Digital skills across the lifetime – existing provisions and future challenges

Future of Skills & Lifelong Learning

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How can slower adaptors to changes in technology be equipped to develop and maintain digital skills for (a) the increasing proliferation of online services; and (b) the future workplace?

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June 2017

Contents

Executive Summary

Technology has been embraced in the UK across all parts of society, but whilst the majority of the population can access digital connectivity through a variety of devices, significant numbers are challenged by the demands and specificities of information and communications technologies (ICTs). These challenges are particularly prevalent for those in social housing; those with lower incomes, or unemployed; those with disabilities; those in rural populations; older people; traveller communities, homeless people, those with 'no recourse to public funds' and young people not in employment, education or training (NEETs). These groups are identified as relatively 'slower adaptors' (Cabinet Office, 2014) and are the focus of this review. In this paper, we review the digital participation process of slower adaptors and identify the challenges involved. We also examine solutions and good practice which have evolved and draw on the multi-faceted evidence to identify key policy issues and recommendations based on the evidence explored.

Slower adaptors are less likely to take advantage of online services or use technology in the workplace, potentially leading to their social and digital exclusion. There are a number of evidence-based considerations to take into account when formulating policy and strategies to equip slower adaptors to develop and maintain the digital capabilities they need to keep astride of online services and technology-rich workplaces:

1. Different groups of slower adaptors share common needs and experience similar barriers to digital adoption. As such, there is considerable commonality in the ICT learning and support requirements of these individuals

2. In-person ICT learning support is vital to enabling slower adaptors to thrive in the digital word

3. There is a void in ICT learning support available at home and in the community

4. Widespread ICT learning support in the community would greatly increase the digital participation of slower adaptors

5. Barriers to digital participation are varied, but commonly include the effects of ageing (e.g. vision, dexterity, memory) and a lack of access to ICT learning support

6. A well-developed proposition for delivering ICT learning support in the community is available for application

7. 'One size does not fit all' and mastery of standardised digital skill sets is not seen as a relevant or appropriate goal by many slower adaptors.

8. Learning is a social process and therefore the shrinking nature of social networks in older age and for the disadvantaged is a priority need to address

9. A cited example of older people working to promote digital participation of their peers demonstrates the possibility of a small-scale, low-cost and low-risk approach for others to emulate

10. Positive experiences of the digital world are important for slower adaptors to make digital participation exciting and inspiring

11. 'Micro-scale' funding of grass-roots ICT learning support delivers significant benefits at low cost and with low risk

A few benefits of supporting slower adaptors:

1. Digital participation brings greater independence and thus there will be less demand on public support services

2. Banks and retailers will benefit financially from more people becoming competent and confident in operating online

3. Those that have 'skilled up' are more likely to support other slower adaptors in their development

Recommendations

To support provision of ICT support in the community:

1. Work with users to create a flexible policy framework for ICT learning support that will encompass the uptake and on-going use of digital technologies in the workplace, the community and at home
2. Introduction of very 'light-touch' arrangements to support grass-roots digital participation
   a. Potentially through collaboration with local councils who can broker and facilitate partnerships and assist with ICT learning support provision (i.e. public libraries)
3. Collaborations and partnerships must be developed across a wide range of stakeholders to ensure sustainable delivery of support
   a. Including end-users, community groups, universities and schools, national and local government, and businesses
4. To ensure continued use of ICT among slower adaptors with shrinking social networks, vibrant social networks in the community should be supported

For the workplace:

1. Raise awareness amongst employers of the impact of the normal ageing processes on the use of ICT
2. Provide in-depth education where appropriate
3. Consider the role of slower adaptors in design of hardware, software and working practices
4. Consider the opportunities for user involvement in design activities such as prototyping and product testing

1. Introduction

Access to digital technology and its increasingly widespread use in a proliferation of online services and in the workplace is widely considered to have the status of a basic human right (United Nations General Assembly, 2011). Technology has been embraced in the UK across all sections of society, but whilst the majority of the population as a whole has digital connectivity through a variety of devices, significant numbers struggle to keep up with the speed of change in the development and introduction of new technologies (software and hardware), and to adjust to the ever changing features of new devices and the myriad ways in which technology is applied in daily life (Ofcom, 2015a). Such people are more likely to be those in social housing; those on lower wages, or unemployed; those with disabilities; those in rural populations; older people; and young people not in employment, education or training (NEETs). These are groups are regarded as 'slower adaptors' (Cabinet Office, 2014) and are the focus of this review.

Other groups of 'slower adaptors' include traveller communities, homeless people and those with 'no recourse to public funds'. Further, small and medium enterprises [SMEs] and charities face many challenges in their efforts to achieve their potential for digital connectivity (DCMS, 2016; Lloyds, 2015); although particular needs are likely to be specialised and beyond the scope of this brief review it is the case that there will be considerable overlap with the characteristics of the slower adaptors considered here.

The term 'slower adaptor' encourages collective consideration of many ICT users with shared characteristics as a group – avoiding unnecessarily fine segmentation. However there are some negative connotations to use of the term since it seems to suggest that it is people who should adapt to technology – rather than requiring technology to adapt automatically to human capabilities and characteristics.

The divide between the digitally connected and those who are not 'is real and pervasive' (Pew Research Centre, 2016:11). Demographic factors relevant to the ability to make use of digital technologies, including age, education and income are trends that apply worldwide; the UK divisions are comparable to those of similarly developed nations.

As a number of reports have shown (Damodaran and Olphert, 2015; DCMS, 2016; Foresight, 2016), work processes, central and local government services, social and commercial interactions are increasingly digitised, and the need for confident and effective digital participation and engagement across the population is increasingly pressing. Slower adaptors, who are challenged by the demands and specificities of information and communications technologies (ICTs) and as a result are less likely to be using online services or participating in the workplace, are at risk of increasing social and digital exclusion.

This review considers (i) the prevailing and future trends; (ii) the impact of ageing on digital engagement in later life; (iii) lifelong learning issues related to the acquisition and maintenance of digital skills and (iv) case studies of successful practice. It will examine the evidence, explore policy implications and will offer recommendations. The recommendations suggest evidence based policies, strategies and solutions to enable significant groups of 'slower adaptors' to

develop and maintain effective digital participation to enhance their wellbeing, prolong their autonomy and independence (see Figure 1).
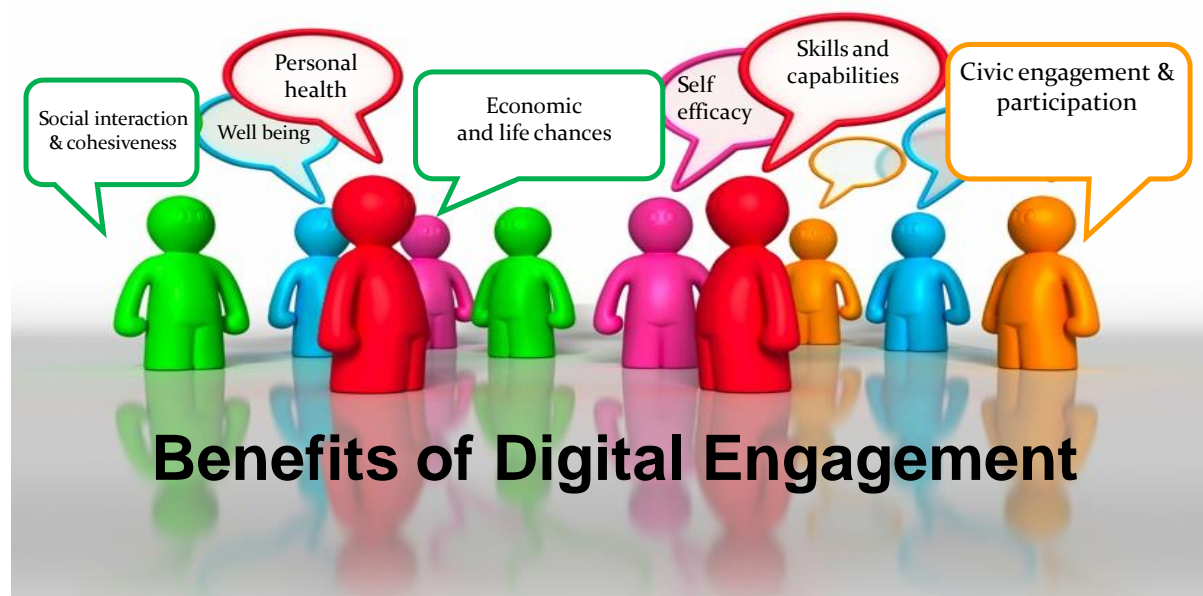
Figure 1: Benefits of Digital Engagement. Figure taken with permission from (Damodaran, 2010) © DTSI

2. Prevailing and future trends for key groups of slower adaptors

2.1 Introduction

An estimated 14% of UK households have no access to the internet at home (ONS, 2015b; Ofcom, 2015a). Some cannot access it (due to cost or location) others are reluctant to do so but both are disadvantaged as a result. The key groups of slower adaptors identified previously overlap significantly. Older people are more likely to have long term illnesses and disabilities (Ofcom, 2015b), and are more likely to live in rural or semi-rural areas (Rural Services Network, 2015). Approximately 26% of the population living in rural areas lack digital capability, compounded by 16% of this population having either no, or limited, internet access (Go ON UK, 2015).

Whilst many individuals in 'slower adaptor' groups do use digital technology effectively, for all the groups the same determinants of digital exclusion apply: poor educational attainment, low income, and higher age.

A common barrier to digital inclusion in lower socio-economic households is a reduced level of access to devices such as smart phones, tablet computers and laptops, together with reduced access to broadband at home. Whilst 'Pay As You Go' (PAYG) arrangements can enable some access, difficulty in making regular payments for connection can limit regular use (CEBR, 2015), so key enablers for this group include low cost or PAYG options for devices and internet connection. Mobile access (smart phones and 'alternative devices' such as e-readers) is particularly successful in enabling access and developing confident use (Tinder Foundation, 2016). While this is a rising trend (Ofcom, 2016) it also has its limitations (e.g. the small screen size and difficulties with saving, managing and locating documents).

Digital connectivity increases employability, gives opportunities to save money, to reduce social isolation, to develop hobbies, and enables people to access resources and advice online (Damodaran, Olphert and Sandhu, 2013).

2.2 Social housing residents

Around 8% of the UK population live in social housing; it is estimated that 4.1 million adults living in social housing are offline, and 60% of adults living in social housing are economically inactive (Tinder Foundation, 2015). In England, 21% of 65+ year olds and 44% of single parents live in social housing; 31% of social housing tenants are retired and 29% are either disabled, full-time students or care for a family member at home.

Challenges to digital inclusion in the social housing sector are similar to those for the older population, with issues of access to support services (cost, distance and availability of transport). Affordability of digital access at home, difficulty with technical jargon (and in some cases basic literacy and numeracy) and a perception that online activity is irrelevant to their lives and may carry security risks form common themes.

