthodox person-led care programs. This paper aims to address this deficit for the Irish context and contribute to international knowledge on this topic. Data for the research comes from four case studies of community care sites, three focus-group discussions and 60 face-to-face exploratory survey interviews (based around stated-preference scenarios) with a general population sample. Care preferences were rooted in orthodox forms of person-led care provision. Perceptions of technology, experience/familiarity with technology, and difficulty conceptualizing technology and need for technology assistance, are interconnected in how they influence ICT preferences and acceptance. More dominant, however, were micro- and macro-contextual factors associated with community care, namely (1) the state of the older adult community care sector; (2) the desire for person-to-person contact; (3) the context of place.

Keywords Older people · ICT · Perceptions · Preferences and acceptance · Community care

Research has shown that in the majority of Western-developed nations, older adults want to be cared for in their own homes for as long as possible (Williams et al.

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2005). With an aging population and these care preferences, the future demands on community-care services are set to increase substantially, with subsequent pressure on the state Exchequers (Barrett and Bergin 2005). Together with other societal changes, these socio-economic implications mean that information and communication technologies (ICT) are increasingly seen as a potential component in community care. The aim of this research is to explore current and prospective care users' perceptions of and preferences for the use of ICT technology in community social care settings. In the context of this paper, ICT will be used interchangeably with the term technology to refer to a variety of health and social-care technology interventions, such as telehealth,¹ telecare,² and smart homes.³

The older-adult care sector in Ireland is considered a “welfare mix” involving family, public, voluntary (community) and private provision, and financing—the majority of provision comes from the informal sector (family, friends, and voluntary groups), and the majority of funding comes from public sources topped-up by private contributions (Mercer 2002). Relevant policy, along with care needs and care preferences in Ireland, emphasize community structures of care. Yet current long-term community-care provision in Ireland has been described as weak, fragmented, and uncoordinated, primarily resulting from funding bias towards long-stay care (Mercer 2002; Garavan et al. 2001). The consequences of such a system places the onus of care on older people and their families to bridge the gap between care needs and care provision. There is little evidence to suggest that families will stop providing care in the future. However, demographic changes, changing family structures, and labor-force participation raise socio-economic concerns in relation to the sustainability of these informal long-term care support systems (Timonen and McMenamin 2002). This shift has led to the crucial question of how best to support frail older people and their carers at home, given the finite resources available to look after them (Department of Health and Children 2001).

Like many other countries in Europe, the Irish health and social-care system is looking at the potential of ICT to serve as a complementary support structure for independent living and community care, thereby establishing a sustainable and balanced approach (Bettio and Plantenga 2004). Aside from the socio-economic implications of an aging population as a motivating factor, the recent uptake of ICT-based products, e.g. Internet and broadband, are also significant in furthering ICT application (Magnusson et al. 2004). In conjunction with this, moves at a European level, including the adoption of the “i2010: European Information Society 2010” initiative, place ICT at the center of strategies for active, healthy aging. The European Commission (2007a, b) highlighted the potential of technologies for increasing the opportunities of self-care, service innovation, and efficient delivery of health and social-care services across the EU. The recognition of the potential of ICT to support independent living and community care is reflected in an investment commitment of €1 billion over the last 5 years to develop the ICT care market in Europe (European Commission 2007a).

¹ *Telehealth* refers to the application of medical practice by telematic means.

² *Telecare* involves community social alarm services; sensory technology; home health monitoring and care provider and rehabilitation technology.

³ *Smart housing* describes the electronic and computer controlled integration of many activities and devices within the home.

Although in some European countries, such as Sweden, the adoption of ICT-based interventions is extensive, the sector in Ireland remains largely underdeveloped. In relation to home telehealth, Ireland can be classified as having little or no level of market maturity, with such services for older people generally unavailable across Ireland (Kubitschke et al. 2008). As a result, the uptake of such services is minimal. Telecare, on the other hand, is reasonably well established in Ireland and consists largely of private-based provision of social alarm services. According to the ICT & Aging Report, the uptake of social pendant alarms in Ireland is approximately 13% to 15% of those aged 65 or older (Kubitschke et al. 2008). In relation to higher-level telecare services (such as smart homes), while there have been a number of pilot schemes in recent years, there has been little uptake of these more advanced technologies. Both telehealth and telecare provision are currently not linked into the mainstream health and social care services in Ireland.

Low-levels of ICT application in health and social care are not isolated just to Ireland. While there are a number of high-profile EU policies and research programs (Ageing Well in the Information Society—European Commission 2007b; Ambient Assisted Living Joint Programme 2008) specific to community-care settings and independent living, actual application in real and practical terms appears to be more limited. Lack of coordination; health professionals' mistrust of ICT interventions; a mismatch between technology services and user needs; the economic viability of care technologies; and the sustainability of the independent living ICT market have all been identified as barriers to ICT adoption in the care sector (Cabrera and Özcivelek 2009). The lack of a business model and national policy structure leaves providers and health and social-care professionals with little incentive to provide such services. Consequently, at the level of technologists, policy makers, and care planners, there appears to be an inadequate understanding of what the role of ICT is in community care and how best it can help older people to stay in their own homes (Magnusson et al. 2004).

