Grandis XXI. - Vocational Education for Interprofessional Elderly Care in the 21st century

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ERASMUS+ Strategic Partnership

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Ageing Report for Grandis

Activity 1 lead

Aston University

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Executive summary

The GRandis research project has completed the first stage of its programme to develop education and training material that will help older adults use technology to improve their lives when living in the community. The aim of the first stage was to survey and compare the situations in four European countries, the UK, Ireland, France, and Hungary, to determine the role of technology in older adults' care and the accompanying vocational education and training required.

The research addressed the following questions about older adults:

1. Are older adults ready and willing to use ICT tools that will help them live independently at home?
2. What is their current engagement with ICT uptake?
3. Are they open to joining virtual communities to avoid loneliness and improve their mental and physical wellbeing?
4. Are they open for connecting to their carer and health providers through the internet and smart phones?

It also explored how we would meet these ICT needs by answering the following questions:

1. How do changing demographics impact on the ability of health services to meet demand?
2. What are the social and legal policies that affect the way in which healthcare is delivered?
3. What education and training is currently available for carers of older adults in the community?
4. What kinds of technology are required to support older adults in the community?
5. What are the barriers to older adults and their carers adopting and effectively using these technologies?

A desktop survey by each partner produced **four national reports** on the social care policy and legislation in each country, the vocational education and training they have for social care workers, the increasing demand through population ageing, what types of technologies exist to support this demand, and what gaps need to be addressed in the current curricula for training carers. This was followed by a questionnaire that also

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targetted each of the four partner countries, Hungary, Ireland, the UK, and France. It investigated the needs, abilities, and attitudes of older adults living at home with a view to determining the roles of technology in their current and future care. The results were **four reports on the needs within each country**. A subsequent workshop was held in Aston University on June 21st and 22nd where the results of each needs analysis were presented and discussed to help ensure the integrated report captured each perspective appropriately.

A "multiplier" event was also hosted by Aston University to include stakeholders from the UK in the needs-analysis and identify the special requirements and problems encountered from demographic changes. The participants came from technology companies and information technology teachers to see how their perspectives fit with the online survey conducted with the older adults themselves. The main multiplier was in Aston University but a second event was held in Belgium at KU Leuven, as part of a related project coordinated by Aston University for older adults in the community. Across the two events, we involved 9 technology companies, including Blackpepper, Capgemini, Holovis, Keynetix, Majestic, Rimilia, Evolyst, BeWell Innovations and Maastricht Instruments, and 34 people, some coming from those companies, some who teach technology, and some who conduct research with older adults in the community.

The multiplier event clearly concluded that the key to solving these problems is simplification, even in the face of increasingly sophisticated functionality. Interfaces designed with the target population involved are essential. However, when the users are not confident or experienced with technology, it is unrealistic to expect them to bootstrap their learning. For healthcare, the goal should be to involve the care team in setting them up and supporting them, which means both the carers and the older adults need to be trained in using the devices. The carers will also effectively be trainers of the older adults and this should be an important consideration in their own training: it should not just be about understanding digital health but also about teaching their patients to understand it.

This report integrates all these previous activities and emphatically shows that demographic change is having dramatic effects in all countries, with an expanding population of older adults making increasing demands on health services. Each country is attempting to mitigate this by reducing reliance on expensive full-time residential care and the UK, for example, has recently approved a new health and social care bill that explicitly attempts to move the focus of care onto the community.

The country reports included a section on the technologies in use or available for helping support older adults at home. The number of companies and the sophistication of sensor devices and accompanying software show that the time is ripe for exploiting technology in healthcare and helping older adults remain at home where they would rather be.

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The GRandis survey of over 500 older adults across the four partner countries concluded that the older adults themselves are more than ready to rise to the challenge of adopting new technology. They already have some experience of technology and most are willing to learn to increase their skills. Many are already using the Internet or smart phones and the infrastructure will continue to improve, making it easier to get online. In England, where there were fewer adults with access, the new legislation will stimulate improved access as part of the implementation of community care.

The online survey showed that older adults are happy to use technology for engaging with their carers and health services. This includes consultations, getting results of tests, and alerting services to emergencies. They also see the benefit of new technology for helping offset increasing loneliness as they get older and it becomes harder to socialise. However, they are less willing to use online social networks to discuss their own health, which they would rather keep within the care network only.

In conclusion, the GRandis desktop research and online surveys have unquivocally exposed a need for new technology to help care for older adults at home and a willingness of older adults to engage with that new technology in their care. The existing education and training courses in all countries lack a proper focus on this newer approach, with very little explicit material on the effects of demographic change and how technology can be used to offset them. Carers need to know how to use the technologies and how to train older adults to use them, neither of which are currently covered appropriately in existing courses. GRandis has highlighted the need for new material in these areas and provided a compelling rationale for how it will improve the ability of carers to look after older adults effectively in their own homes.

Returning to our original research questions, we can now confidently provide answers as follows:

1. Are older adults ready and willing to use ICT tools that will help them live independently at home? ***Yes, without a doubt***

2. What is their current engagement with ICT uptake? ***Some experience but at a basic level***

3. Are they open to joining virtual communities to avoid loneliness and improve their mental and physical wellbeing? ***Yes they are***

4. Are they open for connecting to their carer and health providers through the internet and smart phones? ***Yes they are***

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It also explored how we would meet these ICT needs by answering the following questions:

1. How do changing demographics impact on the ability of health services to meet demand? ***By putting a strain on residential care and increasing the importance of care in the community***

2. What are the social and legal policies that affect the way in which healthcare is delivered? ***They are tending towards more care in the community to help reduce costs on health services.***

3. What education and training is currently available for carers of older adults in the community? ***There are many types of courses covering different types of carer but they do not focus on the use of technology in care.***

4. What kinds of technology are required to support older adults in the community? ***They are many and varied, including wearable and ambient sensors, smart phones that both collect their own data and transfer sensor data to online platforms where they are analysed, and software delivered to personal computers, tablets, or apps that help interpret data, including what actions to take if necessary.***

5. What are the barriers to older adults and their carers adopting and effectively using these technologies? ***A lack of training and experience with the technologies and lack of finance if they have to pay for them. The care network is not currently geared up to provide the training and support the older adults need or to help the carers themselves exploit the technologies. The health services do not have information systems that can easily share data, which makes it more difficult to extract the full benefit of data collection at home.***

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Introduction

The GRandis XXI. project aims to develop a practice oriented, competence based and modular syllabus and further training program for vocational education. The course will prepare carers for effective use of ICT-based tele-care and communication systems that will help monitor, manage, and improve the ability of people to live independently in the community and interact with their care network. The project is aligned with the problems caused by demographic changes all over the world where the number of older adults is increasing every year and creating serious load problems for accompanying social and health systems. This was recognised by the European Union Commission when it started a Research and Development programme called Active and Assisted Living in 2008 (www.aal-europe.eu), aiming to stimulate the development of ICT-based systems and new models of elderly care. These systems support the active ageing and wellbeing of seniors at home in order to avoid their hospitalisation, and to stay in their own house and environment as long as possible. The purpose of GRandis is to improve vocational education and training to optimise adoption and successful use of these systems.

The target groups who will directly use the training materials are students of vocational education and people already working as carers, either informally or as part of clinical care. The mediators, who will deliver the training programme are the teachers of VET schools and trainers of adult education. The beneficiaries of the project results in the long term are older adults from 55+ but with a focus particularly on those over 65. The lessons will also generate useful outputs that inform care delivered for any people living at home with health dependencies.

The first stage of GRandis was to answer the following questions about older adults:

1. Are older adults ready and willing to use ICT tools that will help them live independently at home?
2. What is their current engagement with ICT uptake?
3. Are they open to joining virtual communities to avoid loneliness and improve their mental and physical wellbeing?
4. Are they open for connecting to their carer and health providers through the internet and smart phones?

Our hypotheses are that the answer to each one is "Yes". We also wanted to explore how we would meet these ICT needs by answering the following questions:

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1. How do changing demographics impact on the ability of health services to meet demand?
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The goal of this report is to assess the need for providing new training material for carers that focuses on existing and new technologies. It will also help provide the focus for the curriculum content and where it is most appropriately pitched. The research involves four countries, the UK, Ireland, Hungary, and France, which will give a good perspective on Europe as a whole. This report first reviews demographic changes in those countries and how they affect healthcare for older adults. The impact on social and legal policies will be considered and how these have been incorporated into current vocational education and training. A review of the types of technology currently available shows the potential for improving care in the community for older adults with sensors and software systems. It is followed by a survey conducted by GRandis on the experiences of older adults with technology and healthcare in each of the four countries. The perspective of companies and teachers of technology was explored in a "multiplier" event and will provide further context for training needs. The report ends with conclusions and recommendations for developing new modules for carers.

Changing demographics

The latest population figures released by the United Kingdom (UK) Office of National Statistics (ONS, 2017) are for June 2015. They show that the UK population is just over 65 million people with an increasing proportion of older adults. 11.6 million people are aged 65 and over, which is nearly one fifth of the population, and 1.5 million are aged 85 and over. Since the middle of 2005, the population of people aged over 65 has increased by 21% and by 31% for those aged over 85 years.

Similarly for Ireland where, in the last century, life expectancy has risen from 49 years to 80.1 years, and this is set to increases to 85.7 years by 2050 and up to 91.4 years by 2100 (UN, 2013). The most significant increase will be in the number of people living beyond 80,

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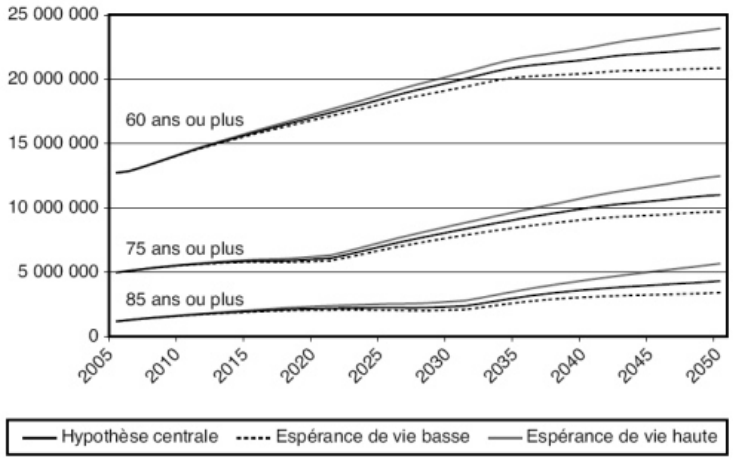
quadrupling from 110,000 in 2006 to 440,000 by 2041 (CSO, 2007). "As a result, the population aged 65 years and over in Ireland is expected to reach 1.1 million by 2036 and between 1.3 and 1.4 million by 2041or 22% of the total population" (CSO, 2012).