Some social housing providers do provide digital inclusion activities (Broadbent and Papadopoulos, 2013), and some have communal internet provision for their tenants, but this is not consistent across all providers and ICT support available for end users is often very limited.

2.3 Young people who are 'not in employment, education or training' (NEETs)

Young people aged between 16 and 24 who are, or, who are likely to be at risk of becoming 'not in employment, education or training' are a particularly hard to reach group, especially at age 18+ when more young people begin to live independently and are no longer registered in education. As a result, there may be many whose current situation is not known and who may be missing out on services which could help them. Numbers in this group have shown a slight decline since a peak in 2011 (DfE, 2016), and Local Authorities' Client Caseload Information System [CCIS] suggests that northern English regions have higher NEET rates in comparison to London and the South East (DfE, 2016:5)

Barriers preventing engagement of this group range from poor self-esteem and lack of self-confidence through to motivational, emotional and behavioural difficulties (DWP, 2013). Ten projects working with schools and Job Centre Plus found that the key features that worked in encouraging engagement were:

- a one to one relationship with a key worker
- action planning and target setting
- activities that increased the young people's self-confidence. (DWP, 2014:1)

Young people who are 'not in employment, education or training' are more likely to claim means tested benefits and therefore need to use online government services, including those required for seeking employment, with consequent disadvantage if they lack digital connectivity.

2.4 Disabled and older people

The extent of digital inclusion is broadly similar for both of these groups of slower adaptors. Only 68% of working age people with a disability are recent internet users compared with 92% of the general population (ONS 2015a; Ofcom, 2015b); the figures for older people show that 56.5% of all adults aged 75 and over, 8.9% of those aged 55 – 64 and 21.5% of those aged 55 – 74 have never used the internet (ONS, 2016). For example, among the over 2 million people in the UK who live with sight loss, 65% of blind/partially sighted people who do not use a computer would like to do so if all obstacles to using one were removed (RNIB 2012).

Regarding access to employment, the employment rate for working age disabled people is 46% compared with 74% for the general population (ONS 2015a). New trends in employment practices (such as crowdsourcing) and changes in government policy indicate that more people will be working past the age of 65 in the future (CEBR, 2015). Ofcom (2015b) found that disabled people in employment were as likely as non-disabled people in employment to own, or have access to most digital communications services. Access barriers are not just about digital accessibility but also access to appropriate ICT learning and support and physical access to transport and buildings. Additional barriers facing slower adaptors include reduced social networks; cost of technological devices and training; lack of user confidence in using of ICTs; lack of user awareness of accessibility features; user attitudes and perceptions of ICT use; age-onset conditions and ICT skills training practices. The issues and barriers identified are

addressed in further detail in section 4 and illustrated in case studies in section 5. The important generic point to note is that the need for help and support across these groups correlates and increases with age, apart from the anomaly of the 18-34 year old band of disabled adults. Members of this younger group have the highest incidence of learning disabilities and require extensive and on-going ICT learning support to empower them to utilise digital technologies in their personal and working lives (Ofcom, 2015b).

2.5 Future trends

Population projections for the UK (ONS 2015c) suggest that the proportion of older people in the population is set to rise significantly in the coming years, with more than 1 in 12 projected to be aged 80 or over by 2039 (Figure 2). Should existing provisions for the development and maintenance of digital skills remain as they are, then we can fairly expect to see a similarly large growth in the number of people lacking the basic digital skills required to keep up.

Today, older people are becoming increasingly dependent on the use of the internet and social media platforms such as Facebook, Twitter and YouTube, to maintain and enhance their communication needs and aspirations. In addition to this discretional use of digital technology for social and recreational purposes, older users are increasingly finding that they must engage with digital technology to manage all aspects of their daily lives. As services from banking to welfare move away from an 'in person' approach in favour of online, the importance of being able to engage with digital technology will only increase.

One significant example of this will be seen in healthcare and the growth of patient "self-care" practices. Within the NHS, self-care has its roots in the publication Five Year Forward View (October 2014), which identified five "sites" across the NHS to work as a "Test Bed", where different technologies could be used to create innovative new service delivery procedures. A key tenet of this initiative has been about giving patients increased control and responsibility to manage their own health conditions outside the clinical setting. In practice, self-care requires patients to use ICT devices such as diabetic testing monitors or cardiac and sleep apnoea equipment at home. It also requires patients to be able to access provided healthcare websites as information on their condition and its treatment is often no longer provided in the physical form of a leaflet or poster. Given that many patients will be slower adaptors, the education, support and monitoring of their usage of such devices and websites will be critical to success of this planned change.

Whilst NHS England introduced statutory guidance several years ago ("Transforming Participation in Health and Care", The Health and Social Care Act 2012) to support healthcare practitioners in understanding the needs of their patient community and to provide innovative delivery of services, an effective solution for assisting slower adaptors still seems some way off. Evidence to be presented later in this review will show that slower adaptors require a comfortable and benign setting in which they can select and learn about the digitally driven services that are having an increasingly profound impact on their lives. Evidence will also show that this can be achieved through development and enhancement of user-friendly learning environments such as local libraries, parish council offices or community centres where slower adaptors can 'walk in', have access to technical equipment and learn on a need-to-know basis. With respect to healthcare this could be the key to enabling the individual user to manage their particular medical condition at home, meaning fewer visits to the GP and/or hospital and a more positive outcome for the patient.

As society moves at an accelerating rate towards a self-care regime in which digital technology plays a pivotal role, there needs to be realistic and relevant support given to the slower adaptors

of our community to successfully negotiate and manage their needs. Government, healthcare, businesses, communities, and user groups need to be able to work together to understand and relate to user needs on all levels.
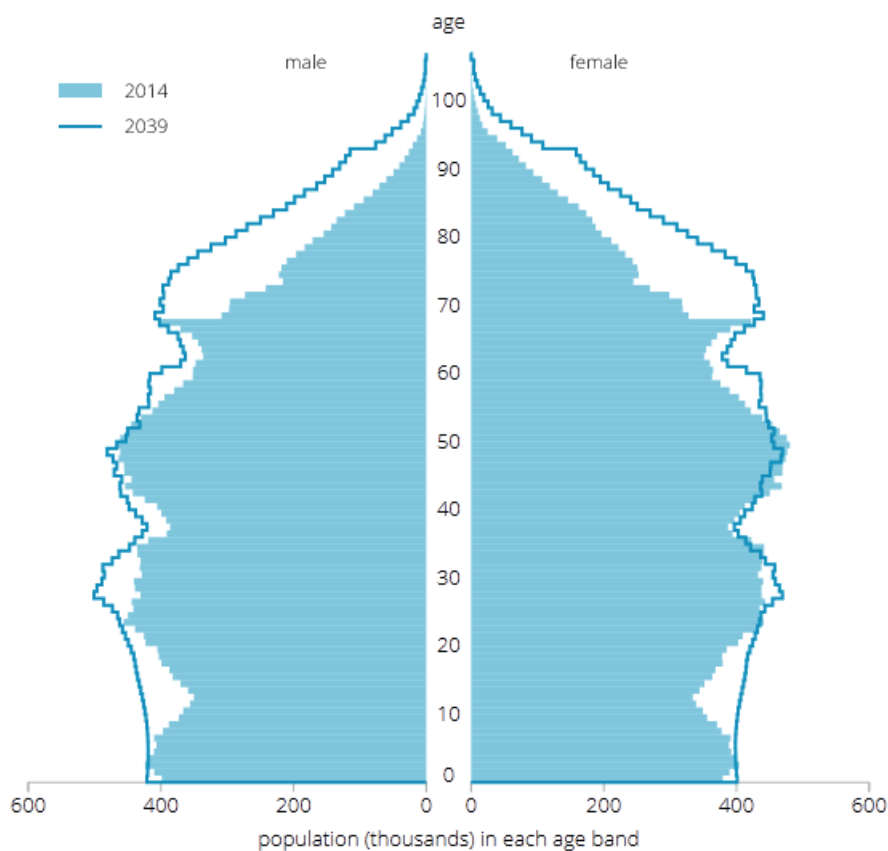
Figure 2: Age structure of UK population, mid-2014 and mid-2039. Figure taken with permission from ONS 2015c.

3. The impact of ageing on digital participation in later life

3.1 Introduction

Older people form the largest group of slower adaptors (some 5.3 million older adults in the UK have *never* used the internet (ONS, 2016). Further, of those who do succeed in going online, those aged 75 and over have the **highest** rate of **lapsed** internet usage in 2016 *(4.8%, compared with 0.2% of adults aged 16 to 24 years.* To arrive at informed answers to the key question of this review i.e. 'How could slower adaptors to changes in technology be equipped to develop and maintain digital skills?' requires exploration and understanding of the reasons for the high incidence of non-users and lapsed users among older people.

Research surveys and studies of the limited uptake and use of digital technologies by older people frequently identify a range of barriers relating to primarily social/attitudinal aspects (Ofcom, 2016). In addition to these barriers, there are a number which are associated with normal age-related changes in cognition, vision, motor function, and hearing. This section of the review considers each these barriers and indicates how to mitigate the effects of the more pervasive ones:

3.2 Cognitive changes

Cognitive changes to fluid intelligence (i.e., processing speed and working memory) resulting from normal ageing have important implications for use of digital technologies and for the workplace. For example, these changes can result in individuals losing their location on screen or experiencing navigational difficulties in websites or interfaces. This may mean that searches take longer than would be the case for younger users (Chadwick-Dias, McNulty and Tullis 2002; Meyer et al., 1997; Czaja and Lee, 2007). Cognitive changes can also affect performance in other ways. For example, visual 'clutter' and extraneous information on the screen can impede the ability of older people to navigate a webpage (Zaphiris, Ghiawadwala and Mughal, 2005; Hanson and Richards, 2005). Research findings also show that systems with large numbers of features can overwhelm older people (Sayago and Blat, 2010) and impair their performance (see recommendation 1 below).

Particularly relevant to workplace performance generally is that older people typically take longer to complete tasks (Wirtz, Jakobs and Ziefle, 2009; Chadwick-Dias, McNulty and Tullis, 2002). Observation studies have shown that older people are often aware that they make more mistakes when rushed and therefore may use deliberate slowness as an error reduction strategy (Sayago and Blat, 2011).

The impact of the normal ageing processes on cognition means that older people often have difficulties in remembering passwords and (Pilar et al., 2012) sequences of steps and in understanding technical terms (Sayago and Blat, 2011). Taking account of these normal effects of ageing in the organisation of work, in training, in the design of hardware, software and the workplace offers significant benefits such as improved morale and better use of information and communication technologies.

In planning adjustments to the workplace to accommodate older people, their qualities and capabilities should also be recognised. For example, there are areas of cognition

that do not decline with normal ageing, namely, crystallised intelligence, which includes general knowledge, vocabulary, formal reasoning and experience (Horn and Cattell, 1967). Therefore creating opportunities to utilise these transferable skills that older people have developed over the course of their lifetime not only benefits younger members of the workforce but it also promotes recognition and appreciation of older people as assets and active contributors. (There are other attributes that increase with age such as the capacity for empathy which enhances the ability of older people to act as mentors and counsellors potentially benefitting both the work place and wider society).