At a more fundamental level, our knowledge of how the key stakeholders (older people as current care users and the general population as prospective care users and the primary tax base) view and rate the current and potential role of ICT in the community-care sector as not well developed. The preferences of these two groups for technological intervention, relative to more orthodox community care programs, are core to the adoption of ICT. While the market barriers described above certainly impact overall patterns of deployment, questions remain about how more local contextual factors, including perceptions, care preferences, and community and place characteristics (socio-cultural and socio-environmental context), can influence the use of technology in practice settings. There are also questions around how perceptions of the older-adult care sector itself might influence preferences—particularly given the funding bias towards long-stay care, the onus put on informal support in community settings, and the structural changes that are occurring at the level of the family.

There has been extensive research on older people's perceptions and acceptance of ICT. However, the majority of studies appear to concentrate either on specific technologies (Melander-Wikman et al. 2008; Williams et al. 2010; King and Workman 2006); issues of usability (McCreadie and Tinker 2005; Magnusson et al. 2004; Eisma et al. 2004; Demiris et al. 2008); the impact of the digital divide on

non-care ICT (Comyn et al. 2006; Cullen et al. 2009); and assistive devices within the home setting (Tinker et al. 2004). Without considering broader micro- and macro-aspects of older-adult community care, it is not possible to understand the complexity involved in the construction of perceptions of, and preferences for, ICT technology. Scheidt (2003) underlines this fact, stating that technology has a nested context and needs to be considered in relation to such contextual community factors as place, systems, re-structuring strategies, and socio-economic patterns. Failing to account for the variety of ways that ICT is embedded in practice settings within an analysis compromises our overall understanding of how people perceive and choose to engage with technology.

This paper aims to address this deficiency by exploring (1) the perceptions of the role of technology in community social care settings; (2) the preferences for community care programs, including technological interventions, within these settings; (3) the factors (contextual and otherwise) that shape both perceptions of and preference for ICT in community care for older people. The paper draws on data from case-study community care sites, involving focus groups with current users of community social care, as well as focus groups and a face-to-face exploratory survey with a sample of the general population.

Methodology

The research used a mixed-method approach structured around two central strands of investigation. The first strand focused on the perspectives of older people currently in receipt of social care and involved a number of case studies on community-care settings across rural and urban Ireland. The purpose of this strand was to understand aging in the community and the existing role of technology in the aging and social-care process. The second strand involved a sample of the general population and sought to capture perceptions of community care and technology application—particularly by exploring the value placed on community-care provision, and preferences for hypothetical care programs and technological intervention. This strand drew on data from a set of focus group discussions and face-to-face survey interviews. The experiential/current (case-study participants) and prospective (sample of general population) viewpoints produced a set of complementary findings that were integrated at the level of analysis and interpretation, and which enhanced the evidence base for the research (as described by Moran-Ellis et al. 2006).

Current Social Care Users—Case-Study Sites

Four community-care settings, in four different regions, were identified as case-study sites through the National Healthy Ageing Database, hosted by the National Council for Ageing and Older People, in Ireland. The sites were chosen on the basis of setting (rural/urban), the type of social-care provision, the scope of provision, and the use of technology within the site. While the case studies are not representative of high-end technological application, they help to contextualize the diversity of community social-care services for older people and the extent of technological

adoption in practice settings. Focus-group discussions were held with older service recipients across each of the four community care sites and were used to gather opinions on experiences of living in the community, attitudes towards technology, and the current and potential role of technology in community care settings.

Overall, 15 people over the age of 65 years took part in the focus-group discussions, with the oldest aged 93 years. The participants included three men and 12 women. Thirteen of the participants lived alone and two lived with their spouses. While the focus groups provided the core data for the case studies, a descriptive audit of operations and community settings was completed for each of the care sites. For the purposes of brevity, only a brief description of the community-care settings is presented below.

Site 1 was a 16-unit, low-support voluntary housing complex situated on the outskirts of a small rural village (less than 300 people). The site allowed older residents from the area to remain living independently in the community through the provision of basic support and security. The units were equipped with home modifications (e.g. grab rails and ramps), and the residents were provided with a telecare pendant alarm, which was monitored by a central call center.

Site 2 was a day-care facility for older people in a large urban town (in excess of 18,000 people) that participated in an e-health program. Together with other day-care services (e.g. provision of meals and recreational activities), tutorials on technology, the Internet, and accessing health and social-care electronic information were provided to older attendees on a weekly basis. Aside from their involvement in the project, each of the participants had a telecare pendant alarm.

Site 3 involved a companion-carer service provided by a community-development organization. The service consists of visiting older people to alleviate loneliness in a sparsely populated and geographically isolated region in Ireland. Having evolved from a tradition of informal visits, the service is typically provided by a neighbor of the older person. Seventy people receive visits each week. Although not directly related to the service, older recipients are encouraged to wear telecare pendant alarms in case of emergency.

Site 4 entailed a telephone link-line, run by a statutory/community partnership. The primary function of the service was to ensure that older people in the region were safe and well in their homes through a pre-arranged telephone call. The link-line operates with the help of volunteer call-operators who telephone approximately 100 older people per week. The link-line also had a secondary function of supplying up-to-date information on services, local activities, and entitlements. Separate to the link-line, each of the participants had a telecare pendant alarm.