Illustration



Champ : France métropolitaine.

Illustration 2 shows the expanding population in France, where 10 million people will be over 75 by about 2035. In Hungary, life expectancy is slightly lower than the other three countries but is still increasing. A Hungarian report shows that these individual figures are representative of Europe as a whole:

"*In EU countries, the proportion of people over 65 years had risen by around half (9.6% - 16%) between 1960 and 2010, and this increase in proportion is also reflected in the proportion of population over 65 versus population between 15-65. The Old Age Dependency Ratio (OADR) has also risen by half (15% - 23,6%). All these data seem to be a modest change as compared to the forecast for 2010-2060 claiming that the proportion of 65+ generation will double (16% - 29.3%), which also means a more than twofold worsening of the dependency ratio (23.6% - 52.4%).*" (Krémer, 2013)

This dramatic and continuing shift in demographics towards older adults requires an equally dramatic change in how we look after older adults. There is acute and increasing pressure on residential care places but, more importantly, people would rather stay in their own homes where their friends and family live if at all possible. One way of achieving this is by using new technologies to help their care network look after and support them.

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Although there is an expanding choice of ICT based tele-care systems available to help the care of older adults in the community, there is not the same expansion in the general competence of either carers or the older adults to use them. The problem is that the very population that needs to increase its reliance on technology is also the population least experienced with and motivated by the same technology. The UK Office for National Statistics figures on internet use in 2016 (ONS internet access, 2016) showed a highly skewed picture of Internet access dependent on age of occupants. Nearly all households with children (99%) have an internet connection compared to only 53% if the households have just one adult aged 65 or over. If the single adult is aged 16 to 64 years, the figure is 87% [2]. In Hungary, there is a very significant relationship between education and internet access for people over 55: only 9% who have primary school attainment use the internet, but 85% do if they have obtained higher education. (Szuhi, 2014)

In general, older population has both less access to the Internet and less experience with the associated technology as a result. However, Internet use is rapidly changing across the age range, with daily use going from under 40% to over 80% in the last ten years and the most popular access being via mobile phones of one sort or another. Access is thus improving, along with the variety of devices available and both provide opportunities for older adults and their carers.

The next section provides a series of charts that show how each country in Europe compares with respect to ageing and participation in society. Although the UK, France, and Ireland tend to be in the top third of countries, Hungary is down at the bottom, which shows that if GRandis can meet the needs of carers in all four countries, it will be relevant across Europe as a whole.

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International benchmarks for ageing and society across Europe

Employment	Participation in Society	Independent, Healthy and Secure Living	Capacity and Enabling Environment for Active Ageing
Employment Rate 55-59	Voluntary activities	Physical exercise	Remaining life expectancy at age 55
Employment Rate 60-64	Care to children and grandchildren	Access to health services	Share of healthy life expectancy at age 55
Employment Rate 65-69	Care to older adults	Independent living	Mental well-being
Employment Rate 70-74	Political participation	Financial security (three indicators)	Use of ICT
		Physical safety	Social connectedness
		Lifelong learning	Educational attainment

Active Ageing Index (Resource: UNECE) showing the factors used to determine quality of life and engagement for older adults. The AAI definition is as follows: Employment (35%), Participation in Society (35%), Independent, Healthy and Secure Living (10%), Capacity and Enabling Environment for Active Ageing (10%) [9-20].

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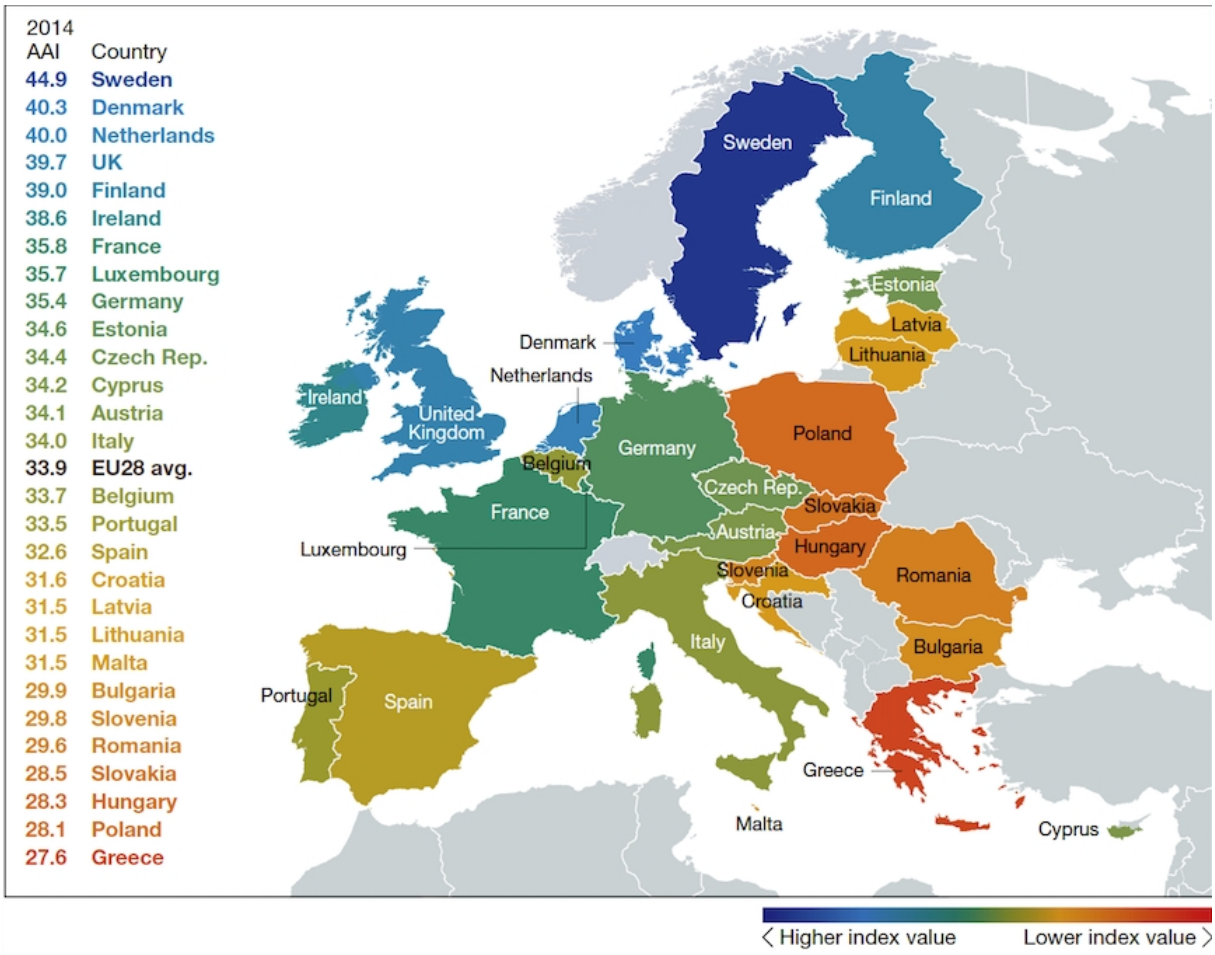

AAI 2014 (Resource: UNECE)

The Active Ageing Index for the U.K., Ireland and France is in the top ten countries of Europe but Hungary is third from bottom.

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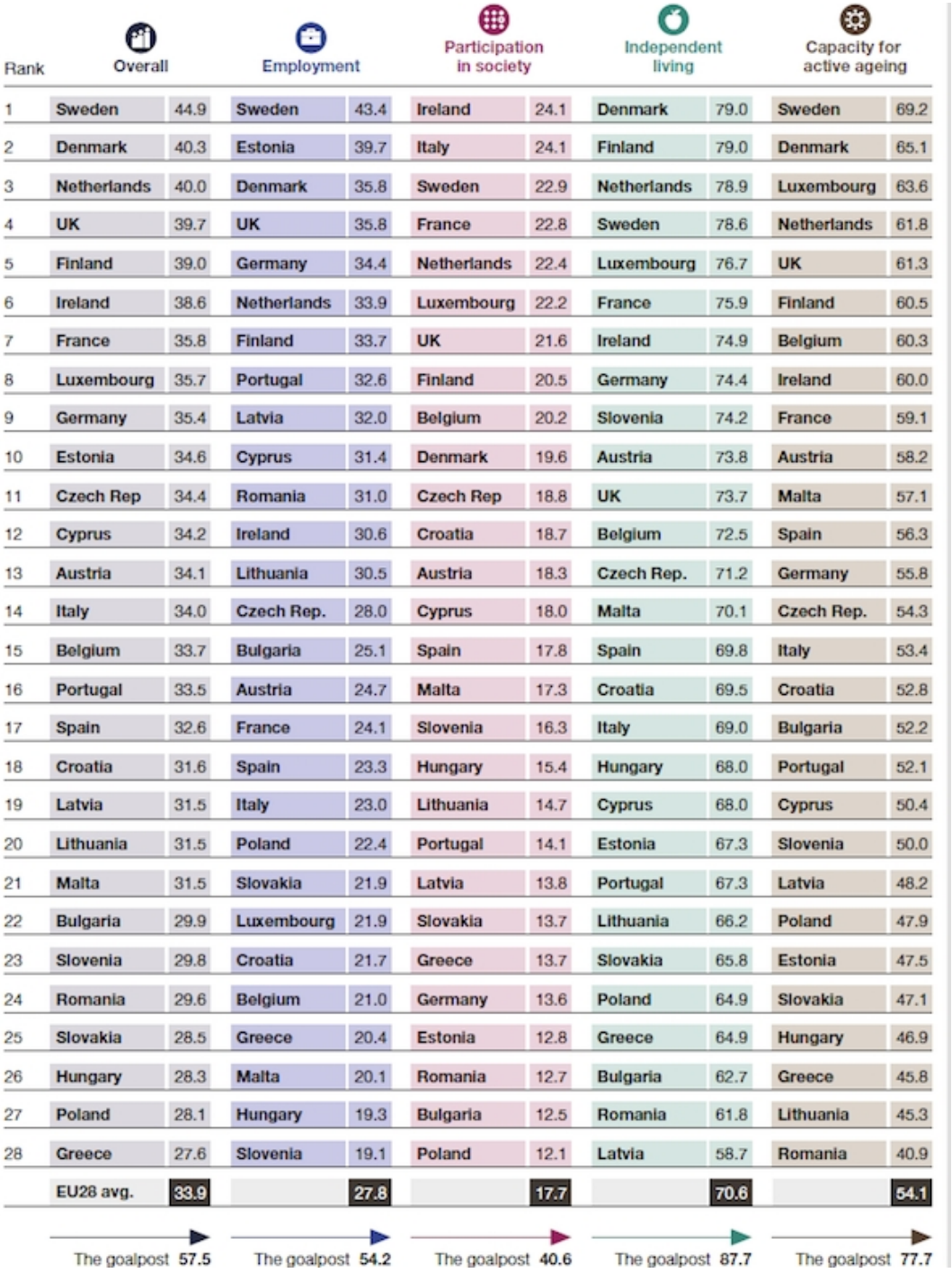