It is helpful to note that there are areas of cognition that do not decline with normal ageing, namely, crystallised intelligence, which includes general knowledge, vocabulary, formal reasoning and experience (Horn and Cattell, 1967). Therefore, to create a working environment for older people that capitalises on previously learned transferable skills acquired in youth, it is particularly appropriate to allocate to older people tasks which utilise these skills. (see recommendation 3 below) (Other attributes that increase with age include empathy which enhances the ability of older people to act as mentors and counsellors in both working and wider life).

Recommended /remedial actions:

1. *Ensure supported personalisation of commonly used features (for example toolbars and menus) to reduce clutter on the screen.*
2. *Allow longer time for task completion.*
3. *Create opportunities to utilise the skills that older people have built over the course of their lifetime to benefit others and to allow older people to be recognised as assets/contributors.*

3.3 Vision

As a normal part of the ageing process from approximately 40 years of age, sight changes may be experienced with visual acuity and the ability to focus possibly requiring corrective lenses from this time (Hawthorn, 2000). Contrast discrimination declines significantly with age. For example, an older person will need greater contrast text compared to a younger person, they may also need more light to see close objects or discriminate between colours (Lighthouse Guild, 2017). The incidence of diseases such as glaucoma, age-related macular degeneration, cataracts, and diabetic retinopathy which affect vision increases with age. By the age of 75 and over, one in five people have some degree of sight loss (Royal National Institute for the Blind, 2010).

Recommended /remedial action:

Ensure that high contrast text options are available, that extra time is allowed and that magnification and screen reading software (as well as ongoing support to use such software) is available for those who want to use it.

3.4 Motor changes

Motor changes (i.e. strength, reach, speed, stability and fluidity of movement) also affect how older people interact with ICT. Older people can experience issues carrying out mouse-related tasks e.g., problems with dragging and dropping(Kurniawan et al., 2006; Hanson and Crayne 2005). Older people may balance the demands of speed with those of accuracy (Ketcham and Stelmach, 2004) (Chaparro et al., 1999). Touchscreens can also pose a number of barriers to

older people. For example, older people have been found to have difficulties with touchscreen movements including rotating onscreen objects and selecting items (Ketcham and Stelmach, 2004). Other interactions such as timing multiple screen taps (e.g., double taps on a smart phone) and dragging and dropping have also been observed as barriers to interaction (Leonardi et al., 2010; Kobayashi et al., 2011). Similarly, the use of a finger as an input device can mean that smaller targets were missed (Kobayashi et al., 2011). Parallax (i.e. where the object on screen appears in different locations based on the position of the person viewing the screen) also impacts on selection of items on screen (Kobayashi et al., 2011) raising the potential for errors and unintentional selection.

Recommended/remedial action:

Use large icons for easy selection and allow extra time for task completion. Ensure that workstations are adapted to user needs/preferences (i.e. length of time for mouse clicks, mouse speed etc.)

3.5 Hearing changes

Hearing decline is also a part of ageing with over 40% of over 50s having some degree of hearing loss. This rises to over 70% for over 70s (Action on Hearing Loss, 2017). Tinnitus affects about 10% of the adult population (British Tinnitus Association, 2012).

*Recommended /remedial action***:**

Keep background noise to a minimum where verbal communication, thinking and concentration are needed.

3.6 Effects of attitudes, experience and access

Other barriers identified in Damant and Knapp's 2015 review of the likely changes which will impact upon the ability of older adults to use ICT are:

- lack of experience in using ICT at a younger age
- the belief that ICT content is more relevant to younger people, and that using social media can harm traditional forms of social interaction
- the perception of ICT as an expensive luxury which also needs continual costly updates and maintenance
- poor access to adequate broadband (this varies nationally)

Regarding the adoption of digital technologies by slower adaptors to technology there is also a social comparison factor. Older people often do not regard themselves as being disabled and are reluctant to use assistive technologies built into browsers and within operating systems even when they are aware of such technologies (Hanson 2009, Sayago and Blat, 2011). Sometimes this preference is because they wish to appear to be like everyone else and do not want to present themselves as either frail or needing special attention (Sayago and Blat, 2009).

Recommended/remedial action:

> *Understand and respect the choice of older users to either choose or refuse to use assistive technologies. Recognise the likely requirement for help and support where users do decide to use assistive technologies.*

3.7 Side effects of medical treatments

The effects of medicine on cognition and as a consequence on use of digital technologies are known to have a negative impact on performance (Gregor and Dickinson, 2007). "Chemo brain" is the colloquial description of a side effect of chemotherapy which causes memory lapses, slowing of processing speeds and difficulties concentrating (American Cancer Society, 2013) all of which may impair performance. Additionally, where older people have a chronic condition, cognitive decline may interact with the condition in ways that make older people perform very differently from younger people with the same chronic conditions.

> *Recommended /remedial action:*

> *Allow people suffering from chronic conditions extra time and breaks so they can move around to ease their symptoms*

3.8 Interactional effects

Sayago and Blat's (2011) study showed that even when older people were aware of features that helped with declining sight, using the aids caused them problems. For example, increasing font size to improve visibility meant that not all content was visible at the same time, which caused cognitive overload. To overcome these difficulties participants tended to use reading glasses or move closer to the screen rather than using the magnification aids. This kind of behavioural response has significant implications for working in later life. For example, physical side effects resulting from coping strategies to compensate for vision decline may give rise to negative impacts (i.e., shoulder and back pain caused by uncomfortable postures) (Hanson and Richards, 2005). As a consequence, neck and back pain may limit how long impaired individuals can use ICT without a break (Yao et al., 2009).

> *Recommended/remedial action:*

> *Understand the physical limitations of older people with multiple minor impairments and adjust job requirements/arrangements appropriately*

3.9 Overall effect of ageing on performance

The effect of ageing on performance is multifaceted and varies from person to person. However some generalisations can be made. In terms of cognition, the speed of processing information is approximately 26% slower for a person of 60 years of age compared with that of a 20 year old (Ketcham and Stelmach, 2004 cited in Welford, 1984). For movement, the duration of a movement (ranging from simple to complex movements) is between 30-60% longer in older adults compared with that of young adults (Ketcham and Stelmach, 2004 cited Welford 1977). However, the effects of ageing vary greatly depending on the task (Ketcham and Stelmach, 2004). Older/ disabled adults can be categorised in the following three broad groups:

- those, while healthy, have needs different from their younger selves
- those with age-related decline and one or more acquired disabilities
- those with a pre-existing disability who are growing older

(Gregor and Newell, 2001)

While these categories are useful in a broad context, multiple minor difficulties experienced in the course of normal ageing can interact with one another in such a way that creates a functional deficit greater than the sum of their parts (Gregor and Newell, 2001). As minor difficulties are personal and varied, the effect of normal ageing on ICT use will also be variable and personal. This diversity of effects underlines the imperative to consult with the individual regarding the nature of their difficulties and to co-create solutions.

To mitigate the effects of ageing on technology use (and on performance in general), some recommended good practice is depicted in Figure 3 and included in section 6 (Policy implications and recommendations).

Figure 3: Mitigating the effects of ageing on technology use

4. Lifelong learning issues related to the acquisition and maintenance of digital skills

4.1 Introduction

This section describes the role of social networks in adult learning, the digital skills 'learning journey' for adults, including the barriers faced. Further, it examines the user-specified requirements for ICT learning support to make the on-going learning process easier, more rewarding and sustainable. Good practice which has evolved in response to the barriers encountered and a proposition for ICT learning support in the community are also cited.

4.1.2 Role of social networks in adult learning

Lifelong learning expertise encompasses an extensive and ever-growing body of knowledge and understanding of adult learning. The recognition of social networks as facilitators of adult learning is relevant to understanding the required underpinning for the development and maintenance of digital capabilities. The recognition that learning is a social process is relevant and important in achieving the successful participation of slower adaptors in the digital world.

Informal social networks enable and promote learning universally. They enable knowledge exchange processes which for most people are inherent to and integral parts of social interaction and exchange in daily living. Fundamental to successful use of digital technologies are informal knowledge sharing and collaborative problem solving with peers and others.

The concept of communities of learning and of interest reflect the experiential nature of adult learning. Working together, people learn from each other and develop a shared purpose, a common way of thinking and talking and of checking their understanding. All of these attributes promote the confident expectation that help and support will be readily forthcoming when sought from the community. Creating communities of learning/interest to promote digital participation therefore offers a powerful strategy for equipping slower adaptors to develop the confidence and the capability to function successfully in the digital world. This approach is aptly summed up in the following observation:

"We should not consider increasing online presence among older people on its own; it is easier to bring people together as a community and to make using the internet part of that." (Adam Hilmore, conference participant from DWP)

4.1.3 The Learning Journey

For adults, learning digital skills in later life can be daunting and challenging, non-intuitive and requiring effort, time and patience. It is not a one-off exercise but an on-going process necessary to cope with the complexity and rapidly changing nature of technology. Some of the barriers faced by slower adaptors are examined below. While much of the evidence presented here comes from research conducted with older people, many, if not all, the issues identified also apply to those in other groups of slower adaptors to technology.

4.2   Barriers to learning digital skills

Learning across the life course inevitably involves overcoming barriers. In the context of ICT learning, there are not only a multiplicity of barriers to overcome but these will be encountered repeatedly and in ever changing forms as technology itself changes on an ongoing basis, posing new challenges with every update or upgrade. Some of the commonly-experienced barriers facing slower adapters in learning ICT skills are listed below and encapsulated in Figure 4. Typically the barriers to learning to use and sustaining use of ICTs include ***personal and social barriers***; ***barriers to access*** and ***ICT learning support barriers.***

4.2.1 Personal and social barriers

These barriers include fear of digital technologies, the effects of normal ageing on ICT use (described in section 3); negative attitudes and perceptions towards ICT use (e.g., lack of relevance); decline in personal social networks (as a consequence of retirement, unemployment; disability, bereavement or other life-changing event); and cost of access to wi-fi, technological devices and training;

Fear of digital technologies:

Evidence from qualitative research indicates the nature and causes of the fear frequently reported by both novice and experienced users. The data show the fear to be pervasive and associated with many aspects of ICT use including the following:

- making mistakes which could have serious consequences;
- use of ICTs where support will not be readily available when difficulties arise;
- identity theft, scams and illegitimate websites;
- sudden, unexpected and unwanted 'pop-ups' and error messages which are reported variously as 'confusing', 'annoying', 'upsetting' ,'distracting';
- lack of confidence in installing and updating software (updates are often seen as baffling, unwanted, unwelcome and threatening disruptions to on-going task performance);
- the challenge and associated anxiety of mastering new skills resulting from frequently occurring technical changes such as 'upgrades' to operating systems.