General Population Sample—Focus Groups and Face-to-Face Survey

An objective of the focus groups and face-to-face survey was to ascertain the preferences for technology intervention in community-care settings and for improvements in community care in general. Following consumer choice theory (Lancaster 1966, 1971), and drawing on stated-preference methodology (as applied by Green and Gerard 2009), three scenarios were used to elicit preferences from samples of the general population. There is a genuine justification for including the

public in priority setting within health and social care, given their role in funding the system and their first-hand experience of the various health care programs. The benefits of providing respondents with multiple programs to choose from are twofold: firstly, we are more likely to discover how they would respond if government proposed these initiatives, and secondly, by reminding them of potential alternatives we are able to elicit truer ranking preferences (O’Shea et al. 2008).

Scenarios were constructed around the structure of the care intervention, the likelihood of needing family care, and the likelihood of needing long-stay care. The first scenario focused on the introduction of a family-care payment program to provide a weekly cash payment to a family carer of an older person in the community. The second scenario involved providing additional statutory funded home-care packages to increase the provision of personal and respite care in the community. The third scenario introduced a home-based technology program that assisted in community living and that either helped to prevent falling, enhanced social connection, or assisted in early diagnosis of cognitive impairment. The technology scenarios were produced with the assistance of an expert group involving clinicians, survey experts, and design engineers from an interdisciplinary research project entitled, “Technology Research for Independent Living”. The outcome of all three of the hypothetical scenarios was that the number of older people entering long-stay care would be reduced by 250 people (1% of the current long-stay care population) per year, in line with care policy targets in Ireland. People were instructed to think of each program as “if they were in competition with each other for funding” and were then asked to rank all three programs with respect to preferences and importance.

Aside from preferences for community-care programs and the collection of biographical and demographic data, other topics of interest for the focus groups and the face-to-face survey interviews included experiences of care giving, perceptions of older adult care in general, perceptions of older adult care in the community, and the role and potential of technology in community-care settings.

Three focus-group discussions were held with a 21-person sample of the general population. The participants were comprised of young, middle-aged, and older adults who ranged from 18 to 84 years of age, and included 12 men and eight women. The participants were recruited through local and regional advertising and community organizations. In addition to providing insightful qualitative data, the findings of the focus groups were used to refine the design of the survey instrument.

Sixty face-to-face survey interviews were conducted with a random sample of the general population, which included representative proportions of respondents on the basis of age, gender, and social class. Thirty-three women and 27 men, ranging in age from 18 to 75 years (average 45 years of age) took part in these interviews. Although the topics of interest corresponded to those in the focus group discussion, the survey instrument consisted solely of closed-response items (multiple choice and Likert scales) providing quantitative objective data.

Experiences of Aging in the Community

Before focusing specifically on technology and community care, it is first helpful to understand the experiences of older people aging in the community. This section will

use data from the case-study community care sites to contextualize the experiences and current challenges around aging in place and community social care.

Being able to live in the community was viewed by focus-group participants as fundamental to their well-being. For many, the memories associated with community life and the connections and relationships that it had produced appeared to fuel both a sense of autonomy and belonging, and for some it helped to affirm their social and personal identities. It is unsurprising, therefore, that participants' preferences for care were concentrated around their homes and communities. Similar findings have been documented in studies on care preferences (Garavan et al. 2001; Williams et al. 2005) and attachment to home (Rowles 1983; Oswald and Wahl 2005). Remaining independent and active was described as a core objective for the coming years. By contrast, moving into a nursing home was described as a fear for the future. However, older participants did recognize that their relationship with their own homes and communities had changed: distances, available resources, and the built environment were now more influential on their independence than ever before. As a result, much of the group discussion focused on factors that undermine older people's ability to remain independent in the community.

At a practical level, individuals spoke about the difficulty in maintaining their homes and coping with the size and layout of their houses. Routine tasks, such as cleaning, changing light bulbs, and clearing gutters, were already unmanageable for some participants. Transport was also an issue. Combined with the sparsely populated landscapes of rural communities, the lack of transport often meant a geographic disconnection for older people. While in absolute terms destinations were not always far away (e.g. 1 to 2 miles), in the context of the capacities and resources of older participants they were substantial. Participants from the more rural care sites (1, 3 and 4) highlighted that if you were unable to drive, accessing services, such as primary health care, and maintaining social connectedness with friends and family was very difficult. This is supported by previous research, which has highlighted the negative psycho-social effects of deficient transport infrastructure on older people living alone and the direct relationship between transport and older adult health and well-being outcomes (Gabriel and Bowling 2004; Cutchin 2003; Sixsmith and Sixsmith 2008).

Concerns over the availability of social and support networks were a dominant theme in each of the case-study sites. These networks were credited with providing social contact, security, and support. While transport and isolating geographies exacerbated the problem in the rural locations, focus-group participants in site 2, a large urban area, felt that even in towns and cities it is possible to become cut off from the community. There was concern that the culture of calling to see neighbours and friends had receded, reducing the opportunities for older people to have contact with their outside community. Participants across several of the community-care sites noted that family responsibilities and the participation of both parents in the labor market meant that people were too occupied with their own lives to be able to support their older relatives and neighbors. In rural areas, the focus-group participants mentioned that many people moved towards larger urban centers to live, or commuted long distances to their employment. As a result, there were not many neighbors that could be called on anymore if assistance were required.