Rank	Overall		Employment		Participation in society		Independent living		Capacity for active ageing	
1	Sweden	44.9	Sweden	43.4	Ireland	24.1	Denmark	79.0	Sweden	69.2
2	Denmark	40.3	Estonia	39.7	Italy	24.1	Finland	79.0	Denmark	65.1
3	Netherlands	40.0	Denmark	35.8	Sweden	22.9	Netherlands	78.9	Luxembourg	63.6
4	UK	39.7	UK	35.8	France	22.8	Sweden	78.6	Netherlands	61.8
5	Finland	39.0	Germany	34.4	Netherlands	22.4	Luxembourg	76.7	UK	61.3
6	Ireland	38.6	Netherlands	33.9	Luxembourg	22.2	France	75.9	Finland	60.5
7	France	35.8	Finland	33.7	UK	21.6	Ireland	74.9	Belgium	60.3
8	Luxembourg	35.7	Portugal	32.6	Finland	20.5	Germany	74.4	Ireland	60.0
9	Germany	35.4	Latvia	32.0	Belgium	20.2	Slovenia	74.2	France	59.1
10	Estonia	34.6	Cyprus	31.4	Denmark	19.6	Austria	73.8	Austria	58.2
11	Czech Rep	34.4	Romania	31.0	Czech Rep	18.8	UK	73.7	Malta	57.1
12	Cyprus	34.2	Ireland	30.6	Croatia	18.7	Belgium	72.5	Spain	56.3
13	Austria	34.1	Lithuania	30.5	Austria	18.3	Czech Rep.	71.2	Germany	55.8
14	Italy	34.0	Czech Rep.	28.0	Cyprus	18.0	Malta	70.1	Czech Rep.	54.3
15	Belgium	33.7	Bulgaria	25.1	Spain	17.8	Spain	69.8	Italy	53.4
16	Portugal	33.5	Austria	24.7	Malta	17.3	Croatia	69.5	Croatia	52.8
17	Spain	32.6	France	24.1	Slovenia	16.3	Italy	69.0	Bulgaria	52.2
18	Croatia	31.6	Spain	23.3	Hungary	15.4	Hungary	68.0	Portugal	52.1
19	Latvia	31.5	Italy	23.0	Lithuania	14.7	Cyprus	68.0	Cyprus	50.4
20	Lithuania	31.5	Poland	22.4	Portugal	14.1	Estonia	67.3	Slovenia	50.0
21	Malta	31.5	Slovakia	21.9	Latvia	13.8	Portugal	67.3	Latvia	48.2
22	Bulgaria	29.9	Luxembourg	21.9	Slovakia	13.7	Lithuania	66.2	Poland	47.9
23	Slovenia	29.8	Croatia	21.7	Greece	13.7	Slovakia	65.8	Estonia	47.5
24	Romania	29.6	Belgium	21.0	Germany	13.6	Poland	64.9	Slovakia	47.1
25	Slovakia	28.5	Greece	20.4	Estonia	12.8	Greece	64.9	Hungary	46.9
26	Hungary	28.3	Malta	20.1	Romania	12.7	Bulgaria	62.7	Greece	45.8
27	Poland	28.1	Hungary	19.3	Bulgaria	12.5	Romania	61.8	Lithuania	45.3
28	Greece	27.6	Slovenia	19.1	Poland	12.1	Latvia	58.7	Romania	40.9
	EU28 avg.	33.9		27.8		17.7		70.6		54.1
	The goalpost 57.5		The goalpost 54.2		The goalpost 40.6		The goalpost 87.7		The goalpost 77.7	

Ranking by domains 2014 (Resource: UNECE). This shows the UK dropping down the ranks for independent living and Hungary moving up. So although a country might be high overall, there are specific areas addressed by GRandis where it is doing less well.

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Social care policy, legislation

In the UK, care services for health can be considered as formal or informal. Formal care services are paid for by the local authority or by the user, as detailed by the National Audit Office (2014) review of adult social care in England, (National Audit Office, 2015, Appendix Three). At the time of the report, there were 152 unitary and upper-tier local authorities in England responsible for adult social services. 87 per cent of adults live in local authorities that set their eligibility threshold to meet substantial or critical needs only. This means there is a huge market for helping people with less serious needs but ones that could make the difference between being properly supported at home or having deteriorating health that push them towards residential and more expensive care.

In Ireland, the Health Service Executive (HSE) has responsibility for the delivery of public health community and home care supports at local level, including the Home Care Package scheme. This scheme is provided by the HSE, aiming to support any person who requires assistance to live independently at home. Recipients include people with physical or intellectual disabilities, people recovering from illness and older people who require medium to high caring support to continue to live at home. This scheme is made available on demand, although it is not a legal entitlement, and access may depend on budgetary conditions from time to time. In 2010, 57,500 people were estimated to be benefiting from the scheme, which was 12.8% of the total population over the age of 65. So the private care providers and the state's own care providers, both of whom are funded to some extent by the government, depending on the circumstances of the clients, are the main supply-side stakeholders in home care in Ireland. It is likely that they would benefit from the Grandis XXI proposal for a new training programme and certification for carers to enable them to use technology to better care for their clients.

In Hungary, Act III. of 1993 bill on Social Administration and Social Benefits was modified in 2016 so that a certain proportion of older adults is entitled to limited care, called "social promotion", which can be provided by unqualified persons. The next category is "personal care" which means more intensive nursing tasks. According to the new legislation, an elderly person living alone may receive a maximum of four-hour daily help with state support. A point system is used to determine entitlement, which can be used by the government to withdraw budgetary resources by tightenting the rules.

Social care for elderly has been organised in France as part of "Services à la Personne" or Services to People. This includes a list of 26 activities, many of which encompass care appropriate for older adults. In 2005 the law was changed to simplify the processes for people to access to services, to employ professionals directly or through special organisations. One of the most important decision was the creation of special bank orders

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(Cheque Emploi Service) to help declaration of social taxes, (charges sociales) and thus help create 500,000 employment position within 3 years. Actually nearly 2,000,000 people are employed in this sector with 2,700,000 people using the services and 880,000,000 working hours paid. The total annual turnover is estimated at 20 Billions Euros

In general, publicly funded care makes up only a minority of the total value of care, and this proportion is decreasing. Most care and support is provided unpaid by family, friends and neighbours (informal care), while many adults pay for some or all of their formal care services. This is where Grandis has a crucial role because it will help support this range of informal and formal carers in conjunction with new technologies.

The UK Department of Health's Care Bill (2014, www.gov.uk/government/publications/the-care-bill-factsheets) is designed to rationalise local authorities' obligations, to introduce new duties based on individual wellbeing and to mitigate pressures on self-funders and carers. From April 2015, the bill will change how local authorities assess and fund adults' care needs. From April 2016, it will introduce a limit on an individual's contributions to meeting their eligible care needs. The government wants to continue reducing public spending while maintaining spending on care and support, and improving outcomes for adults, as need for care rises. This paradoxical position is similar elsewhere in Europe and is a symptom of the general fiscal policies that have constrained public purses.

The National Audit Office has a diagram that illustrates the multiple and interrelated care needs of older Adults. It is shown in the figure below and illustrates the complexity of the network of services, which will be the same in all countries. A person's care depends on them working together properly and technology will increasingly become a part of facilitating this.

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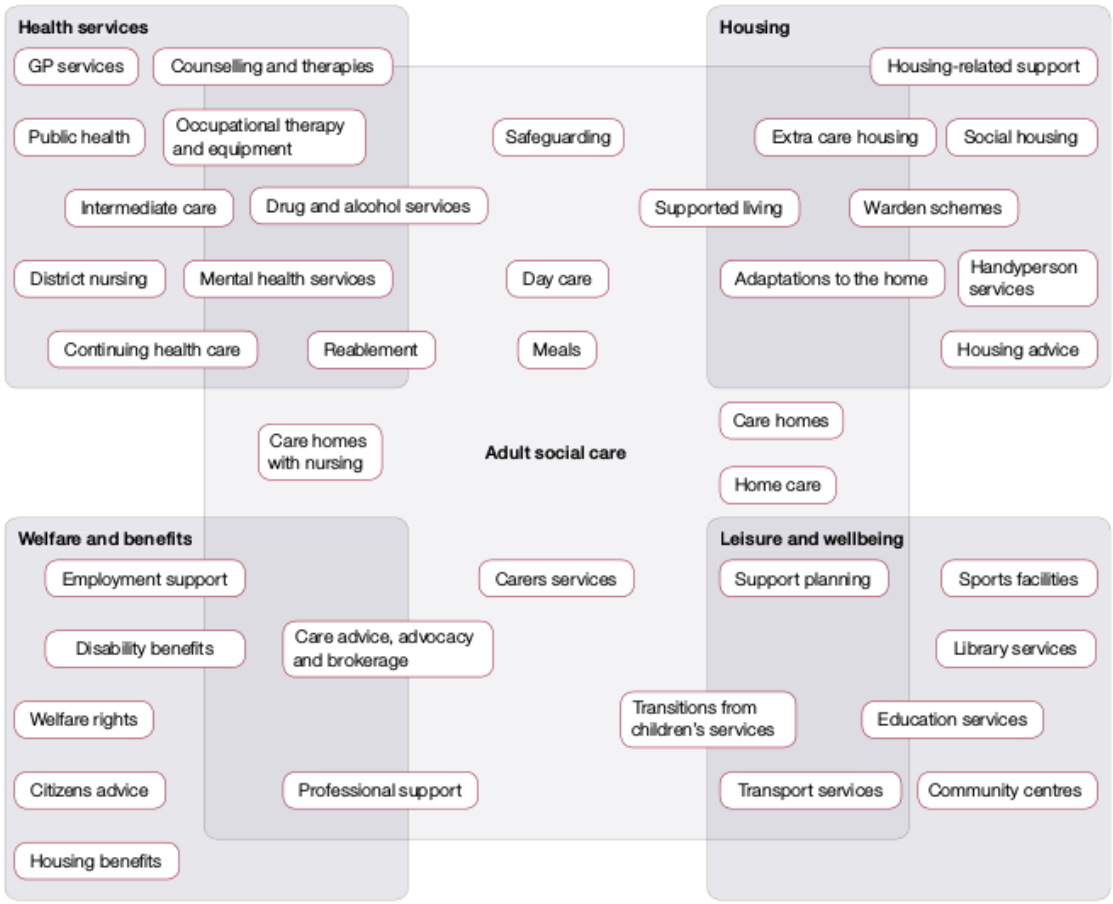

Source: National Audit Office

Informal care is often provided by unpaid family, friends and neighbours who provide personal and practical help, and coordinate formal services. The UK government has a Carer's Allowance that partly acknowledges this role. As it says on the Government website (https://www.gov.uk/carers-allowance/overview), carers "could get £62.70 a week if you care for someone at least 35 hours a week and they get certain benefits. You don't have to be related to, or live with, the person you care for. You won't be paid extra if you care for more than one person." However, the general austerity climate has, according to the National Audit Office survey, forced local authorities to save money by changing contractual agreements, paying lower fees, negotiating bulk purchase discounts and commissioning less care.