(Sandhu, Damodaran and Ramondt, 2013; Olphert, Damodaran and Sandhu, 2013)

The fears felt by many slower adaptors may be exacerbated by their relatively limited range of digital capability, sometimes characterised as 'narrow' skills (Ofcom, 2015a). One consequence of this is that the user often lacks knowledge of how to be secure and protect themselves against identity theft and other scams.

Negative attitudes and perceptions of ICT use:

Studies and surveys frequently report a lack interest and motivation to use ICTs/the internet (Selwyn et al., 2003; Ofcom, 2015; Oxford Internet Survey, 2016). One of the reasons for this may be that older learners find commonly available skills-based training unsatisfactory. Such

training has usually been designed and developed to increase the employability of younger adults and is therefore not well suited to the needs of slower adaptors. This is borne out by qualitative evidence (Sandhu, Damodaran and Ramondt, 2013; Damodaran and Sandhu, 2016) which indicates that generic training, for example, in the use of Word and Excel or to gain the European Computer Driving Licence is not generally seen by older people as relevant to their needs or interests.

Decline in personal social networks:

Social networks tend to diminish following life events such as retirement, unemployment, illness, disability, bereavement and homelessness. When this occurs it means that the opportunity for everyday learning of new things and for reminders of previously known information and knowledge also diminishes. The lives of many slower adaptors are characterised by poor social networks, making the digital skills learning journey harder for them.

Cost of access to wi-fi, technological devices and training:

Older people and other slower adaptors with constrained incomes find the costs of becoming and staying connected a barrier to digital participation. This is a particular concern for users who need repetition and reminders of their learning and can face fees for repeating a course of instruction.

4.2.2 Access barriers

- poor access to digital technologies and the internet;
- poor access to transport and public buildings (for ICT learning support);

4.2.3   ICT learning support barriers

- Difficulties using online help/automated menus
- ICT Learning support void

Difficulties with Online help/automated menus/instruction manuals:

Survey research and qualitative data revealed difficulties such as navigating through multistep automated help menus, long waiting times, and high associated costs in accessing telephone helplines and online support (Sandhu, Damodaran and Ramondt, 2013; Damodaran, Olphert and Sandhu 2014; Ofcom, 2015a). These difficulties appeared to be major and sometimes insurmountable barriers to accessing support through the use of help lines.

Written documentation also posed problems e.g. some users found manuals 'incomprehensible' while generic 'how to' guides were found to offer limited assistance in solving technical problems (Sandhu, Damodaran and Ramondt, 2013). In addition, both such sources quickly become outdated as technology moves on (ibid). Websites offering online services to answer queries and solve problems which arise in ICT use are frequently seen by the providers as a low cost solution for them to provide in response to users' learning difficulties and support needs. Such 'services' are proliferating – this is despite their poor performance from the users' perspective and the consequential financial costs and frustration caused.

ICT learning support void:

The availability of ICT learning and support provision at home and in the community to meet the requirements articulated by older people is generally poor. A study of ICT learning support provision in seven cities (Sandhu, Damodaran and Ramondt, 2013) revealed this provision was extremely patchy, variable in quality, availability, approach
and content and falling a long way short of meeting the requirements specified. The study also showed that there is far greater emphasis on getting people connected than there is on consolidating their nascent skills and sustaining their digital participation skills beyond the classroom. The most serious deficiency identified in this respect was the scarcity of help with 'troubleshooting' to address such matters as upgrades, connection problems, choice of ISP, and the purchase of ICT devices. This is discussed below (in 4.4.1).

Typically the availability of ICT support in the home or community falls a very long way short of the provision which exists in many workplaces where most, if not all, the prerequisites for ICT use are addressed on behalf of the users and are available free and on demand to the end user. Significantly, *not* being in the workplace means that the end-user is no longer a part of the social network which gives informal access to help and support with many issues, including use of ICT. Without this support infrastructure the end users outside the workplace must fend for themselves or rely on informal support (typically friends and family).

4.3   Facilitators of digital participation

4.3.1 Motivational practice

To increase relevance of digital skills for slower adaptors, giving them opportunities to influence the contents of learning opportunities offered to them, means their needs can be better met and relevance increased. An example of this approach was identified in classes in the Midlands where learners are consulted at the beginning of the course regarding what they would like to learn in the ensuing classes. The contents of the following six weeks of the course are then structured around their interests. Typically these interests include learning how to engage in online communication, search for information, and research family history. A further example of motivational practice was found in the computer classes/club in a community centre where participants were encouraged to 'experiment', 'mess about' and 'play with' technologies to learn about the computer capabilities that were of particular interest to them. Creating this kind of opportunity to learn in an experimental and playful manner was shown to reduce fear and to capture the interests of more adventurous older ICT users (Damodaran and Sandhu, 2016).
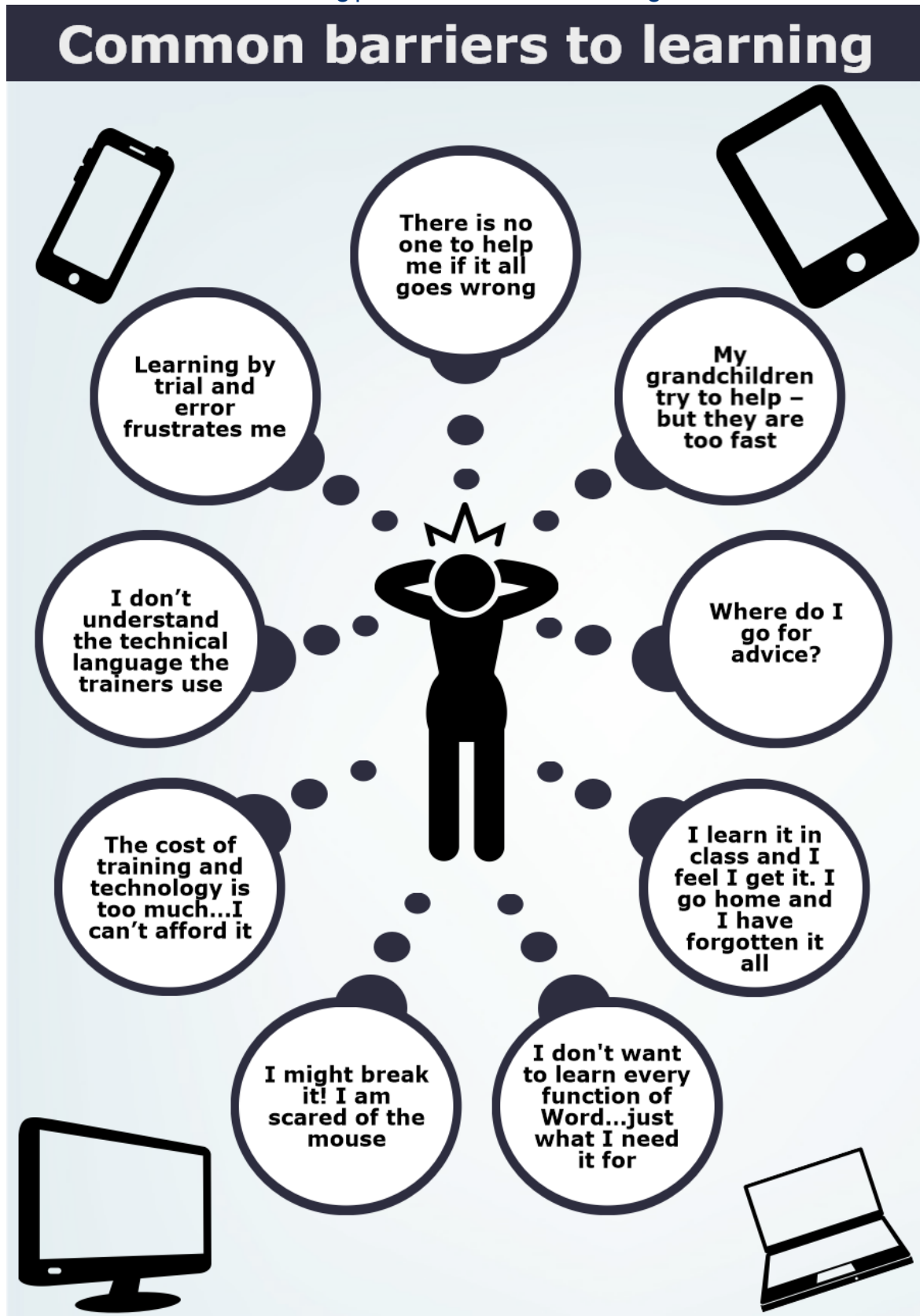
Figure 4: Common barriers to learning

4.3.2 Learning support and 'troubleshooting' assistance in the community

A small but growing number of examples of good practice in providing assistance with ICT issues are evident in the community. These are organised and delivered at grassroots in flourishing learning and support venues which are user-led or co-created with users, and have developed their provision around the interests and needs of local people (Ramondt, Sandhu and Damodaran, 2013). One such example of good practice is provided by the Long Eaton 50+ forum, Derbyshire who provide an effective and compelling combination of structured classes, informal introductory sessions on using laptops and tablets, and, crucially, the availability of informal 'troubleshooting' sessions (Sandhu Damodaran and Ramondt, 2014; Damodaran and Sandhu, 2016). Classes have been running for over 11 years and the drop-in sessions were introduced in 2009 to deal with the myriad baffling problems which arise with digital technologies – free of charge and in a welcoming and relaxed social environment (Damodaran and Sandhu, 2016). This rich portfolio of provision meets the highly varied needs of its diverse members.

Another example of grassroots development and delivery of ICT support in the community is at the Duston Parish Centre in Northamptonshire. At this centre the twice weekly sessions provided for around 30 people have been running for around 10 years. These provide tailored help and learning support in response to users' highly varied needs with desk top computers available for people without a laptop or tablet. There is always a waiting list for places (with waiting time of a few weeks). In addition to giving essential IT support, the sessions also enable and encourage social interaction.

The value of the Long Eaton and Duston ICT support groups is evident from the levels of take up of the service and continued use. Their capacity to offer troubleshooting assistance is crucial in sustaining digital participation for many of their members. It is when something unusual or unfamiliar happens in their interaction with ICTs that they have not encountered before or changes occur in the operating systems, that for many, perhaps most, users, digital engagement comes to a halt – sometimes permanently. This outcome can in most cases be averted –often with just a few minutes of support and help. In recognising and meeting such needs, the groups at Long Eaton and Duston provide an ongoing and effective approach to sustaining digital participation. The needs for accessible, friendly, timely and reassuring ICT support in familiar surroundings ("***trusted faces in familiar places***") at little or no cost to users are met successfully. Enabling everyone to have ready access to ICT learning and support in their locality is analogous to the routine provision of ICT support that is taken for granted in many work organisations.