Regardless of the reason, a number of participants felt links within communities were not as strong as they once were, and as a consequence, the cohesiveness of society suffered. This is echoed in the literature, which documents the importance of social-support networks for older people and their communities (Cattell 2001; Phillipson et al. 1998) and suggests that such forms of social capital are declining (Costa and Kahn 2001; Anheier and Kendall 2002).

The focus groups in the rural community-care sites also raised concerns for long-term community sustainability. As with other rural cases documented in the literature (Marcellini et al. 2007; Joseph and Cloutier-Fisher 2005; Cloutier-Fisher and Skinner 2006), these areas have suffered from extensive service rationalization during the past 15 years. The services' central offices were seen as valuable social outlets where people could meet others from the surrounding area. Service personnel, such as postmen, provided older isolated people with some degree of social contact and helped to identify those who were most in need of assistance. With the advent of on-line provision and a perceived preference for efficiency instead of customer service, participants from both rural and urban sites were concerned for the social and person-led aspects of these services. This was especially true for social care services.

Perceptions of Technology

This section will draw on data from the four case-study sites and the three general-population focus groups to explore the perceptions of technology and its role within community-care settings. Both in terms of the case-study and the general-population focus groups, participants' perceptions of technology appeared to be founded on the sort of technology that they were familiar with and their experiences with those devices. Similar frames of reference have been identified by Brown and Venkatesh (2005), with perceptions of new technology and adoption of new technology rooted in people's current understanding of technologies' purpose and capacity.

The extent of technological application in the community-care sites was not extensive. For that reason, the experiences of case-study participants were primarily confined to home modifications (multiple sites), personal computers (site 3), mobile (cellular) telephones (multiple sites), and telecare personal pendant alarms (all sites). At a general level, older people in the community-care sites perceived technology as being beneficial to them and the wider community. There was an awareness of the impact that technology had on society as a tool, and of the associations between technological development and economic, medical, and communication advancement.

The case-study participants also accepted that technology could potentially be of benefit to older people living in the community. Like other studies on technology perceptions (Kurniawan 2008), the mobile telephone was often cited as an example of this contribution, especially with respect to safety and keeping in touch with family and friends. In most cases, discussion of ICT in terms of older-adult community care focused on an extension of this role—either enhancing social connectedness or facilitating emergency communication. To some degree, even with limited technological application, the community-care sites appeared to foster a greater awareness of these roles.

However, for many of the participants, experiences with the telehealth pendant alarms influenced the extent to which they perceived technology as being a useful component in community care. On one side, the case-study participants recognized the advantages of using the device and acknowledged the extra reassurance that it had given them. On the other side, participants stated that they rarely wore the pendant and that for the most part the alarms were placed on the bed-side locker, around the bed-post, or on the sink by the bath. Some individuals spoke about the fear of pressing the pendant button accidentally and causing the monitoring-center to telephone them. Other participants described the pendants as simply too cumbersome and too awkward to wear.

Usability of assistive devices and ICT technologies has been found to be a key determinant of older-adult technology acceptance (Charness 2003; Loh et al. 2009). More importantly, ease of use has been associated with the effectiveness of the outcome of the technology use (Rogers and Fisk 2003; Eisma et al. 2004), in that the more usable a piece of technology is then the more likely the user will obtain the intended benefits from its purpose. This relationship takes on new importance when the technology is providing some form of health and social care service (Hanson et al. 2007).

The case-study groups recognized that not wearing the pendants negated the very reason for having the devices. Although participants were aware of the problems in not wearing the pendants, they stated that it was unlikely that they would ever use the alarms in their current form. There was also an indication that people were reluctant to wear the pendants because of their obtrusiveness and because they would be recognized as a care or assistance device. Although research on technology associations is limited, Goberman-Hill and Ebrahim (2007) did note that people can be reluctant to use assistive aids because of associations with aging and dependency.

As a consequence of these experiences, while there was an appreciation for the role that technology could play in community care, there was also a sense that participants perceived a limit to its true usefulness. Scheidt (2003) highlights that the attitudes of some older individuals to technology will be founded upon highly specific, tech-related experiences and often include mundane and negative interactions with everyday devices. It is understandable, then, that participants in this research mapped their experiences with the pendant alarms onto their perceptions of health and social-care technology for community care in general. The perceptions constructed in this case appear to focus on the perceived utility of these sorts of devices, with the efficacy of the technology perceived to be limited.

In the case of the general-population focus groups, the discussion around perceptions and understanding of technology emerged from the community-care ranking exercise. While a similar pattern of technology perceptions was evident for these participants as for the case-study groups, it was constituted at a different conceptual level and varied by technology type and age cohort. Out of the 21 focus-group participants, 11 rated their experience with technology as good or higher out of a five-point Likert scale for self-reported technical proficiency. Eight participants rated their proficiency as average, and only two as limited. Therefore, overall there was a higher level of technological understanding amongst the three focus groups. In addition, 16 of the 21 participants had previously used community services for older people, either for themselves or on

behalf of their older relatives, demonstrating some understanding of community older adult care.