Conclusions

In all partner countries of GRandis, the increasing population of older adults has led to changes in health and social care policies. These are recognising the role of carers in the community and trying to provide support for them, albeit within a background of financial

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austerity. The drive to reduce costs is in the favour of GRandis because anything that helps look after people in their own homes is cheaper than residential care. Improving the education and training of informal and formal carers will help support older adults more effectively and increase the workforce who are able and willing to meet their needs. The next section looks at how the partner countries are currently delivering the sort of training required and whether there are gaps around the use of technology in home care.

Review of the education of social care workers

The International Standard Classification of Education (ISCED) is maintained by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The levels of ISCED for the 2011 version are

Level 0 – Early childhood education

level 1 – Primary education

level 2 – Lower secondary education

level 3 – Upper secondary education

level 4 – Post-secondary non-tertiary education

level 5 – Short-cycle tertiary education

level 6 – Bachelor's or equivalent level

level 7 – Master's or equivalent level

level 8 – Doctoral or equivalent level.

This classification is useful for determining the types of education provided in healthcare and its relevance to the target population of Grandis. The key qualifications or certificates for Grandis are the Care Certificate, the Foundation Degree in Healthcare Practice, and Certificates in Vocational Education as well as in Higher Education. Specifically, Levels 3, 4 or 5 are around where Grandis will be pitched, providing training to care workers wanting their first care job. For those already working, there are opportunities to increase skills and take on more responsibility (Table 1).

In the UK, the most relevant qualification is the Care Certificate, which is a set of standards that social care and health workers stick to in their daily working life. It is the new minimum standards that should be covered as part of induction training of new care

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workers [5]. It is not accredited through Awarding Organisations and hence is not a qualification. Instead, it was developed jointly by Skills for Care, Health Education England and Skills for Health. It equates to somewhere between Level 3 and 4 of the ISCED (2011). It is particularly pertinent for Grandis because it is designed with non-regulated workers in mind, the Care Certificate gives everyone the confidence that workers have the same induction - learning the same skills, knowledge and behaviours to provide compassionate, safe and high quality care and support. Anyone who is new to working in the Health or Social Care sectors is expected to complete an induction with their employers, which includes learning about the skills and knowledge required for their employment/job role.

The 15 standards of the Care Certificate: Understand your role, your personal development, Duty of care, Equality and diversity, Work in a person centred way, Communication, Privacy and dignity, Fluids and nutrition, Awareness of mental health, dementia and learning disabilities, Safeguarding adults, Safeguarding children, Basic life support, Health and safety, Handling information, and Infection prevention and control.

In France, the National Diploma Social Educational Companion (EAES) targets a similar need. The educational and social accompanying person realizes a daily social intervention aimed at compensating the consequences of a handicap, whatever the origin or the nature. It takes into account difficulties linked to age, illness, lifestyle or the consequences of a social situation of vulnerability, to enable the person to be actively engaged in his or her life plan. The aim is to support people in the essential acts of daily life as in the activities of social life, school and leisure. It ensures the acquisition, preservation or restoration of the autonomy of children, adolescents, adults.

As elsewhere, Hungary has a series of qualifications that increase depending on the level of education. However, its social care provider, specialised social worker, Social care provider and nurse competencies (National Vocational Qualification's Register, FEOR 3413) give a series of expectations that match the qualifications described for France and the UK: understand written and read out general and technical texts; communicate adequately and lead a non-directive, supporting conversation; use info-communication tools and a computer; use health care's fixed assets, nursing tools and instruments adequately; use, maintain and clean medical aids and amenities; use first-aid equipment and bandage; use household apparatus and kitchen devices, use and cleanse textiles (http://szakkepesites.hu/szvk2013/34_762o1_Szocialis_gondozo_es_apolo.pdf).

Qualifications Quality Ireland (QQI) Level 5 in Healthcare support has similar expectations for home care in Ireland. The duration of the Care Assistant (Care for the Elderly) Traineeship programme is 36 weeks. The Traineeship consists of 16 weeks off-the-

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job training with an Education and Training Board (ETB), 15 weeks integrated training (3 days per week with an ETB and 2 days per week with a host employer) and 5 weeks on-the-job training with a host employer. A qualified Care Assistant is capable of performing a wide range of tasks required in the day to day care of older people in nursing homes or hospitals, those attending day care centres or in need of assistance in their own homes. Their capabilities include practical personal caring tasks such as assisting with toileting and bathing, managing meal times, feeding dependant clients, assisting with dressing, lifting and handling clients, mouth care and using relevant aids and equipment.

Conclusions

All countries in GRandis have a stepped series of qualifications for care in the community. The one most appropriate for informal carers or those formal ones most likely to be in daily contact with older adults is the care certificate in the UK, which has correlates in the other partner countries. The basic skills for all of them fails to address the use of sensors and accompanying software systems, which is why the training material proposed by GRandis is so important.

Assistive technologies

The demand for independent living with good quality of care at a low cost is bringing the focus on creating new and more reliable sensor devices operating on wireless sensor networks. It is likely that the future of modern healthcare within an aging world will need much more of this ubiquitous health monitoring with minor interactions between patients and doctors. There are, though, technical issues that have to be addressed, such as information quality due to packet loss, which is a result of network congestion, and high energy utilization rate that can seriously threaten the healthcare environment, where zero tolerance level is expected. [23][24] .

Wireless Medical Sensor Networks (WMSNs) are composed of medical sensors called motes. Motes can be wearable, portable and implantable and the networks can be On-body, External and In-body respectively. Each type of WMSN is explained below. A mote is characterized by a limited battery power which is enough for simple interaction and can be integrated in other types such as Telos, Mica2 and MicaZ.

One of the most important implementations of WMSNs is for smart homes. A smart home designed and inspired by Intel for an Alzheimer's patient gives a good example of the ambitions involved with technology and care in the community. The network uses motion sensors to monitor patient's movements, pressure sensors in chairs which understand when the person is sitting as well as optical switches. RF antennae monitor when the person is

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entering the kitchen via sensors placed in shoes. All these are useful in order to confirm that the patient will not be dehydrated which is common for patients with Alzheimer. The system calculates also the time passed since the patient took his medicine.

Intelligent homes like these are becoming more common, with companies such as ExtraCare in England, for example, creating residential villages for independent living where one of the houses is kept as a demonstrator for new technologise and how they support older adults. In Ireland, the Great Northern Haven, Dundalk (http://agefriendlyireland.ie/portfolio-item/great-northern-haven/%20) is a set of 16 purpose-built apartments designed specifically to provide a sheltered environment where independent living is assisted by technology. Each apartment has more than 100 sensors, connected televisions, touch screen devices and a core network infrastructure throughout. However, even though such devices are relatively simple to install and use, there is still no incentive for carers to use them and no instruction on their value is included in any formal training and certification they might receive.

In Hungary, MENTA is a big data-based integrated health care reporting application that has received significant government funding. It has ambitions that relate to the Connecting for Health programme in the UK that attempted to integrate information technology across the NHS. Although the UK programme did not meet its ambitions, it did motivate and stimulate better IT and all countries are recognising its importance in healthcare.

The following table gives a sample of the types of sensors that will be involved in assisted living. It shows the expanding variety of measurements that can be taken and the sophistication of the devices for doing so. They will proliferate as care shifts to the community and the opportunities for technology become better recognised. Price is also reducing all the time, bringing these sorts of measurements within reach for older adults. However, the deployment and use of them is non-trivial but will fall into the remits of both the older adults themselves and their carers. This is where the new digital training curriculum of GRandis will have a huge benefit.

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Device	Description
iOximeter	It measures a person's pulse rate and blood oxygen saturation by shining a light through the person's skin. **Physical transducers Physiological signals**
MobiCuff	It converts a sphygmomanometer blood pressure cuff into a smartphone blood pressure monitor **Physical transducers Physiological signals**
Clarius	Handheld wireless ultrasound machine that doesn't compromise on image quality **Physical transducers Video**
Medical smartglasses	It provides such exceptionally clear, accurate images. **Physical transducers, video**
VARIO MEDCARE	It can measure your health values (ECG, blood-sugar, blood-pressure, blood-oxygen, etc.) **Physical transducers Physiological** signals
Digistat Intensive Care Unit (ICU)	It's designed to automate the documentation of the activities of the department to ensure efficient use of clinical facilities and proper control of activities**.video**
Ascom Myco 2	**App** It merges data from doctors,

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	nurses and the like
Alarm.com	Monitor Activities of Daily Living & Critical Events **Physical transducers**
Story-Call	**APP** Designed to offer reassurance, information and services to caregivers, and facilitate supportive efforts
CaringBridge	**APP** Connects several caregivers through one app, allowing several people to keep track of appointments changes in health and other essential information.
Elder 411	**App** It has practical information for caregivers all in one place
Alzheimer's Caregiver Budd	It helps caregivers manage their personal stress, navigate family conflict and reach a 24/7 helpline.
AARP Caregiving	**App** It monitors symptoms, coordinate care with other family or caregivers, and keep track of appointments and medications.
DirectLine	**APP** all-inclusive suite of maintenance management Software as a Service (SaaS) delivered over the Internet. Created by Toronto-based Megamation Systems,
The BodyGuardian Remote Monitoring	It monitors cardiac health using a

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System	lightweight wearable sensor **Physical transducers Physiological signals**
Carely	**APP** Mobile application developed specifically to support caregivers and their family.
Silver Mother	Silver Mother's sensors seamlessly blend into the everyday activities of seniors.
Wellbeing Status Monitoring System	Activity of Daily Living Monitoring **Physical transducers**
TTEKG	Wearable EKG machine with Bluetooth connection. **Physical transducers Physiological signals**
Wearable Pain Relief Gadget	Neural pulses trigger a natural response that blocks pain signals, leading to widespread pain relief **Physiological signals**
Leaf Healthcare Sensor	The wireless, disposable sensor attaches to patients using an industry-leading, medical-grade adhesive
Dementia Day Clock	Designed to help people with dementia to make decisions about how to plan their day **Physical transducers**.
Advance Pill Dispenser	Sounds an alarm when it's time to take medication. **Physical transducers**.