Both examples of good practice in promoting digital participation meet the following user-specified requirements for ICT support elicited in participative research/co-production with older people (KT-EQUAL, 2012):

- readily available, trusted and sustained
- delivered in familiar, welcoming and local venues
- embedded in social activities / personal interests
- free of time pressure and assessments
- inclusive of problem solving / troubleshooting
- offering impartial advice and 'try before you buy'

4.4 Proposition for ICT learning support in the community

A well-developed proposition for socially embedded IT support to facilitate learning and ongoing digital participation has been published under a creative commons licence (Damodaran and Olphert, 2013). This is based upon collaborative work with a wide range of relevant stakeholders, including older people. It offers a highly flexible model for community-based ICT support venues variously termed clubs, hubs, centres and so on. Typically these use existing community venues, are locally run, address local issues and use local assets. They are often based upon peer support as well as intergenerational exchange, all within a relaxed, social context and with access to professional expertise. There is a strong evidence base for this proposition and extensive validation and development has taken place with relevant stakeholders (Damodaran and Olphert, 2013).

Benefits of community-based ICT support for collaborators and partners:

- provides opportunities for hardware, software and web accessibility designers to evaluate older users' needs and preferences,
- enables trial and test prototypes and products leading to better targeting and improved design of products and services that appeal to the older market and meet the real needs of older people.

The wide ranging benefits of applying the community-support proposition are enjoyed and valued in pockets of good practice. Its application can be expected to reduce digital inequalities for its older citizens and other slower adaptors while meeting the objective of local councils to increase uptake of online services by these groups and to promote self-care. The examples cited suggests that the role of ICT support in the community in empowering citizens to participate in the digital world offers such extensive benefits that it merits consideration as a strategic priority, encouraging the implementation of the proposition on a wider scale, reducing digital inequalities and moving towards the vision of widespread digital inclusion.
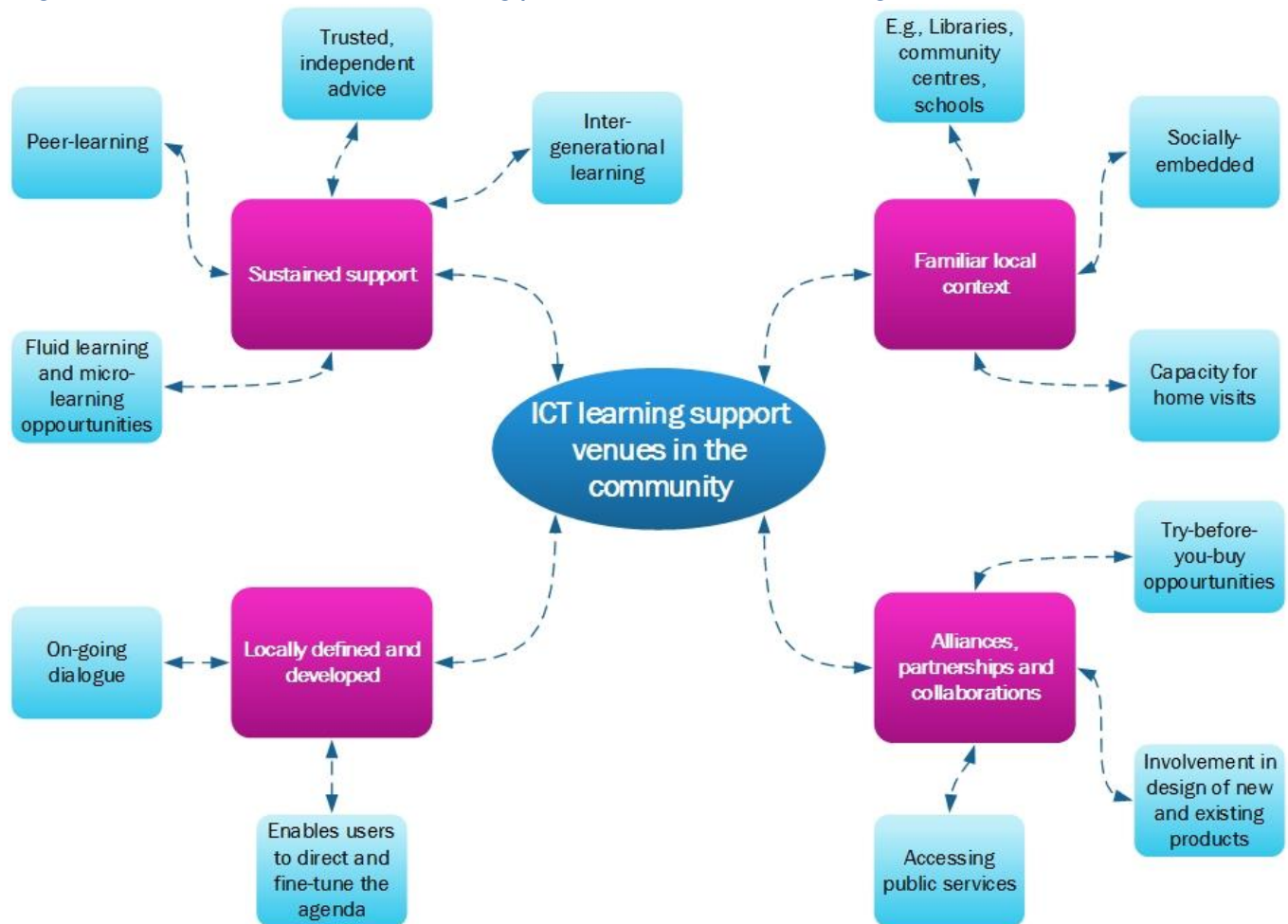
Figure 5: Proposition of ICT learning support in the community. Figure taken with permission from (Damodaran and Sandhu, 2016) © 2016 Inderscience

4.5 Summarising the issues related to acquisition of digital skills across the life course

The evidence presented shows that the ICT skills acquisition and maintenance process, an essential enabler of engagement with the digital world, is highly challenging for many slower adaptors to technology. Typically, novice ICT users face a number of barriers, depicted in the infographic above (figure 4) in the process of learning to use ICTs. Once initial learning barriers are overcome, users encounter further, often unfamiliar, barriers on an ongoing basis in continuing their use of technology in the progression from being a novice to a becoming a more experienced ICT user.

ICT support in the community has emerged as a facilitator of digital participation of slower adaptors through providing easy access to technology in venues offering comfortable, warm, friendly and welcoming environments; opportunities for social networking and informal peer-to-peer support and knowledge sharing; and 'micro-learning' i.e. learning that is focussed upon specific tasks the user wishes to undertake. The teaching styles and learning environments are often informed by user needs and preferences, with paper-based learning support materials available (eg visual aids, 'aide memoires', and guidance notes); help and guidance provided in a non-judgemental manner with patient repetition of instructions and explanations when required, and privacy when assisting a user. Established and trusted on-going relationships with learning providers/helpers/ IT teachers/ peer support are other important attributes.

Digital skills across the lifetime – existing provisions and future challenges

Powerful incentives to overcome the barriers to ICT skills acquisition and maintenance include empowering people in the pursuit of their passions and interests enabled by their use of ICT. Social support in the provision of ICT learning has a crucial part to play in reducing digital inequalities for slower adaptors. Although examples of this in practice are small in number to date, the ICT learning support in the community proposition has the potential to empower most citizens, including slower adaptors, to participate in the digital world and reap the benefits of doing so, reducing digital inequalities and moving towards the vision of widespread digital inclusion.

5. Unlocking the potential: acquiring and sustaining digital capabilities: case studies of user experience

5.1 Introduction

To equip slower adaptors to changes in technology to use the proliferating online services requires strategies that are informed by real user needs, characteristics and experiences. This in turn requires clarity regarding the key processes and practices which bring about the transformation from being a non-user of ICT/the internet to being a participant in the digital world.

The previous section considered lifelong learning of digital skills and the barriers and facilitators involved in their acquisition. In this section ten personal stories describing user experiences are examined. The case studies were collated as evidence for the NDA Sus-IT project (NDA, 2013) using a range of methods (see Damodaran, Olphert and Sandhu, 2013 for further information). Each describes the real life experiences of the individuals (aged between 50 and 84 years) which enabled and empowered them to become active users of ICTs including the internet. The implications of the user experience described in each example are articulated to provide, collectively, important evidence about how slower adaptors can be equipped to use digital technologies for accessing online services. The embedded learning in each example is extracted and documented below to inform policy and practice relating to measures required to equip slower adaptors to participate in the digital world. The case studies therefore serve to inform actual or potential solutions to the research question the review is addressing and these are presented in the next section.

The case studies presented below have been selected to provide descriptions of the stages in the transformation from non-user to active user.

5.2 Case studies

Each case is described briefly and an analysis of the content of the user experience is presented.

Inspiring the breakthrough to digital connection

Case study 1A

Meg and Jill, two women in their 80s and members of a customer panel of their local council participated in a focus group held on behalf of the local authority. The objective of this investigative exercise was to explore how the council might proceed to get older residents to engage with the internet and make use of the council's website. Neither Meg nor Jill had ever used the internet; when asked at the start of the session they were adamant that they never would (and gave reasons relating to their lack of interest in computers, assumed lack of relevance of content to their lives and interests and so on). To identify potential areas of interest and relevance to their lives in the website content, they were asked to each describe a leisure activity that they enjoyed. Meg identified swimming at the council leisure centre as a pastime she enjoyed, and Jill described her interest in live theatre. When shown the council's webpage for the leisure centre on a PC, and subsequently the websites for two local theatre

groups, both women were amazed and expressed their astonishment at what they saw on the screen. When the cause for this surprise was probed by the researcher, the reasons they gave included the discovery that (contrary to their prior expectations) the contents of the sites were presented 'in plain English – just like a newspaper', not in programming language or technical jargon as they might have imagined. They were also surprised to discover that there was information on the website that was very relevant to their interests and to their lives. It was evident from the discussion that ensued between them that they very quickly recognised and appreciated the advantages this access to the internet offered them in saving their time, effort and cost. They were asked at the end of the exercise if this experience of going online meant they would in fact use the council website in future, and they responded that they definitely would do so "if someone was there to help" and "if it was not expensive".

What this user experience tells us:

- Fundamental change in beliefs and intentions about digital technologies and its use can be achieved in a very short time (about 15 minutes in this particular case).
- Misperceptions are quickly corrected through experiential learning (seeing on the screen that text was readable and understandable removed one barrier).
- Face-to-face communication is a crucial component of successful learning support which in this example achieved a critical breakthrough in understanding and willingness to use digital technology.
- Human support is also a crucial facilitator in achieving on-going use by giving inexperienced users confidence that help will be readily available when the inevitable and unfamiliar ICT related problems arise.
- The social nature of the experience is likely to reduce the fear of the unknown and facilitates shared learning.

Overcoming the fear of ICT

Case study 2A
Rosemary aged 63 wanted to learn how to use a computer to keep in touch with her grandchildren who lived far away. Her son gave her a computer, taught her how to switch it on and off and left her to learn by trial and error. She describes one of her very first experiences of using the computer: "*When I first started, a message used to come up, saying you have just done an illegal entry and the computer needs to close down. I shut the windows and closed the curtains because I thought the police were coming*". Rosemary genuinely feared that she had done something illegal and that she would be in trouble with the police. It was only with the help from friends and family who explained the routine use of terms such as 'illegal entry' that Rosemary's fears were alleviated. She learned to understand that the seemingly threatening terms appearing on her computer screen were not being used in a literal way and was then able to laugh at her earlier reactions. Nevertheless, she remained cautious in her use of the computer.