The majority of focus-group participants were familiar with technology for social connection, whereas half of the participants were aware of the use of pendant alarms to assist in the prevention of falls. Overall, participants had the least experience, and also the least understanding, of cognitive technologies. Thus many individuals found it difficult to comprehend the kind of benefits available through technological intervention for cognitive impairment. This again relates to the findings of Brown and Venkatesh (2005) and the interaction between familiar and new technologies at an associated level. The lack of familiarity with devices to assist in either the diagnosis of, or the effects of, cognitive impairment is not atypical. Even at the level of research, while there is an extensive literature on built-environment technologies for people with dementia (van Hoof et al. 2009), few ICT studies go beyond documenting prototypes for addressing cognitive-related disabilities (Rantz et al. 2005). ICT support for more profound behavioral and psychological changes in age-related cognitive impairment has been relatively disregarded (Lauriks et al. 2007).

There was a noticeable age gradient in relation to the value placed on the different kinds of technologies. Younger people placed greater value on the cognitive technology than on technology for falls prevention. Amongst the younger participants, there appeared to be a lack of understanding of the immediate and potential long-term impact that a fall can have on an older person. This was acutely evident in one younger participant's curt description of such an incident—*“sure it's only a broken bone”*. Older people, on the other hand, valued the falls technology most out of all three technologies. This appeared to be connected to the older participants' personal experiences and those of their family members with falling. All age groups agreed on the value of social-connection technology. This may suggest that people in general can readily relate to concepts of loneliness and isolation more than they can to physical or cognitive decline. It also suggests that there is a recognized application for technology to enable and enhance social connection in our society.

Preferences for and Acceptance of Technology

Preferences for, and acceptance of, technology is inextricably linked to perceptions (Charness 2003), and for that reason it is difficult to disentangle one from the other. We will, however, use data from the stated preference-ranking exercise, in the general-population focus groups, and the face-to-face survey interviews to explore preferences for technological-care interventions relative to more traditional care programs. Information from the general population cohort will then be supplemented with the case-study focus groups to explore how factors outside of perceptions of technology, although interrelated, influence the willingness to accept technology in community-care settings.

The ranking exercise in the general-population focus group demonstrated a clear preference for the more traditional care programs, i.e. the family-care payment program, and the additional home-care packages. While technology was accepted as a potentially useful tool for the delivery of community care, it was not viewed as a

stand-alone intervention or as a replacement for these more orthodox channels of care delivery. For that reason, the home-based technology program was ranked third and received the least support from across all focus-group participants. There was some variation in preferences for the orthodox care programs. The majority of participants favored the family-carer payment program over the additional home-care packages. The older participants felt it was more important to support the family care giver directly, while some younger participants felt that it was unnecessary to pay families for care provision, and that instead funding should be directed towards statutory-care intervention in the form of the home-care packages.

Overall, the stated preference pattern for the traditional care programs versus the technology care program was supported by the face-to-face survey interviews. Like the focus-group participants, more than half of the survey respondents reported above-average technological proficiency, with almost a quarter reporting average proficiency. Nevertheless, almost 80% of respondents ranked one of the traditional care programs as more important than the technology intervention. On a scale of first, second, and third of most importance: 57% of respondents ranked the family-care payment program as being the most important; 60% ranked the home-care packages as the second most important, and 68% of respondents ranked the home-based technology care program as the third most important. Although the focus groups with the general population demonstrated an age gradient with respect to preferences for the two traditional care programs, the survey rankings were consistent across the age of respondents.

Even with acknowledging the forced-priority setting within stated-preference exercises, it is clear that traditional care programs are more favored than technological interventions in community-care settings. The question then is, why is this the case? This research suggests that there are multiple factors at play, reflecting the complexity of the intersection between perceptions, preferences and acceptance, and setting context. There was evidence within each of the data-collection strands that there are inherent comparisons made with person-led interventions when considering technology's role in community care. Older people who took part in the case-study and general-population focus groups were concerned that there would be an inevitable trade-off between technological deployment and face-to-face care provision. While perceptions of technology were not negative, acceptance in a community-care setting was accompanied with the caveat that person-led care should not be reduced. Given that older participants had highlighted the need for additional social contact, it was not surprising that there was a reluctance to embrace an intervention that was perceived to threaten interaction with people even further. This apprehension was also related to the depletion of the person-led infrastructure (such as post offices) within the site communities. Case-study participants expressed concern that such developments could result in their communities decreasing in size and, effectively, vanishing. One participant in site 3 simply stated that, "*Having people that are aware of you is important.*"

The differences in preferences for the traditional versus technological care programs also appear to be intertwined with preferences for care in the future. With reference to Fig. 1, the majority of survey respondents (60%) stated that they wanted to be cared for in their own home by family members. Twelve percent of respondents indicated that they wanted to be cared for in their own home by