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Oscar Senior	**APP** Oscar Senior is a family app that connects seniors with no computer experience with family and friends.
Activ8	A medically certified time-synchronized **multi-sensor** solution that measures posture & motion in high resolution at multiple body segments simultaneously **Physiological signals, Video**
UC-352BLE	**Physical transducers**.
Upper Arm Blood Pressure Monitors	**Physical transducers**. **Physiological** signals
Blood Pressure Monitor- Family Lite	Physiological Signals
Smart Watch	V06 Bluetooth 4.0 Smart Watch Heart Rate Blood Pressure Alcohol Allergy Test Sports Fitness Tracker for Android iOS.**Physical transducers**. **Physiological** signals
Medicover	**APP** Mobile Application today and enjoy access to the best medical care wherever you are. Book an appointment, check your lab test results and order a prescription from anywhere in the world.

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Beddit	It Monitors sleep quality. **Physiological signals, Video/Audio,** Piezo force sensor Capacitive touch sensor Humidity sensor Temperature sensor Microphone (in the smartphone
IHealth BG5	It connects to your smartphone or tablet using Bluetooth technology and automatically records all of your glucose readings within the app logbook, eliminating the need for manual records. **Physiological signals**
Ihealth BP7	Blood pressure monitor share data to doctor. **Physiological signals**
iCare Health Monitor App	iCare Health Monitor canmeasure blood pressure,heart rate,vision,hearing,SpO2,breath rate by the phone. **Physiological signals, Video/Audio, Measuring Vocal-source biomarkers**

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The following section gives some case studies for the care of older adults using new technology. There is one from each partner country to illustrate the common objectives in each one that will need to be supported by appropriate digital skills.

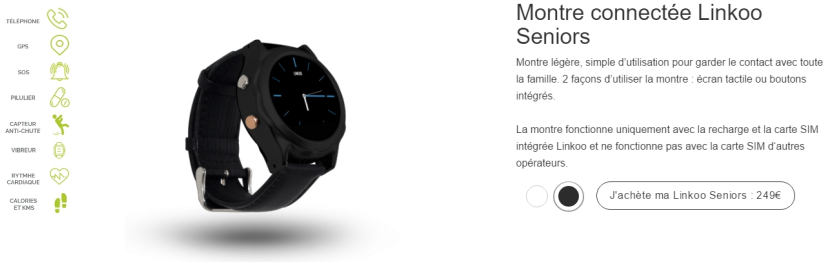
Case studies

Sus-IT project in the UK:

This project is an older people's survey, funded by New Dynamics of Ageing (NDA) in the UK, related to digital engagement which indicates the kind of learning and support mechanisms older people use, and how they would prefer ICT learning and support to be delivered. The main barriers of learning were recorded: such as the lack of confidence and fear of using ICT‟s, the absence of adequate support, the varied provision and quality of ICT training, the high cost of training, memory problems, problems with understanding technical jargon and dealing with pop-ups and spam. The answers show that older adults value the role of ICTs in keeping them in touch with family and friends, using the internet for information searching, for hobbies and interests (such as researching family history), and to make the mechanics of daily life easier (such as online banking, shopping online, writing letters, and financial budgeting) [21,22].

French networked system

The diagram below shows a typical networked set of sensors that would be linked to a platform that integrates and analyses the results. The system records vital parameters, control of medicines taken or not, tracking for contact with children or friends and alarms if a person is lost of falls, with geolocalisation for finding them quickly.



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Hungary case study

Zsuzsa Széman reports an experiment where elderly (75-80 years old) patients were taught how to use the internet. In the first stage, the experiment took place in a more developed, urban environment, whereas in the second stage, it was held in a less developed, rural environment. ICT technology was provided by Malteser International and a small entrepreneur, due to financial limitations for 15 people only.

The training focused mainly on using Skype, partly because of its relative simplicity and partly because of its supposed potential to strengthen the interpersonal and intergenerational relations of the elderly people, which may help to fight loneliness and depression.

The researchers deliberately chose to work with elderly people who had never used computer before and had an aversion to it because they hoped to register change easier this way.

The first stage of the experiment took place between December 2010 and December 2011. Most of the participants were patients over 80 in a rather bad mental state.

The beginning of the experiment was difficult; on the one hand, because of the aversion of the elderly; on the other hand, because of the lack of experience of the caretakers or family members. Moreover, the experts providing the technology doubted that the skills of the elderly people could be improved. (At the beginning, it was also a problem that pictograms had to be enlarged and the mouse sensitivity had to be lowered because of the poor sight of the participants.)

It had given great impetus and taught many lessons when high school students who wanted to complete their obligatory 50 hours of community service in this field and the social worker students joined the program from the third month on. The students worked in pairs, and they were available for two hours per week. Besides the basics of ICT, they taught the patients how to use Skype, which was also fuelled by the potential to communicate with grandchildren and relatives. Soon, the grandchildren themselves came up with ideas, games and suggestions to use Facebook and online shopping systems.

The aversion dissolved and the project – in addition to the positive mental and emotional impact on the participants through the new connections – served with useful lessons to

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strengthen the relation of the different generations and to narrow the huge gap in ICT competences.

In the second stage of the project from 2012 on, the volunteers were invited to work on the project from the very beginning, and new elements were included in the methodology. For example, the prior knowledge of the elderly people was assessed and the pairs exchanged their didactic experience when they changed each other.

As Zsuzsa Széman puts it in the final chapter of the case study:

"The model project proved: with the help of info-communication devices not only the loneliness of elderly people can be dissolved, their relationship network can be reversed, their knowledge of info-communication, similar to that of the youngsters, serves as a new basis of intergenerational relations. Elderly people become integrated members of society instead of being outcasts. An elderly man, who had been using the computer for 8 months only, has just passed away but he led a pleasant life with his computer until his death. What is this if not social inclusion? The research is to be continued; at different places with different sample we are likely to encounter different problems and find new solutions, but based on our past experience it seems: info-communication training by young volunteers outlines a new solution to "elderly care"." (Széman:2013).

ProACT in Ireland

ProACT is a major EU Research project, led by Trinity College Dublin, with the objective of revolutionising digital healthcare for older people. It will initially address chronic disease conditions of older people, starting with integrated care for diabetes, chronic heart disease, congestive heart failure, chronic obstructive pulmonary disease (COPD) and age related cognitive decline. The project will deliver a coordinate network of new and existing care applications, sensors and healthcare technology devices, linking them together and sharing their data. Patients, carers, doctors, pharmacists and hospital-based clinicians will be enabled to access the system on a tablet or phone or computer in order to enter and access relevant information from one centralised location. This is intended to support home-based, digital integrated healthcare. (http://www.homeinstead.ie/news-events/2016/06/08/new-cutting-edge-health-technology-to-enable-older-people-with-chronic-illnesses-to-be-treated-in-their-own-homes-launched-by-new-minister-of-state-for-older-people#sthash.MbOEXsaY.dpuf; http://proact2020.eu/)

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The ProACTproject sets out some clear benefits for care providers that can accrue from the smart use of technology for the care and support and interactions with older people initially, and ultimately for all care settings and all population groups.

1. Care providers have more time for personalised interaction with patients.

2. Care plans can be better tailored to individuals.

3. Significant reduction in administrative activities.

4. Care providers have the ability to constantly monitor and interact with patients despite distance and mobility of either party.

5. The healthcare delivery environment is safer and more supportive of patient-care.

6. The healthcare delivery environment is safer and more supportive of patient-care.

7. Staff initiative and innovation activities can be proactively supported.

8. Information and performance management services to support proactive and effective clinical leadership are established.

9. Through access to accurate management, process and cost data, healthcare service providers have the opportunity to develop innovative services based on new revenue models.

10. Continuing professional development, up-skilling and skills development programs have been developed and are incorporated into human resource management and planning.

As outlined in the eHealth Strategy for Ireland (2013), various technology devices such as blood pressure monitors, glucometers, lung capacity monitors and others can be successfully deployed in remote settings like the home, taking and relaying regular measurements to trigger alarms, decision support systems and alerts. Such technology has significant potential not only for the proactive management of chronic diseases, but also for social, emotional and personal care and intervention, leading to high-quality of life and better outcomes for older people. Many trials and pilots have been implemented over the past ten years and full commercial deployments are now becoming more common.

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Conclusions

It is clear that there is not only a proliferation of new sensors and software that can collect a wide range of data about people living in the community but that these are now becoming integrated into sophisticated networked platforms for information sharing and analysis. There are huge technological opportunities for supporting older adults at home but a purely technical perspective will not address the main question: how will older adults and their carers react to all this technology? If the older adults do not want to use technology then it makes no difference how good it is: it will not be adopted. So GRandis carried out an online survey of older adults to find out what attitudes older adults have to technology and its potential involvement in their care.

Survey of older adults in the community

Abstract

Purpose The key to producing appropriate training material that will help improve adoption and use of technology to support older adults in the community is to find out what attitude those adults have to such technology. Do they think it will improve their lives? What do they feel about new technology and how familiar are they with it? If they are not familiar with it, are they willing to learn about it and bring it into their lives? It was questions like these that led to a survey of older adults carried out in the four GRandis countries: Hungary, United Kingdom, Ireland, France and Spain.

Method A questionnaire was presented online with 23 questions, all except one of which generated quantitative answers. It was completed by 521 older adults: 62 from England, 55 from Ireland, 80 from France, and 324 from Hungary. The proportions of answers in each answer category were the main descriptive statistic but Crosstabs and Pearson Correlation Methods using SPSS were applied to the data to find interesting significant relationships between variables.

Results

Half the 521 completed questionnaires were for people aged between 65 and 84. Health issues are common, with balance and risk of falling a dominant issue but loneliness was probably the most important factor, being cited in half of the sample. Almost everyone had some experience with technology and about three quarters of the sample were willing to consider using technology for all types of health services as well as using it to improve communications with family and friends. Relationships and healthcare support were also

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the most common areas of their lives people would like to improve and 80% of the sample were willing to learn new things.

Higher levels of education tended to provide better perceptions of health but an increasing willingness to try new technologies to support their health and wellbeing as people grow older was not limited to educational level. As expected, loneliness also increases with age, as do health needs and a desire to be more active. People also had increased interest in using technology if they were more worried about being a burden on their carers.