What this user experience tells us:
- Despite living in a technological society, some individuals will start their digital learning journey from a very long way back and learning support needs to take account of this reality.

- Individuals who are socially isolated or whose social contacts are not familiar with digital technologies are likely to lack relevant knowledge and understanding. This can lead to unrealistic fears and concerns about them – and to little knowledge of the potential benefits and advantages they bring.
- Ill-founded fears and concerns can be significant barriers to the adoption and acceptance of digital technologies and be a cause of significant distress and anxiety to potential users, as was the case with Rosemary.
- Rosemary's experience highlights the importance of having access to reassurance and the need for beginner level ICT learning support to include explanation of the puzzling and sometimes threatening terms used routinely in error messages.

Case study 2B

The first two classes of a 12 week introductory course in computer use (offered by a community group for complete novices) showed the learners how to use the keyboard and mouse through playing games which were familiar to them (such as solitaire and chess). Playing games on the computer enabled learners to become accustomed to using a mouse in an enjoyable, 'fun' way. The instructors provided a demonstration and gave learners an easy to understand and jargon free hand-out which guided the learners through how to use the mouse or keyboard to play the games. One-to- one support was then available for those who required it. Many learners commented that this informal way of introducing them to the mouse had 'put them at ease' and taken away the fear of 'breaking the computer'.

What this user experience tells us:

- The importance of friendly and insightful ICT instructors and guides who empathise with ICT novices and develop innovative ways of supporting learning through familiar, enjoyable, and non-threatening activities.
- A social context enables and encourages shared learning.
- Embedding the learning in a social process reduces the fear and makes learning pleasurable.
- Access to one-to-one support provides reassurance and increases the confidence of users that help is available when required.

Getting Started (i.e. learning the essentials: switching on the device, manipulating the mouse, using a touch screen etc.)

Case study 3A

Mike aged 63, a widower living alone had begun to learn how to use a computer through a 6 week beginner's course tailored for people without prior experience of using ICTs held at his local library. With patient one-to-one help when needed he became confident in doing the essential, very basic, tasks such as switching the computer on and off, using a mouse and keyboard and using Google to search for information. Mike learned how to do these tasks through practical demonstrations from the trainer and repetition of basic steps.

What this user experience tells us:

- Supporting an isolated individual in his decision to take steps to develop his digital capabilities is a powerful motivator and therefore effective facilitator of digital participation.
- A sympathetic, supportive manner and ready availability to provide one-to-one assistance gives reassurance, grows confidence and promotes learning.
- A familiar and accessible venue encourages attendance and participation.

- One-to-one help and support are especially important for those taking their first tentative and fearful steps into the digital world.

Extending and applying digital capabilities

Case study 4A

Mike (see above) was very interested in locating friends from his secondary school days and therefore was keen to learn how to use email and social networking sites to enable him to do this. Following Mike's attendance at the introductory course at his local library (see 'Getting Started' paragraph above) he was helped with one-to-one support from a volunteer tutor to set up an email address and learnt how to send and receive emails. With the help of his granddaughter, Mike then set up a Facebook account and was able to locate one of his former classmates. Overjoyed at re-establishing contact, he has since stayed in frequent contact through social media and has received photos of his old school and class photos from his friend via email. This valued social interaction with people important to him has enriched his quality of life significantly and reduced his isolation and loneliness in a way that is important and relevant to him.

What this user experience tells us:
- Empowering people to follow their passions is a very powerful motivator to invest time and effort in learning, developing and applying digital skills.
- Social support from family (in Mike's case his granddaughter) is a crucial enabler/facilitator of sustained digital participation.
- Digital participation promotes social inclusion by extending and strengthening social networks, in this case, renewing important relationships from Mike's past /combats loneliness.

Case study 4B

Rosalind aged 63 learnt how to use a computer through a beginner's course, delivered by a local charity. However her progress in consolidating and developing her digital skills was hindered by the fact that funding for the courses she attended was often withdrawn leaving Rosalind without the vital support she needed to maintain her digital skills. Rosalind was put in touch with a national charity who offered courses for older people at both beginner and intermediate levels. Through attending these classes, Rosalind was able to consolidate her ICT skills and felt confident in using the computer – particularly as she knew troubleshooting support was available from qualified trainers and volunteers for the duration of the course. Rosalind loves keeping in touch with people. The new skills Rosalind learnt at the classes offered by the national charity was to write, save and letters and to send and receive emails enabled her to pursue this interest. For writing letters she now uses a computer and finds it, 'very very useful'. She writes regularly to certain people and can follow their correspondence. Being able to use email is especially important to Rosalind in enabling her to keep in touch with her granddaughter, who got a job working on a Caribbean cruise ship. As it was her granddaughter's first experience of being away from home, Rosalind was worried about her and wanted to be in regular contact. E-mails enable Rosalind and her granddaughter to stay in close touch and they both value immensely the frequent communication they enjoy which is only made possible through digital technologies.

What this user experience tells us:

- Continuity of ICT learning support is a prerequisite for consolidation and development of digital skills.

- Motivation to learn and develop digital skills comes from having a real-life problem (in this case how to communicate and maintain contact with a geographically distant grandchild) which can only be solved through using digital technologies (e.g. use of email to reach her grandchild away at sea).
- Pursuit of a passion (for letter-writing in this case) enabled by digital technologies is a powerful motivator for technology adoption and the investment of time and effort in the process.

Case study 4C

Kay, a wheelchair user aged 54, who lives with chronic pain reported feeling depressed and out of touch, that she had lost her dignity and self-respect and felt failed by the system. She had no computer or internet experience, and the formal training available did not meet her learning needs. Through joining a group set up of the objective to reduce social exclusion, Kay realised that her need and strong desire to communicate meant that she really wanted to learn relevant digital skills which would enable her to do this. Years of social exclusion had led to lack of confidence; fear of breaking the computer and not knowing who to ask for help if she got stuck. She was assessed by a specialist ICT support team in the local council (Leicestershire CareOnline). To meet the needs identified, she was given a recycled laptop free of charge and was provided with support and encouragement and one-to-one tuition in using email, the internet, word processing and Skype. Using the skills she mastered through a sensitively supported process, Kay was able to teach herself to use a range of other applications, with the continued support from the council service. The result was that she felt able to manage her life again, accessing benefits and services, do online shopping and access information. She felt better off financially and emotionally, and felt, at last, able to be "part of something". She told Leicestershire CareOnline staff, "It's changed my whole life. I feel valued and I feel confident... it's improved my life so much."

What this user experience tells us:

- Profoundly transformational change in quality of life can be achieved for even the most severely disadvantaged individuals through appropriately supported use of digital technologies.
- Tailored one-to-one support delivered by specialist staff who are knowledgeable about disability and associated characteristics such as lack of confidence, social isolation and impact of chronic pain is the key to achieving and sustaining digital participation.
- Sustained on-going support (encompassing ICT 'trouble-shooting') is essential to sustain digital participation beyond initial skills development.

Case study 4D

Alana, aged 62, is single and the carer for her mother who suffers from dementia and requires full-time care. Alana was a confident and highly competent computer user when she worked for the Police. When she left work to care for her mother full time, she lost the knowledge and skills to use technology as it advanced and as a result, her confidence in continuing ICT use declined significantly. She wished she had 'kept going' because she needed to use on-line services to find appropriate care for her mother in order to get some respite and possibly go on holiday. She was however fearful of sharing her personal details and conducting transactions online and simply did not know how to access information about holiday respite care. She was assessed by the specialised Leicestershire CareOnline service, and then loaned an iPad and given six one – to – one training sessions which covered internet use, being safe online and looking for and managing information (e.g. flights, holidays, respite care homes). As a result she has been able to gain respite care, conduct research on flights to Spain and make on-line hotel bookings enabling her to attend her niece's wedding. Alana continues to receive ICT learning support including troubleshooting assistance from Leicestershire OnLine Care staff when she needs it.

What this user experience tells us:

- A history of successful use of digital technologies does not necessarily mean this continues beyond the workplace and into retirement.
- The dearth of ICT learning support beyond the workplace can lead to ICT use lapsing, as it did for Alana in this case.
- Restoring provision of ICT learning support, empowered Alana to re-gain confidence and update her digital capabilities to manage many aspects of her life through use of digital technologies, enabling her to participate in family/social life and to travel.

Case study 4E - Developing digital capabilities: to sustain participation in the workplace
Simon, a maintenance worker aged 50, took his new digital notebook into his local Community Managed Library computer support group. He had been given the device at work and informed he must now use it to manage emails, timesheets and work records. Simon had only used social media and local news services on his PC at home previously. No ICT learning support was offered by the employer and Simon had been too embarrassed to explain that he had never used one before. He was also reluctant to reveal a lack of knowledge and skill that he feared could be seen as a failing which could be documented as evidence of poor performance in his next staff appraisal. A volunteer at the library was able to show him how to find his emails in Outlook, use the contacts list to send emails, and how to fill in records in Word and Excel. He was further reassured that he could call in to any of the evening ICT sessions if he needed further support at any stage. He expressed his appreciation of this and explained that he was concerned that if he asked his work colleagues or manager for help he would risk being seen as lacking competence and therefore vulnerable to losing his job.

What this user experience tells us:

- ICT skills development needs are not only an issue or problem for retired people.
- Well-resourced employing organisations do not necessarily meet the needs of older workers for ICT learning support.
- Community provision of ICT learning support can serve to promote digital participation of people in work as well as those who are not in employment.

Case study 4F: Developing digital capabilities: to become economically active outside the workplace
Ian, aged 59, had run a family cabinet making business over many years. His business partner with digital skills did all the computer-related work for the business. As a result of a severe stroke, Ian ceased to be able to do the manual precision tasks required in cabinet making and the business had to close. Nor could he continue with his main hobbies of riding a motorcycle and doing photography. Ian had never used a computer, but after the stroke he learnt, with sympathetic and extensive help from family members, how to use a digital camera and a laptop which was gifted to him. He is now able to take digital photographs, view and manipulate them on his laptop. With the help of his daughter and a willing friend in managing sales and purchases, Ian is able to use the photographs to trade motorcycle parts on eBay. This has enabled him to generate a form of income. Learning digital skills has meant that Ian is now economically independent, is therefore not reliant on the State for an income and does not claim benefits. Additionally he has been empowered to re-engage with his hobbies. He would like to learn how to do more on the laptop if he was able to get to a local drop-in session for further ICT learning support.

What this user experience tells us:

- Major life events, such as stroke, frequently cause significant deleterious change in many, if not all, areas of life – including the capacity to be economically active.
- By developing appropriate/relevant digital capabilities, new ways of becoming economically active are opened up (in this case removing dependence on welfare benefits).
- Capitalising on new digitally enabled opportunities requires help and support to be readily available at home or in the community – in this case Ian's ICT learning support needs are met almost entirely by close family and friends. To be sustainable in the long run, accessible and affordable help in the community is likely to be required.