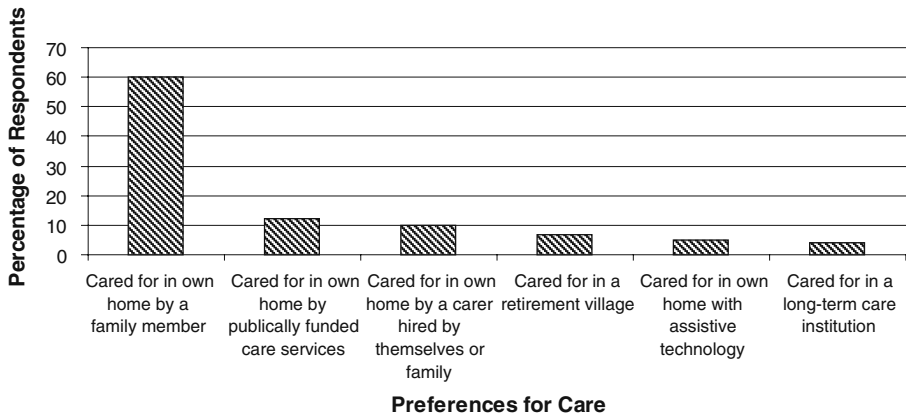


Fig. 1 Reported preference for care in the future. Source: Face-to-face survey interviews

publicly funded care services, and 10% said they wanted to be cared for in their own homes by a personal carer hired by themselves or their families. Seven percent wanted to be cared for in a retirement village. Just 5% stated they would like to be cared for in their own home with assistive-technology devices. Only being cared for in a long-term care institution elicited fewer responses (4%). These findings again show the strong preference for person-led care delivery over technological interventions.

Perceived need with respect to technology and the conceptualization of technology are factors that must also be considered. A number of older people in the community care sites did not think that they required the assistance of technological intervention now or in the future. This assessment appeared to be independent of an evaluation of prospective care needs and in part was rooted in these participants' experiences of the pendant alarms. More so though, the assessment appeared to be connected to problems in conceptualizing how technology could actually contribute to their lives. To some extent, difficulties in visualizing the role of technology as a valid care component were evident across all community-care sites and were linked to participants' lack of knowledge of such care interventions. As mentioned previously, when participants did speak about technology, it was typically in the context of social connection and a similar role to the telephone.

However, problems in understanding the potential contribution of technology to older-adult community care were not isolated to the case-study community sites. Although the general population participants had, overall, expressed least understanding of cognitive technologies, younger participants had placed greater value on these devices than the other age cohorts. These participants also possessed the highest levels of technological experience and proficiency, suggesting their familiarity and knowledge influenced their perception of the role of these technologies in community care. In response to a question on prioritization for additional public funding, 12% of survey respondents said that social-connection technology should be the highest priority, in comparison with 8% for cognitive technology, and 2% for falls-prevention technology. This

finding again suggests that familiarity with the type of technologies and the purpose of the intervention were key factors in preferences and acceptance.

Finally, and perhaps most tellingly, the current state of the older-adult care system was highlighted as a factor that influences how community care is valued. Participants in the general-population focus group stated that the lack of state support for older people in Ireland was a substantial concern. There was a distinct lack of faith and confidence in the Irish health and social care system to actually provide state support for older people. For example, while social contact was highlighted as critically important, people were sceptical in the capacity of public health nurses to visit older people. Even if state support were provided, there was doubt that this would be in an efficient or effective manner.

In addition, participants in all three focus groups commented on the inefficiency of the existing health and social-care system. This lack of trust in the health service statutory providers was why focus-group participants, and also most likely survey respondents, ranked family-care payment programs above additional state-run home care packages. The discontent of participants, or the apparent “protest vote”, relates to their reluctance to invest in state-run care programs. However, it also influenced how technological interventions were valued. There appeared to be an assumption by both focus-group participants and survey respondents that if fundamental forms of care cannot be sufficiently provided, then how could the state be trusted to manage and coordinate a more complex technological care intervention.

Discussion

This paper should not be viewed as an audit of technological application within community-care settings. Nor should it be viewed as a review of state-of-the-art exemplars. That said, the research, in combination with the data available for Ireland, helps us to understand current practice with respect to community-care provision and the limited extent of technology deployment and adoption within community-care sites. While there are individual projects that demonstrate high-end technological application within similar settings in Ireland, these are typically isolated to specific sites and are often limited to a particular timescale. This is supported by previous European and international comparative studies that show relatively low levels of ICT application in the Irish health and social care system (Kubitschke et al. 2008).

As with previous research on ICT and older people (e.g. Demiris et al. 2004; Magnusson et al. 2004; Ostlund 1995) the findings indicate that on a general level, the older participants, along with the younger individuals, had favorable perceptions of technology. However, perceptions of technology specific to care and independent living were more complicated. The experience of older case-study participants with telecare pendant alarms limited the perceived utility of technological interventions. As Brown and Venkatesh (2005) highlighted, ICT users make a cognitive connection to the most similar product with which they are familiar. Issues around usability, obtrusiveness, and perceived “assistive” associations shaped the case-study participants’ perceptions and understanding, with similar findings documented in the literature (Mollenkopf and Fozard 2003; McCreadie and Tinker 2005;

Magnusson et al. 2004; Tinker et al. 2004). For individuals in the general sample focus groups, familiarity with technological concepts and understanding of age-related conditions appeared to be influential. Yet it is fair to say that for both groups of participants, perceptions of ICT in community care were not negative.

While technology perceptions were certainly related to people's preferences for, and acceptance of, technology in community-care settings, they were not the only influence. Instead, the findings show that preferences were a product of a dynamic construction of multiple interrelated factors. With reference to Fig. 2, these factors included those that were specific to ICT (technology perceptions; familiarity with technology; difficulty conceptualizing technology, and difficulty conceptualizing need for technology use), and those that were more contextual in nature (the older-adult care sector; preference for person-to-person contact, and context of place). The remainder of the discussion will focus on how these factors, and the interrelationships between them, influence preferences for community-care technology.