Conclusions

Taken together, we have strong evidence to suggest that older adults will engage very positively with new technology because they see how it can benefit them and are willing to put in the effort to learning how to use it. The motivation increases when people have greater concerns about their health and wellbeing, which is encouaring for GRandis because it means older adults will want to overcome barriers to adoption of technology even when those barriers may become higher.

Introduction

The key to producing appropriate training material that will help improve adoption and use of technology to support older adults in the community is to find out what attitude those adults have to such technology. Do they think it will improve their lives? What is their atttitude to new technology and how familiar are they with it? If they are not familiar with it, are they willing to learn about it and bring it into their lives? It was questions like these that led to a survey of older adults carried out in the four GRandis countries: Hungary, United Kingdom, Ireland, France and Spain. The survey generated 521 questionnaires in total, filled online by 62 older adults from England, 55 from Ireland, 80 from France, and 324 from Hungary.

Survey objectives

Specifically, the objectives of the survey were to:

- record demographic characteristics and personal information of older adults related to their needs and their heath;
- explore relationships between older adults and technology;
- record the current assistance that elderly people have in household duties and compare it with what they would like;

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- record the willingness of older adults to use online health and care services;
- survey the existing types of home technologies used by older adults;
- find out what are the most important things older adults would like to change in their lives.

Method

A questionnaire was presented online with 23 questions, all except one of which generated quantitative answers. It was completed by 521 older adults: 62 from England, 55 from Ireland, 80 from France, and 324 from Hungary. The proportions of answers in each answer category were the main descriptive statistic but Crosstabs and Pearson Correlation Methods using SPSS were applied to the data to find interesting significant relationships between variables. Most of the questions involved ordinal answers such as levels of preference but some were categorical and one, age, was an integer.

Results

Although the sample has a very large proportion from Hungary, the sizes for each of the other three countries are large enough to give a good understanding of the issues under exploration within each country and in general. The sample demographics cover the relevant variations with enough participants to draw reliable conclusions.

The age range is mainly between 65 and 84, with nearly half living with their spouse and just under 40% living alone. Roughly two thirds of the sample (67.6%) lives in populated areas that are more accessible socially as well as having better access to the internet and other services compared to rural areas. A similar proportion (67.2%) has a good level of education but there are enough without any that will help understand whether this is a significant issue to consider. As far as the current work status of older adults is concered, two thirds have no work commitments (68.5%). Almost all the adults have no caring responsibilities, which suggests they are more along the continuum towards needing it themselves rather than providing it for others. For those who do have caring responsibilities, their role as secondary caregivers is most common in Hungary compared to over half the sample in Ireland that has a primary caring responsibilitu for a child (60%).

Characteristic	***Frequency***		
Gender of all countries	frequency	male	female
UK	62	26	36

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France	80	28	52
Ireland	55	26	29
Hungary	324	99	225
Age	55-64 (33.4%); 65-84 (57.2%)		
With whom they live			
Alone	203 (39%)		
Spouse/partner	244 (46.8%)		
Other family members	58 (11.1%)		
Anyone under 18	13 (2.5%)		
Any-non-relatives	1 (0.2%)		
Area of residence			
City/Suburb	190 (36.5%)		
Town	162 (31.1%)		
Village	148 (28.4%)		
Rural/Remote area	21 (4%)		
Education level			
No qualifications	65 (12.5%)		
Certifications normally passed by the age of 16	106 (20.3%)		
Certifications normally passed at the age of 18	136 (26.1%)		
Higher Education	214 (41.1%)		

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Work Status	
Full-time job	75 (14.4%)
Part-time job	53 (10.2%)
Unpaid-Voluntary work	35 (6.7%)
No work commitments	357 (68.5%)
Caring Responsibilities	
None	369 (70.8%)
Primary Carer of child or children (under 18 years)	76 (14.6%)
Primary carer of disabled child or children	6 (1.2%)
Primary carer of disabled adult (18 years and over)	3 (0.6%)
Primary carer of older person or people (65 years and over)	29 (5.6%)

Table: Demographic characteristics and personal information of elderly in four Europenian countries (England, Hungary, Ireland, France)

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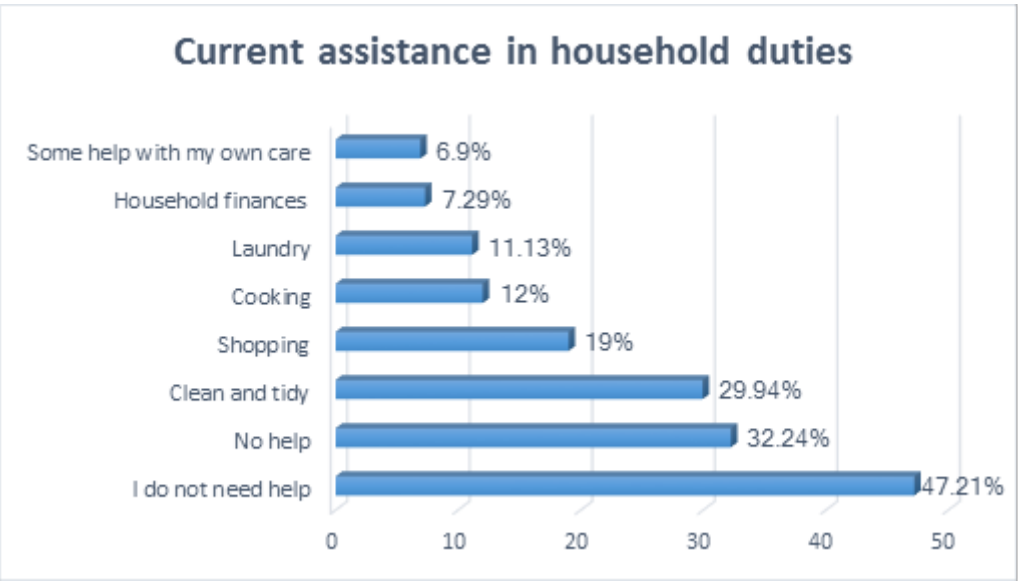
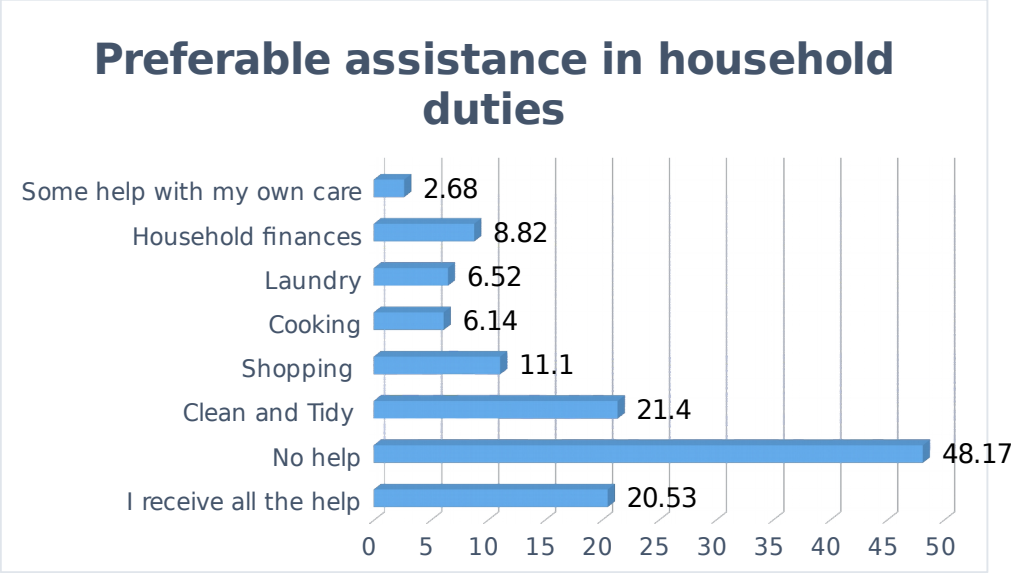
Older adults' support for household duties





Over half the survey sample already have some kind of help, which shows that they are good candidates for improving their support. At present, they mainly receive help for general household duties such as shopping, cooking, and cleaning and this accords in the main with the kind of help they would like to receive. For most of the quesetions, there is

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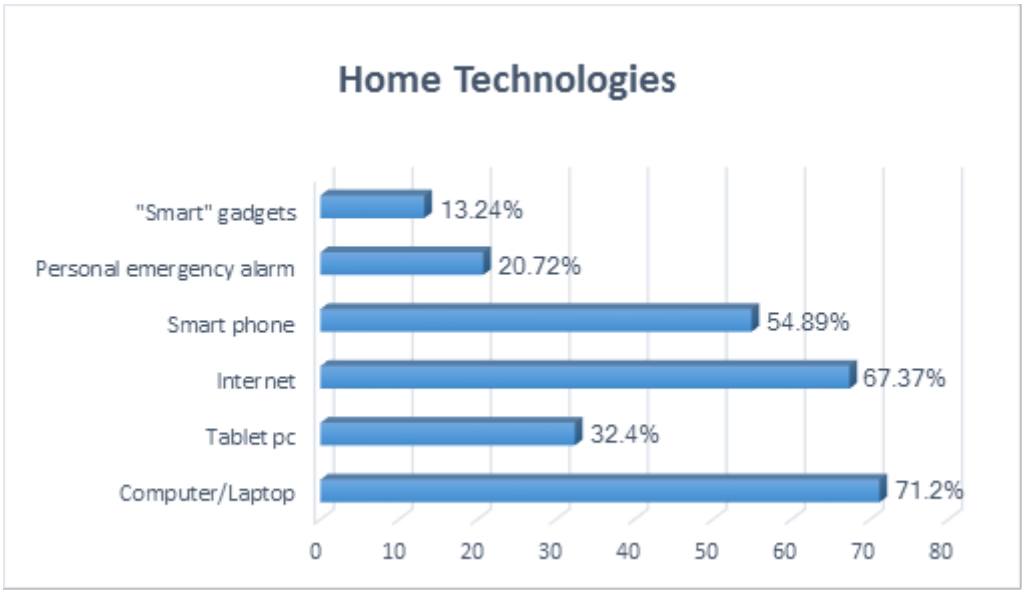
not much difference between the countries but for this one, there seems to be a greater need for help with cleaning in France (44%).

Note that the two questions have one in common: they don't need any help currently and they do not have a preference for any additional help. Each question gets an almost identical response proportion, which shows that people are considering the questions carefully enough and answering them consistently.

Health, security, and social activity

Although most people have reasonable health, a signifiant proportion does have some health issues (12.5%) and balance is a problem (29.7%), which puts people at risk of falling. Most of the sample across Europe feels safe at home (88.5%) but loneliness is an issue in almost half the sample: living alone seems to be a social problem rather than a security one but technology can help address both.