Evidence of the critical role of available and accessible 'troubleshooting' assistance

All ICT users require on-going ICT learning support, including 'troubleshooting' assistance to enable them to become and to remain users of the internet and ICTs. Such support and assistance is regarded by both older and disabled ICT users as essential in sustaining their on-going use of technologies, boosting capability and confidence. Help is often needed to learn how to carry out essential 'housekeeping' tasks such as installing software updates and deleting 'apps' and data to free up storage space. These tasks often baffle both experienced and novice users. Drop-in sessions are an effective means of providing troubleshooting assistance and informal learning opportunities to deal with such problems (Damodaran and Sandhu, 2016). Immediate benefits include the successful resolution of what are often major insurmountable stumbling blocks for the non-expert user. Some examples of troubleshooting issues addressed at an informal 'drop-in' session run weekly by a 50+ older people's forum based in the Midlands are presented below:

Case study 5A
Thom aged 72, learnt basic digital skills (sending/receiving emails, using word and searching and managing information) using his own laptop at the drop in sessions offered by the 50+ forum. He found it very important in sustaining and extending these skills to attend the 'Drop In' sessions offered by the forum to provide on-going learning opportunities and ICT troubleshooting assistance. They enabled him to consolidate the skills he had learnt in the beginner's classes and address his short term memory limitations by reminding him of the sequence of steps involved in tasks he had learned. The sessions also enabled him to extend his digital capabilities to overcome barriers posed by the array of ICT-related problems that crop up unpredictably. For example, on one occasion, he was delighted and relieved to be able to gain immediate and rapid assistance in resolving an IT problem which was trivial in itself but an insurmountable hurdle for him to overcome: Thom had accidentally pressed some keys which changed the settings on his laptop to high contrast (resulting in a black background with white writing) which made it very difficult to read. He had continued to use his laptop (with considerable difficulty) and thought he had done irreversible damage. He believed that to resolve the issue would be to buy another laptop. Faced with this possibility and the associated cost, he said he had been on the verge of giving up ICT use completely.

Case study 5B
Sharon aged 63, learnt basic digital skills whilst employed as a teacher. She uses the internet regularly to access the news and weather reports and bus and train timetables. She also uses the Internet to shop online for her groceries. Sharon describes herself as being fairly confident in using technology and is able to troubleshoot ICT issues through trial and error. However, she struggles to use the laptop when she is not able to resolve technical issues successfully and cannot access timely support. For example, on one occasion, Sharon found herself bombarded

with pop ups, some of which were offensive and distressing. In the absence of support from family members, Sharon was not able to resolve this problem and stopped using the internet. She sought help to deal with the pop-ups at a drop-in session at her local 50+ Forum. A volunteer trainer showed her how to make use of the pop-up blocker incorporated in the antivirus software already installed on her laptop. This assistance enabled her to resume use of the Internet, freed from the intrusive pop-ups.

What these user experiences tells us:
- Both novice and experienced users encounter technical issues, which requires timely troubleshooting support and assistance
- In the absence of troubleshooting support users either continue use of their computers with considerable difficulty or were unable to use their computer.
- Drop-in sessions provide an invaluable source of troubleshooting support

5.3 Summarising the evidence from user experience

The examples presented above illustrate the varied pathways followed and the range of outcomes achieved by the individuals involved. The documented outcomes for these individuals included retaining employment, becoming economically active through selling products/services through a website; closer links with family; a wider social network; and pursuit of valued hobbies and interests.

The examples given above of user experience of the stages of transformation from non-user to active ICT user. The transformation process typically begins with an experience that inspires a breakthrough and is followed by overcoming fear of the technology and then by practical experience of getting started with using an ICT device of some kind. These initial three stages characterise the first phase of transformation for most, if not all slower adaptors. Beyond this 'lift off' moment, numerous possibilities and alternative pathways arise. The key steps involved in unlocking the potential of slower adaptors in the development and maintenance of digital capabilities are depicted in Figure 6.

The case studies provide crucial insights in to the circumstances in which slower adaptors thrive and become enthusiastic and committed users of digital technologies who make use of online services to achieve their goals. The evidence from case studies demonstrates:

- that new insights, ideas, opportunities, relationships, and significant life events prompt individuals to learn how to do something new and to extend their horizons in the digital world, encouraged by the availability of support in the use of digital technologies.
- that some ICT 'converts' become technology enthusiasts who continue to develop their digital skills (especially if they are driven by a particular passion, the pursuit of which is empowered and enriched by use of ICTs);
- outcomes for all of the individuals involved includes improved quality of life as a result of their capability to use online services;
- approaches and conditions which facilitate transformation and those which are barriers to it. Facilitators include human support and companionship, appropriate teaching styles, patient guidance and reassurance;
- slower adaptors have clear ICT learning support needs. These include the strong preference for learning support activities to take place in a welcoming, local, accessible and user friendly

environment in which learning opportunities are embedded in purposeful and enjoyable activities, achieving objectives that matter to the person involved;

- the importance of vibrant social networks to compensate for the decline in former networks which retirement, unemployment, illness, disability, bereavement and homelessness;

- the strategies and solutions which succeed are those which unlock potential (by reducing barriers), enabling and empowering slower adaptors to progress and thrive in the digital world.
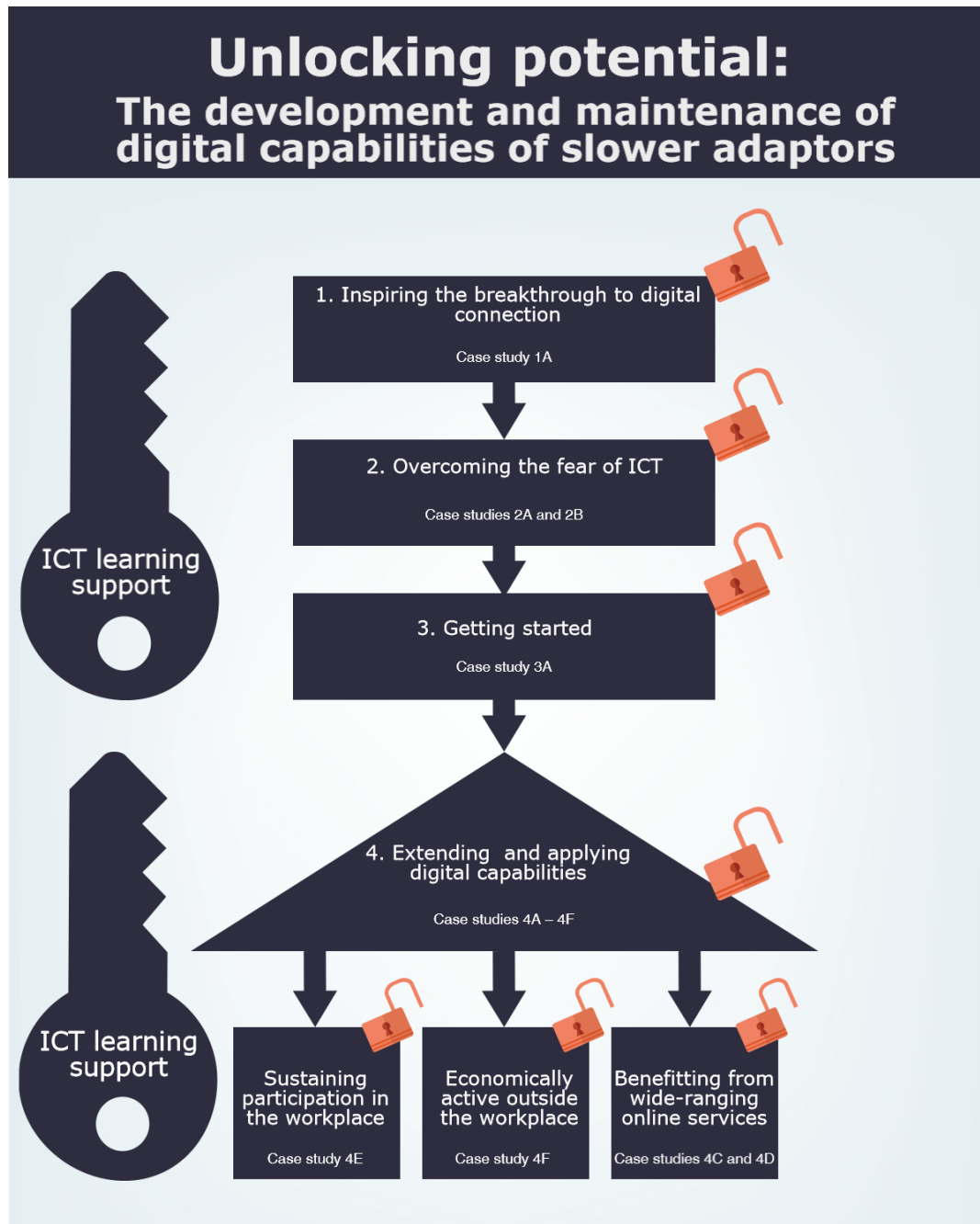
Figure 6: Unlocking potential – the development and maintenance of digital capabilities of slower adaptors

6. Policy implications and recommendations

6.1 The evidence

This review has addressed the question "How could slower adaptors to changes in technology be equipped to develop and maintain digital skills for the increasing proliferation of online services and the future workplace. It has examined the evidence relating to the prevailing and future trends, the impact of normal ageing on the use of digital technologies, lifelong learning issues, and experiences of slower adaptors as ICT users. The evidence has provided us with the following:

1. User-specified ICT learning support requirements for the digital participation of slower adaptors.
2. Knowledge and understanding of the barriers to digital participation – in particular
     (i) the impact of normal ageing on use of digital technologies and
     (ii) the void in ICT learning support for slower adaptors.
3. Examples of good practice in equipping slower adaptors to develop and maintain digital participation.
4. A well-developed proposition to deliver ICT learning support in the community to fill the void identified.

6.2 Policy Implications

The review provides compelling evidence that ICT learning support is critical for slower adaptors to thrive in the digital world. There is a significant opportunity to increase the acquisition and maintenance of digital capabilities by them through provision of widespread ICT learning support in the community which meets the user-specified requirements listed in section 4.

Bearing in mind that there is extensive crossover of characteristics and needs of people who are older, disabled, in social housing or are NEETs, a common policy framework may be used to meet the lifelong learning needs of slower adaptors. Such a framework will encompass the uptake and on-going use of digital technologies in the workplace, in the community and at home. Policy formulation is expected to yield significant benefits to individuals, communities, and to the economy and to wider society.

Some of the issues relevant to formulating such policy are identified below.

6.2.1 Enabling and empowering start-up of ICT support in the community

The evidence shows that grassroots local initiatives start small, building on their own networks, friends and neighbours and also engaging some readymade local groups and organisations such as carers' groups and older people's forums. They can recruit volunteers who have the expertise and shared interest; they can find free accommodation and maintain informal, social groups that respond to needs as they arise. It is likely that some of the older people attending will themselves become volunteers.