In line with the literature in this area, and as with perceptions, familiarity with ICT appeared to influence the willingness to accept technological interventions in community care (Brown and Venkatesh 2005; Gregan-Paxtan et al. 2002; Moreau et al. 2001). It is unsurprising, therefore, that the younger participants, who reported the highest rates of technical proficiency, valued technologies that had a more technically complicated means of intervention. Even though the purpose of the technological intervention, and an understanding of the underlying construct (e.g. loneliness and falls prevention), are also likely to be important, this finding suggests a “digital divide” in technology acceptance supporting previous studies (Magnusson et al. 2005; Kubitschke et al. 2008; Cullen et al. 2009; Selwyn et al. 2003).

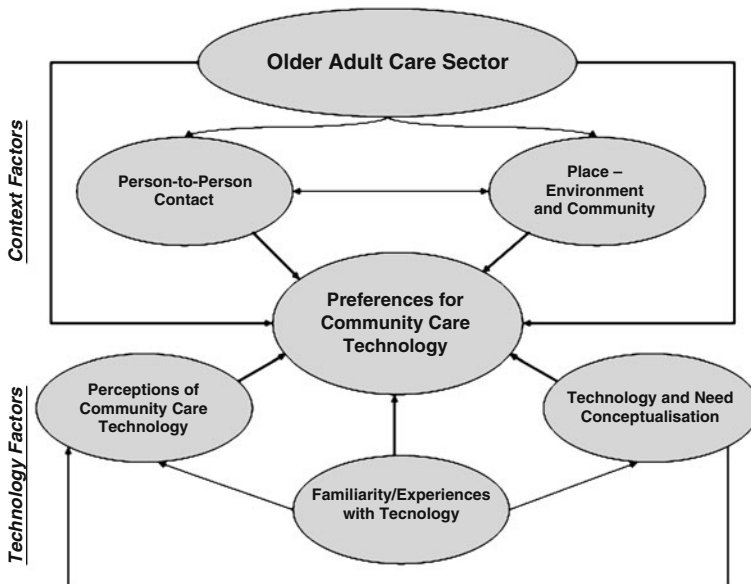


Fig. 2 Factors that shape preferences for community-care technology. Note: Arrows of light weighting represent interrelationships between factors; arrows of heavy weighting represent direct influence on preferences for community-care technology

It may thus be suggested that care technology in the future will be more readily accepted by generations that have grown up with ICT within their lives. However, Scialfa and Fernie (2006) have noted that there is a distinction between current and emerging technologies, and that acceptance is still likely to be an issue for new, unfamiliar ICT devices. Evidence from this research illustrates similar patterns. While familiarity is certainly a factor in constructing preferences and in understanding the devices themselves, the participants with higher rates of technical proficiency still had difficulty in visualizing the actual role of ICT in community care. Then again, and as mentioned in the introduction to this paper, policy makers, care planners, and technologists are also struggling to visualize this role. Difficulty in role conceptualization is likely, in turn, to affect the construction of perceived needs for technology use. In this research, perceived need was shown to influence older people's preferences for technology.

On the basis of the evidence thus far, perceptions of ICT, familiarity with ICT, and difficulty conceptualizing technological interventions and need for technology, appear to be interrelated technology factors that influence preferences for, and acceptance of, ICT in community-care settings. Perhaps of more significance, this research indicates that there is a reluctance to select any intervention that is seen to undermine person-to-person contact in a care environment. Other researchers have documented similar conclusions (Magnusson et al. 2004; Demiris et al. 2004; Cabrera and Özcivelek 2009; Loh et al. 2009). The findings show that preferences for care are still very much rooted in the orthodox models of care provision. In addition to maintaining the social contact connected with care provision, the sensitive and intimate nature of care that is supported by physical touch and emotional support is likely to be core to the justification for person-led care services (Woolhead et al. 2004). Issues of trust and perceived loss of control over the care process have also been linked to care quality and to willingness to accept technology (Cabrera and Özcivelek 2009; Gilson 2003). While the competing scenarios for the stated-preference exercise may have served to frame technology as a substitute, this fear of replacement was robust across all focus groups, even when discussing ICT as a complementary tool for care. Furthermore, difficulty conceptualizing the role of technology, described above, may have led to ambiguity about the relationship between the carer and technological interventions.

Comparisons between technology and people seem inevitable, with participants, and older people especially, anticipating a rationalization of personal carers. It is not enough to dismiss this view as being overly suspicious or unduly protectionist. As much as EU policy on ICT stipulates that technology is only meant to assist the care giver (Comyn et al. 2006), we need to acknowledge that if technology is successful in the community-care market, then it is likely that it will have a substitute role, just as state care had for informal provision (Bolin et al. 2007). In addition, there appears to be contradictory visions of the role of technology at a policy level: One of the justifications for investment in ICT is to address the reduction in numbers of informal carers in the future, suggesting some form of substitution.