Older adults and technology



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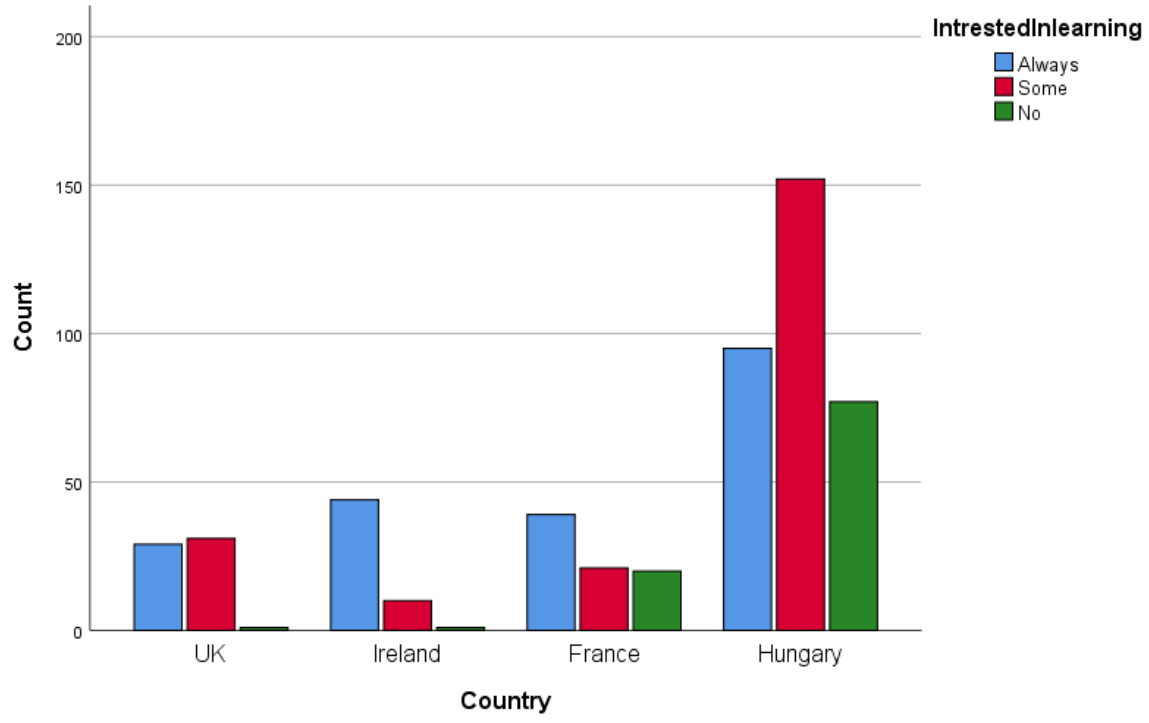
Level of experience	Frequency	Percent
Expert	29	5.6
Advance	102	19.6
Reasonable	161	30.9
Only a bit	109	20.9
nothing	119	22.8
Total	520	99.8

Almost everyone in the sample had some experience with technology but for many it was at a basic level, which means training will be crucial if and when introducing more sophisticated software and devices. The good news is that a very high majority (80.8%) were willing to learn and they had many good uses for which they would want the technology, such as staying in touch with friends and family and access to health services. Hungary was a little less enthusiastic about learning and more effort in motivating older adults might be required in this country but this was still less than one third of the sample. Overall, this shows fertile ground for introducing technology but with the right support being vital given the current low level of experience in the sample.



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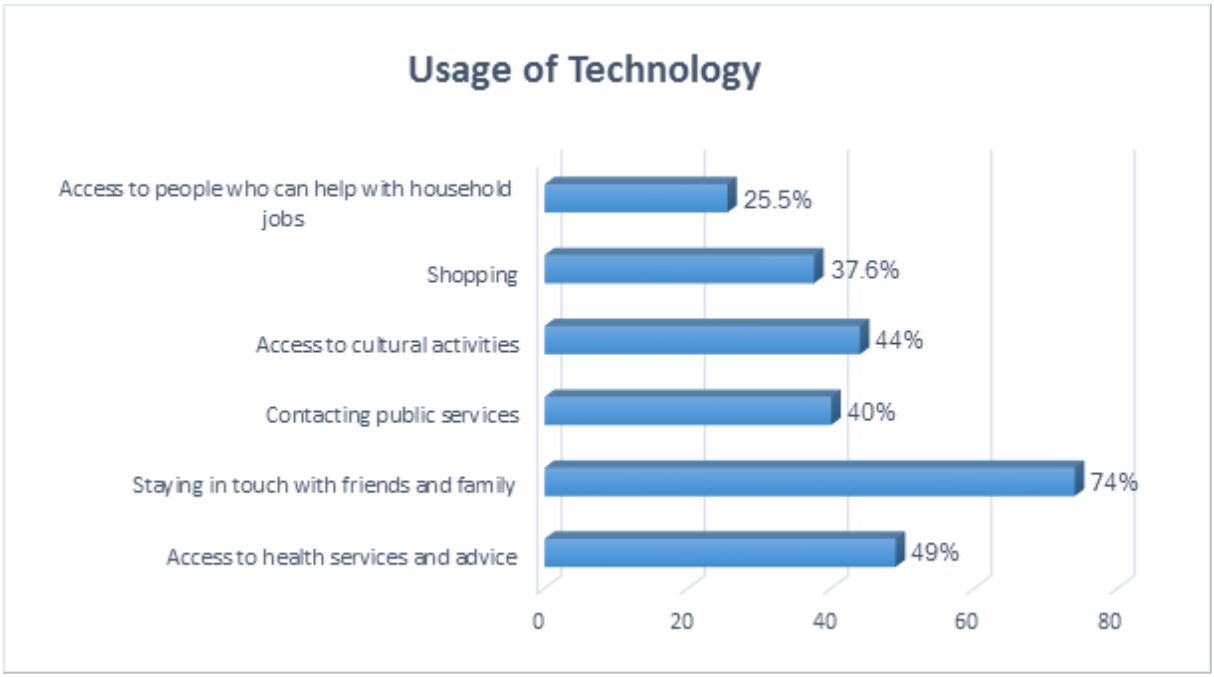
The infrastructure for accessing the internet is usually available already (67.37%) but surprisingly only about half this proportion in England. This may make it a bit more challenging in England but broadband and smart phone use is increasing, with more government services going online to encourage better participation. France is distinctive by more use of smart phones (77%), suggesting wireless and mobile access is more important than broadband for them.



What types of health services would people use techology to access	YES	MAYBE	NO
Medical consultation and help in case of an emergency at any time	267(51.2%)	161(30.9%)	92(17.7%)
Talking to a doctor or a nurse online at an appointed time	236(45.3%)	157(30.1%)	127(24.4%)
Ordering prescribed medicines that are then sent to your home	236(45.3%)	110(21.1%)	174(33.4%)
Accessing test results online or, getting them by email	300(57.6%)	101(19.4%)	119(22.8%)

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Automatically alerting clinical services through a personal emergency alarm or some other technology in your home (e.g. when you press an emergency button or if sensors detect you have had a fall)	300(57.6%)	143(27.4%)	77(14.8%)
Have health and fitness data measured and sent to your doctor or clinic	222(42.6%)	166(31.9%)	132(25.3%)
Participating in an online forum where you could discuss health matters with others.	110(21.1%)	157(30.1%)	250(48%)

When exploring in more detail what kind of health services older adults might want to access using technology, three quarters of the sample were interested in all types of potential care, including online consultations and emergency calls, prescriptions, accessing results, and monitoring general health and fitness. What they did *not* want to do (48%) was participate in forums to discuss health matters, which suggests that the role of technology in connecting them with people is more about social rather than physical health needs.

Improving lives

An open ended question asked the older adults what they would like to change in their lives. The text was thematically analysed and produced answers within the following general headings: relationships, healthcare support, finance, level of activity, mental health, physical health, more time for leisure and enjoyment of life, better diet, and less responsibility. The themes with the greatest prevalence were relationships and healthcare support, which fits with the quantitative answers given in the questionnaire. It underlines the emerging role of technology that this survey has identified and provides the motivation for ensuring it is made available and easy to use for older adults.

Relationships between questions

So far, the results have shown consistent assocations between whole answers, such as people wanting technology to improve access to friends and family and wanting to improve their social lives. However, we also explored any relationships between particular ranges of answers. For an indicative survey of this sort, the correlations are not expected to be very large and most were, indeed, quite weak. Nevertheless, they support the emerging picture and help confirm our conclusions. An important one for understanding the challenges to be addressed was that people with higher

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levels of education tend to be more positive about their health status (p=0.000, r=0.277). This implies that people with lower levels of education will require more healthcare support but our results showed that their level of technical expertise is actually better than the higher-education group ($r = -0.256$, $p < 0.05$), which bodes well for adoption of technology.

As people grow old, their health problems increase and they become more lonely, which was confirmed by our survey (p=0.000, r=0.278 for loneliness and increasing age). Online social networks would help to connect to family members, friends, and communities when health issues make it more difficult to get out and about. People are also more willing to consider using online services for accessing test results, for example, (p=0.000, r=0.269). A similar association is found for their willingness to participate in online forums (p=0.001, r=0.185) and medical consultations and help in case of an emergency (p=0.003, r=0.155). Although these are weak associations, they are all in the same direction: as age increases, so do needs, and people are willing to consider new ways of accessing those needs accordingly (p=0.000, r=0.272). The most encouraging aspect is that they will embrace unfamiliar experiences to do so and this willingness is not limited to people with higher education levels.

Getting older increases the amount of free time people have but health problems make it harder to use that time. Our survey showed a relationship between wanting to be more active as they get older (p=0.000, r=0.441), which suggests problems in trying to maintain their level of activity and thus things to do with their free time. Technology can help monitor and encourage activities and is an important area for education and training of carers and older adults.

Finally, a relationship was found between worries of the elderly (especially women) about being a burden to carers and their interest in getting help from technology (p=0.000, r=0.356). This suggests their motivation for using technology will increase as their needs increase, which encourages optimism that they will overcome the hurdles even though life in general is becoming more difficult.

Conclusions

In general, the survey has not shown any particular differences between countries that will have major effects on education and training of carers. The 521 completed questionnaires produced half between the ages of 65 and 84 and was a large enough sample to produce a good understanding of people's lives in different living circumstances and educational

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backgrounds. Health issues are common, with balance and risk of falling a dominant issue but loneliness was probably the most important factor, being cited in half of the sample. Almost everyone had some experience with technology, albeit without regarding themselves as being adept, and 80% were willing to learn. About three quarters of the sample were willing to consider using technology for all types of health services as well as using it to improve communications with family and friends. Relationships and healthcare support were also the most common areas of their lives people would like to improve.