Central and local government have significant roles to play in encouraging these start-up activities, for example, in supporting and enabling libraries to offer ICT learning support beyond their statutory responsibilities. Beyond start-up, the role of government continues to be important as grassroots groups face challenges in sustaining the ICT provision they seek to provide. Funding can be difficult to access, require particular skills in the process of application,

and often comes with substantial demands for data collection and continuous assessment of outcomes. The demands of meeting such requirements are out of all proportion to the abilities and capacities of groups – and often not appropriate to their aims and objectives. Similarly, it may be beyond small, informal local groups to maintain an overview of resources (what is available and how the grassroots level can gain access to them and make best use of them).

The inspiring and exciting examples cited in section 4 of successful practice in attaining and sustaining digital participation of slower adaptors offer a low cost and sustainable model which can be replicated widely. These examples demonstrate the successful 'buy in' of older people to digital participation through an alliance between them and local government to provide, shape and manage the infrastructure. Local councils are uniquely well positioned to participate in such collaborations as they have a presence across the country with premises such as public libraries where ICT support can be delivered in a venue which is comfortable and familiar to many older people. Empowered in this way, many older people (and other slower adaptors) will succeed in attaining the wide-ranging rewards and benefits that digital technology offers, reaping financial advantages, enjoying enhanced communication, and prolonging their autonomy and independence".

A key issue for strategic policy makers or service providers therefore is how to develop policy and practice to bridge the gap. The incentive to do this is the recognition that empowering older people (and other slower adaptors who are similarly unable to access services online and therefore marginalised) brings benefits for the policy /service as well as for the digital economy and wider society.

How to mediate between the two levels presents a challenge because local groups at the grassroots need support, but not an overly bureaucratic procedure to which they must conform. Any system that can mediate successfully between the levels needs to avoid these pitfalls, enabling activity, while stepping back and not requiring specific approaches nor demanding labour intensive monitoring or evaluation of outcomes.

6.2.2. Achieving sustainability of ICT learning support

For ICT support in the community to be delivered and sustained successfully, collaborations and partnerships involving a wide range of stakeholders (– including the end-users, community groups, universities and schools, national government, local councils, business, policy makers; and third sector organisations) are vital.

To achieve sustainability, partnerships, innovative funding models and a range of different revenue streams are an essential part of widespread implementation of community-based ICT support provision. Relationships with potential partners and collaborators can attract contributions from local people and local companies. In addition, developing and nurturing such relationships ensures the support is on-going. For instance, free accommodation with Wi-Fi provision can be made available through local libraries, and collaboration with colleges, universities and schools. Other in-kind assistance such as donated computers/tablets etc. may be available from local businesses and organisations. In particular, developing relationships with these organisations may yield fruitful long term support, for example, through corporate social responsibility (CSR) schemes, internships and so on. Partnerships and collaborations with NVCS, local volunteer forums, schools, colleges and informal social groups can foster the development of a network of volunteers with digital skills who assist in supporting learners. The example of successful ICT support in the community at Long Eaton 50+ forum in Derbyshire (section 4) demonstrates these kinds of links and partnerships in active and on-going practice.

Many stakeholders both nationally and locally will have business interests which would be served by investing in community-based ICT support. Banks, retailers (such as supermarkets and mobile phone/computer companies), product developers, local and central government and many others will all benefit from more people becoming competent and confident in operating online. Setting up appropriate community-based support therefore offers a way of achieving the objective of greater digital participation across society. It also has the potential to benefit such businesses by providing a platform for retailers and service providers to demonstrate their online services, provide information and support, build capability in the older population, encourage customer loyalty and develop user engagement.

6.2.3 Role of 'grassroots' in provision of ICT learning support

Grassroots involvement and leadership in the provision of ICT learning support in the community is shown by the evidence to be important for success, for example in community-managed libraries, as in Long Eaton (section 4). Local initiatives, such as those cited in Duston and in Long Eaton, are founded on the goal to help others to join the digital world. Grounds for action for them include issues of justice and inclusion, including access to information and ease of application to statutory services; apparent local interest and demand; the social value of groups that bring people together around a common interest, and combat loneliness, boredom and isolation; instrumental, based on evidence that people who have control over their lives experience better health and maintain themselves in their own homes (this is a public health issue that brings savings for the NHS)

Engaging the community in co-design, specification and decision making is part of the process necessary to set up local community venues, clubs or hubs to support ICT use. Grassroots provision meets the needs for accessible, friendly, timely and reassuring ICT support in familiar surroundings ("***trusted faces in familiar places***") at little or no cost to users. Indeed, enabling everyone to have ready access to ICT learning and support in their locality is analogous to the routine provision of ICT support that is taken for granted in many work organisations.

The examples of successful grassroots practice given in section 4 in attaining and sustaining digital participation offer a low cost, low risk and sustainable model which could be replicated widely. The examples demonstrate the successful 'buy in' of older people to digital participation through an alliance between them, local government and other local stakeholders to provide, shape and manage the infrastructure, delivering ICT support which is well-received by its users.

Successful grassroots provision of ICT support in the community is characterised by the following features:

- user-led or co-developed with users,
- locally run and responsive to local needs and local assets,
- engaging multiple stakeholders
- accommodating diversity
- an age-friendly culture and practices based on experience and empathy
- sustainable and on-going

6.2.4 Promoting Digital by Choice

Research findings presented in this review suggest that once slower adaptors start doing what matters to them, enabled by their use of ICTs, they experience first-hand the advantages, such as ease of use, saving time and cost. As a consequence they are more likely to be motivated to

extend their participation in the digital world to encompass other tasks and activities. In other words, the evidence suggests that enjoyment of a satisfying user experience with ICT encourages people to extend their digital participation and to progress to being 'digital by choice' in other areas of their lives – including accessing government and other services on-line. To achieve 'digital by choice' by slower adaptors requires policies which promote a user-centred design approach. Fundamental to such an approach is the active involvement of users in design and decision making. The benefits of user-centred design are well-established and include the advantages of improved interface design (e.g., which result from a co-design process where users evaluate prototypes as an integral part of iterative design). Other benefits include changes in practice such as increased availability of face-to-face ICT support in a social setting. This would increase the numbers of slower adaptors migrating to using digital by choice as a consequence of their confidence that help would be readily available when they required it.

Further, the implementation of comparable changes in business policies and practices to meet user-specified needs in the design, delivery and support of products, systems and services will enhance capacity to meet the needs of the growing market of older consumers worldwide. This opens the way for businesses to reap significant financial rewards, while also enhancing the lives of many slower adaptors.

6.3 Recommendations

A number of specific recommendations to help slower adaptors to cope with digital technologies in the workplace and in their lives are presented below.

Recommendations for the workplace

In the workplace appropriate 'age/disability-friendly' employment policies and practices to accommodate the diverse needs of the workforce will be informed by consideration of age-related changes such as the slower speed of cognitive processing and the limitations of short term memory. These are important in all areas of work performance but are particularly relevant to ICT use.

a) Design of the working environment to take on board accessibility criteria in all areas. Surroundings, equipment and furniture, systems, processes and procedures should all be designed to take into account the effects of age-related capability decline and the limitations imposed by different aspects of disability. For example, provision of documentation appropriate to the age range and to relevant characteristics of employees i.e., language sensitive (reduction of unnecessary jargon), larger font, etc.

b) Design, develop and implement working patterns, practices and procedures which promote effective performance of people with less well-developed digital capabilities. This should include understanding of the need for a slower learning pace, the need for patient repetition of instructions, and the use of carefully tailored documentation to meet user need, including clear graphical guides (using the same computer and equipment as the learner).

For older/disabled people and for those with limiting medical conditions take account of the following:
- age-appropriate scheduling and performance criteria
- recognition of how changes in health and side effects of medical treatments may impact on performance e.g., appropriately adjust time allowed for task completion, frequency of rest breaks away from workstations, and so on.
-

*Recommendations for **all** ICT learning support venues*

c) Informed selection of accessible hardware and software
   - design which accommodates motor and sensory needs in both the physical and ICT environment e.g. reduction in noise, availability of high contrast settings, large, well-spaced icons for touchscreens etc.
   - provision of awareness training for ICT and other staff on the barriers to and uptake of assistive technologies

d) Education of learning providers (staff trainers and volunteers)
   - provision of awareness training to promote understanding of the impact of multiple minor conditions as well as chronic pain, medications and physiological changes associated with ageing

e) Promote understanding of the principles of digital inclusion and extend diversity training for all staff in organisations using digital processes, and providers of community services. This should include awareness of normal ageing effects and their impact on use of digital technologies. As an example this could be achieved by provision of an introductory course in digital inclusion covering such topics as:

   - the context and benefits of digital inclusion
   - common myths relating to digital inclusion
   - age-related changes and the use of technology
   - the role of human / social support
   - the ICT learning journey and 'slower adaptors' learning and support experiences and preferences
   - engaging with 'slower adaptors'
   - community-based ICT support
   - ethical and safeguarding issues

f) Encourage and enable user involvement in design. Older people are often enthusiastic to participate in the design of digital technologies and services to improve the design and better meet their needs (NDA, 2013). This should be encouraged and enabled:
   - in the design or adaptation of the physical and ICT environment
   - user involvement in design activities such as prototyping and product testing

g) Promote the development of strong peer support and social networks to support ICT learning and troubleshooting.

Recommendations for ICT learning support in the community

h) Ensure access to technology, learning venue, premises and facilities, comfortable, warm, friendly and welcoming environments e.g., armchairs rather than 'workstations', refreshments; provision of opportunities for social networking and informal learning; enable 'micro-learning'; teaching styles and learning environments which are informed by user characteristics and preferences; paper-based learning support materials (e.g. visual aids, aide memoires, and notes); guidance for dealing with upgrades, patient, non-judgemental, repetition of instructions and privacy while learning with peer/IT trainer support; established and trusted on-going relationships with learning providers/helpers/ 'IT teacher'/ peer support.

i) Development of appropriate learning opportunities, strategies and training methods are characterised by the following features (RNIB, 2012; NDA, 2013):
   - Support tailored to individuals

- Using participants' own devices
- Awareness of options/costs of hardware/software/connections, including accessible solutions
- Technical support at set up and beyond
- Adjusted/accessible technology/software
- Peer support (e.g. through local groups, radio, podcasts)
- Basic training, e.g. on access technology
- A variety of methods to meet different learning needs, e.g.:
  - face-to-face, 1-2-1 and in groups
  - peer support
  - printed reference materials
- Hands-on demonstrations are effective and encourage others

The policy implications and recommendations presented here are a small sample or sub-set of the wide range of potential actions and guidance which arise from the extensive evidence collected for this review. They are selected as important potential 'game-changers' in the approach taken to equipping slower adaptors to develop digital capabilities for a) the increasing proliferation of online services and b) the future workplace. They offer a pathway to realising the vision of Digital Britain in the 21st century.

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