The importance of community context also emerged from the findings. Case-study participants were apprehensive about the impact of any sort of technology on existing communities, and the informal social-care role of people within these communities. The apprehension is understandable given that person-led infrastructure had been reduced in

almost all of the case-study sites. The findings suggest that preferences around technology and care provision extend beyond the personal domain to that of the socio-environmental realm. The importance of place in health and social-care provision and in the lives of older people has been well documented—primarily in terms of rural areas, but also with respect to the urban-neighborhood context (Kearns and Joseph 1997; Joseph and Cloutier-Fisher 2005; Milligan et al. 2004; Eschbach et al. 2004; Gary et al. 2007). Less is known about the intersections between place, as constituted by a geographic locality and social representation, and preferences for technology in later life. Studies on the interrelationship between the places that people live, care provision, and technology are even rarer. Poland et al. (2005) underlines the complexity of this relationship in the context of the uniqueness of place, the influences of technology as a significant dimension of place, and the provision of health and social care in community settings. Further research is required before we can fully comprehend how such relationships impact older people's preferences for technology in community care.

The study demonstrated that macro-contextual factors within the older-adult care sector were operational in shaping preferences for community-care programs—including technological interventions. People in this research did not trust the statutory health service to manage community care provision for older people. This is evidenced in the preference to support family carers rather than state-run home care packages. Given people's desire to be cared for by a family member, the pattern of preferences for community care programs cannot be viewed purely as a protest action. The degree of emphasis, however, was related to people's disapproval of the management of the sector by the health service. Because the state was involved in the program implementation, the disapproval was transferred to preferences for technological intervention.

Issues around poor resource allocation, fragmented care provision, quality of care, low levels of spending on long-term care, and an overall lack of prioritization characterizes the older-adult care sector in Ireland (Mercer 2002; Garavan et al. 2001; OECD 2005), and for that matter in many other EU and international countries (Xu and Kwak 2005; Simonazzi 2009). Additionally, the majority of the responsibility for caring for older people falls to a poorly supported and under-acknowledged informal voluntary sector, (Walsh and O'Shea 2008; Timonen and Doyle 2008). With such engrained problems within older adult care, Irish older people have reported just being concerned with finding someone suitable to care for them (Walsh and O'Shea 2009).

In this light, the issues inherent within the sector are interconnected with the participants' experiences of fragmented community infrastructure and their preference for person-led care delivery. These factors, (1) the state of the older adult care sector; (2) the desire for person-to-person contact; (3) place, appear to combine, in this study at least, to be dominant influences on preferences for, and acceptance of, technology in community care. Such factors, unlike perceptions, familiarity with technology and difficulty conceptualizing technology interventions and technology need—which could be addressed in part by information, training, and education, relate to the embedded context of community care at the individual, local, and macro level. This supports the assertion by Scheidt (2003) that technology has a nested context.

There are also questions surrounding how technology can be integrated within the existing older-adult community care system. Cabrera and Özcivelek (2009) note that the lack of understanding around how ICT can enable independent living within current and future models of care is a key factor for the success of technological application within community care sites. Kubitschke et al. (2008) highlight that given the public, private, and voluntary mix of health and social care provision in Ireland, and an already fragmented community care provision, it is unclear at this time where telehealth and more advanced telecare services would fit into the organizational structure of the care sector. There are also legitimate concerns that if technology is integrated into an already problematic care model, the existing issues in community care around service fragmentation, social connection, and quality of care may be further exacerbated, intensifying the challenges experienced by older people living in the community.

Concluding Remarks

The research has a number of limitations. First, ethnographic observation was not included in the community care sites. Observational data would further our understanding of the influence of experience, familiarity, and conceptualization of technology on acceptability of technology in care sites. Second, the ranking-survey exercise was based on forced priority setting. While this is not considered a limitation relative to the determination of preferences, an acknowledgement of the mutually exclusive presentation of the scenarios is warranted. Third, and finally, the samples sizes in this study were small and therefore an extrapolation of the findings to national representativeness is not advised—although this refers primarily to the survey interviews, given that the other methods gathered qualitative information.

Despite these limitations, the research provides insight into the perceptions of the role of technology in older-adult care and identifies a complex range of interrelated factors that influence preferences for, and acceptability of, technology in community-care settings. Perceptions of technology, experience/familiarity with technology, and difficulty conceptualizing technological interventions and need for technology assistance, are interconnected in how they influence preferences. Even more intriguing was how the state of the older-adult care sector, the desire for person-to-person contact, and the characteristics of place shaped preferences for technology in community-care settings. The influence of these micro- and macro-contextual factors on individual preferences is reflective, in part, of the existing fragmented and uncoordinated service provision in Ireland.

While recommendations for market and business-model development are outside the scope of this paper, our analysis indicates that progress in ICT acceptance and deployment in the community-care sector is linked to the effectiveness of care models at a local and national level. If ICT is really to be a viable alternative or compliment to person-led care delivery in an Irish context, a holistic and integrated approach to technology deployment, led in partnership by care and technology stakeholders, is a central prerequisite. This would involve not only a program of training and education for practitioners, service providers, and older users, but significant sector reform at the level of the care-model and community-care

infrastructure. Further research is also required. Our socio-economic understanding of technology for care is extremely limited. Information is necessary on how people prioritize spending on community care and to what degree they are willing to pay for technological and traditional care programs. Obtaining this knowledge is critical to the development of successful and innovative community-care and ICT policy. Additional data is also necessary on how the sector-level factors, such as those documented in this paper, influence people's decision to pay for these programs. Finally, further research needs to be conducted into integrated models of care that can account for human and technological capital components, while ensuring quality of life for older people in community settings.

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