Higher levels of education tended to provide better perceptions of health, which suggests the bigger load on healthcare will be with people who have less education. This does not look like causing problems because people with lower education seem to be more experienced with technology.

Another interaction, not entirely unexpected, is that loneliness increases with age, as do health needs. But less obviously, and most encouraging for GRandis, is the finding that people's willingness to try new technologies to support their health and wellbeing increases with age. It suggests that people will try unfamiliar things as their need for help rises and this was not limited to educational level. Similarly, people's desire to be more active goes up with age and this is another area where technology can stimulate and encourage them.

The final encouragement for using technology to support older adults is the interaction between concerns about being a burden on their care network and their interest in using technology. Taken together, we have strong evidence to suggest that older adults will engage very positively with new technology because they see how it can benefit them and are willing to put in the effort to learning how to use it.

Multiplier event

The aim of the event was to involve stakeholders from the UK into the needs-analysis to identify the special requirements and problems encountered from the demographic changes. The participants came from technology companies and information technology teachers to see how their view of supporting older adults in the community fits with the online survey conducted with the older adults themselves. The main multiplier was in Aston University but a second event was held in Belgium as part of a related project coordinated by Aston University for older adults in the community. Across the two events, we involved 9 technology companies, including Blackpepper, Capgemini, Holovis, Keynetix, Majestic, Rimilia, Evolyst, BeWell Innovations and Maastricht Instruments, and 30 people coming from those companies, who teach technology, or who research with older adults in the community.

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Discussions with attendees explored the following areas and topics:

1. Stakeholder profiles:
    1. Do you work with older adults in the community with any of your products?
    2. How do your products help them?
    3. Who do you engage with when selling and/or deploying your products?
2. Sensors and related technology
    1. How do older adults adopt them?
    2. How easy is it to sell the concept?
    3. How much training do they need?
    4. How well do they persist with the sensors and interacting with them?
    5. Who installs the products?

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6. Do your products require engagement with the wider care network?
7. Who is involved in that network?
8. How do you get the network to understand the role of your products?
9. Who do you need to train to use your products?
    1. Older adults?
    2. Informal carers?
    3. Practitioners?
    4. Any others?

The conclusions from the discussions were that getting people to understand how to use devices and software is a major challenge. Teaching people to use technology is better done through practical demonstrations and exercises but when the devices are sold to the general public, the main way of communicating how to use them is via packaged manuals. However, these manuals are almost always supplemented by online resources where tutorials and videos can be presented, often using the youtube platform. Apps are also increasingly used to deliver the software support via mobile phones or tablets and these are another way of delivering instructions about the devices.

For some companies such as iMotions and BeWell Innovations, they provide platforms for other organisations' technologies and have to produce clear instructions for how to link them. This is complicated by the fact that the external organisations creating the devices will have their own instructions for how to use them and also most likely their own web services for viewing the data. BeWell handles this by providing its own app and then using a series of clear sequential steps for linking each device to the app and thus to BeWell's platform. It is a good example of how integration across devices is becoming essential and how difficult it is to provide clear and unambiguous instructions for doing so.

The multiplier event clearly concluded that the key to solving these problems is simplification, even in the face of increasingly sophisticated functionality. Interfaces designed with the target population involved are essential. However, when the users are not confident or experienced with technology, it is unrealistic to expect them to bootstrap their learning. For healthcare, the goal should be to involve the care team in setting them up and supporting them, which means both the carers and the older adults need to be trained in using the devices. The carers will also effectively be trainers of the older adults

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and this should be an important consideration in their own training: it should not just be about understanding digital health but also about teaching their patients to understand it.

Overall conclusions

The aim of the first stage was to survey and compare the situations in four European countries, the UK, Ireland, France, and Hungary, to determine the role of technology in older adults' care and the accompanying vocational education and training required. The desktop survey showed that in all partner countries of GRandis, the increasing population of older adults has led to changes in health and social care policies. These are recognising the role of carers in the community and trying to provide support for them, albeit within a background of financial austerity.

All countries in GRandis have a stepped series of qualifications for care in the community. The one most appropriate for informal carers or those formal ones most likely to be in daily contact with older adults is the care certificate in the UK, which has correlates in the other partner countries. The basic skills for all of them fails to address the use of sensors and accompanying software systems, which is why the training material proposed by GRandis is so important. It will be a crucial element in empowering carers and older adults themselves with taking responsibility for their own care in the community.

The report then looked at the kinds of technologies currently available for supporting older adults in the community. It is clear that there is not only a proliferation of new sensors and software that can collect a wide range of data about people living in the community but that these are now becoming integrated into sophisticated networked platforms for information sharing and analysis. There are huge technological opportunities for supporting older adults at home but the technical opportunities must mesh with the motivations of the people who need to take advantage of them. GRandis carried out an online survey of older adults to find out more about these motivations in the four partner countries.

In general, the survey did not show any particular differences between countries that will have major effects on education and training of carers. Health issues are common, with balance and risk of falling a dominant issue but loneliness was probably the most important factor, being cited in half of the sample. Almost everyone had some experience with technology, albeit without regarding themselves as being adept, and 80% were willing to learn. About three quarters of the sample were willing to consider using technology for all types of health services as well as using it to improve communications with family and friends. Relationships and healthcare support were also the most common areas of their lives people would like to improve.

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As expected, loneliness increases with age, as do health needs but our survey shows that people are more willing to try new technologies to support their health and wellbeing as they get older. It suggests that they are happy to work with unfamiliar solutions as their need for help rises and this was not limited to educational level. Similarly, people's desire to be more active goes up with age and this is another area where technology can stimulate and encourage them. Overall, the survey was conclusive in showing that older adults see the benefits of using new technology in their care and are willing to make the effort to learn how to use it.

A multiplier event then explored the views of technology companies and people who teach technology. Sophistication of functionality and issues with connecting devices to software systems were a big headache. The key to solving them is simplification, which needs to be achieved by designing interfaces in partnership with the target population. At the same time, it was clear that care teams will need to help set up and support the technologies for the older adults, which means both the carers and the older adults need to be trained in using them. The carers will also effectively be trainers of the older adults and this should be an important consideration in their own training: it should not just be about understanding digital health but also about teaching their patients to understand it.

In conclusion, integration of activities in the first stage of GRandis emphatically shows that demographic change is having dramatic effects in all countries, with an expanding population of older adults making increasing demands on health services. Each country is attempting to mitigate this by reducing reliance on expensive full-time residential care and the UK, for example, has recently approved a new health and social care bill that explicitly attempts to move the focus of care onto the community. The number of companies and the sophistication of sensor devices and accompanying software show that the time is ripe for exploiting technology in healthcare and helping older adults remain at home where they would rather be. The existing education and training courses in all countries lack a proper focus on this newer approach, with very little explicit material on the effects of demographic change and how technology can be used to offset them. Carers need to know how to use the technologies and how to train older adults to use them, neither of which are currently covered appropriately in existing courses. GRandis has highlighted the need for new material in these areas and provided a compelling rationale for how it will improve the ability of carers to look after older adults effectively in their own homes.

Returning to our original research questions, we can now confidently provide answers as follows:

1. Are older adults ready and willing to use ICT tools that will help them live independently at home? ***Yes, without a doubt***

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2. What is their current engagement with ICT uptake? ***Some experience but at a basic level***

3. Are they open to joining virtual communities to avoid loneliness and improve their mental and physical wellbeing? ***Yes they are***

4. Are they open for connecting to their carer and health providers through the internet and smart phones? ***Yes they are***

It also explored how we would meet these ICT needs by answering the following questions:

1. How do changing demographics impact on the ability of health services to meet demand? ***By putting a strain on residential care and increasing the importance of care in the community***

2. What are the social and legal policies that affect the way in which healthcare is delivered? ***They are tending towards more care in the community to help reduce costs on health services.***

3. What education and training is currently available for carers of older adults in the community? ***There are many types of courses covering different types of carer but they do not focus on the use of technology in care.***

4. What kinds of technology are required to support older adults in the community? ***They are many and varied, including wearable and ambient sensors, smart phones that both collect their own data and transfer sensor data to online platforms where they are analysed, and software delivered to personal computers, tablets, or apps that help interpret data, including what actions to take if necessary.***

5. What are the barriers to older adults and their carers adopting and effectively using these technologies? ***A lack of training and experience with the technologies and lack of finance if they have to pay for them. The care network is not currently geared up to provide the training and support the older adults need or to help the carers themselves exploit the technologies. The health services do not have information systems that can easily share data, which makes it more difficult to extract the full benefit of data collection at home.***

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Project details

Title: GRANDIS XXI - 21st - Vocational Education for Interprofessional Elderly Care of the 21st century

Identifier: 2016-1-HU01-KA202-123044

Program: Erasmus+ KA2: Cooperation for innovation and the exchange of good practices

Countries: Hungary, United Kingdom, Ireland, France

Duration: 1 September 2016 – 30 June 2018

Coordinator: Prompt-H Ltd. **Contact:** Mária Hartyányi. Email: maria.hartyanyi@prompt.hu

GRANDIS XXI. project aims to develop a practice oriented, competence based and modular syllabus and further training program for the vocational education ("Networked Elderly Caregiver") delivered trough attractive, motivating digital learning content for social caregivers. The course will develop the advanced digital skills of formal and informal social caregivers, to prepare them for effective use of the ICT-based telecare systems, like smart devices, and prepare them to apply web-based tools for communication, keeping contact through the Internet for supporting independent living of elderly people.

Target groups:

- students of vocational education,

- formal caregivers, care workers,

- informal caregivers (relatives, family carers),

- „young" elderly people in pension from related professions (e.g. teachers), who are open and active enough to work as informal caregivers in online communities.

Intellectual outcomes:

- Study on training needs of 21st Century Social Caregivers based on surveys in four countries

- Curriculum for "Networked Elderly Caregivers" aligned with the European and national standards (EQF, NQF, ECVET)

- Grandis XXI. course book and online learning content in five modules of "Networked Elderly Caregivers" course, delivered online and tested in four countries

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- Networked Elderly Caregiver Certification for national and EU-level accreditation

Partners:

- Prompt-H Számítástechnikai Oktatási, Kereskedelmi és Szolgáltató Kft. -HU
- SZÁMALK-Szalézi Szakközépiskola - HU
- Veszprémi SZC Öveges József Szakképző Iskolája és Kollégiuma - HU
- Balatonalmádi Család- és Gyermekjóléti Központ és Szociális Szolgálat – HU
- ASTON University – UK
- ICS Skills – IE
- GUIMEL – FR
- Corvus Kft. – HU

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