E-learning and over 60s: designing for accessibility and digital inclusion.

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Dr Shirley Evans – Jisc TechDis.

Dr Shailey Minocha – Centre for Research in Computing, The Open University, UK.

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Overview

- Background and context to project.
- Terminology.
- Non-physical and physical characteristics.
- Demand for e-learning by over 60s.
- Incidence and implications of age-related difficulties.
- Study.
- Discussion.
- Recommendations and conclusion.

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Background

We investigated the role of online social interactions (for example via email, Skype, Flickr, or Facebook) in supporting people aged 65 or over to sustain or even improve quality of life and well-being by avoiding or overcoming social isolation.[1]

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Context

- 1985: over 65s were 15% of UK's population; 2010: 17%; 2035: 23%.

- 5.7m have never used the internet out of the 10.3m people aged 65 or over.[2]

- Diminishing print resources of information – local council, local news, travel, interests/hobbies.

- Digital by default.

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Previous investigations

- focus on older people (aged 65+)
- their online social interactions
- email, discussions forums, Skype,Twitter, blogs, Facebook
- iPads, smart phones, desktops, laptops

Previous findings

- In our empirical investigations with older people, the accessibility, usability and safety aspects of online environments were identified as being the key obstacles in their online engagement and positive user experience.

- In essence older people may experience age related difficulties which are like (and may indeed overlap with) disabilities but these may be slow in onset, difficult to identify and may be dominated by reduced cognitive ability.

- Difficulties need to be contextualised within the older person's non-physical characteristics such as experience with technology and motivations.

Previous findings

- During our investigations into over 65s online social interactions we identified e-learning as being an important aspect to consider in terms of older people's motivations for engaging with technology.

- As a result we decided to investigate further the extent to what we had learned from the previous project could be applied to e-learning and the implications for designers and providers of e-leaning for older people.

- The W3C (2010)[3] states that age-related difficulties 'overlap with the accessibility needs of people with disabilities.' Whilst we concur with this overlap, simply meeting the accessibility needs of disabled people will not address all of the needs of people aged over 60.

- As Sloan (2006)[4] posits, there is a failure to encourage consideration of context. In any case the W3C, and indeed other guidance, focus is on the design of websites rather than on e-learning.

As younger users become 'older' users, to what extent will we have to re-think teaching and learning, that is, there will be people who have grown up with and adapted to various forms of technology. How do we challenge these people? How do we develop them further? It is an interesting time in online education!

(Workshop participant, 7th March 2013)

Target Group

- In our previous research we used the term 'older people' to describe our target group which was people aged over 65.

- We have also decided to extend the age range to incorporate people aged over 60. It is recognised that is difficult to impose a 'cut-off' for any age group and over 60 covers a 40 year age range .

- Craddock in Aging, Adaption and Accessibility (2012, p. 12)[5] argues that a major obstacle in adoption of technology by older generations is that older uses are wrongly perceived as a homogenous group.

- Some age-related difficulties may begin at a much earlier age for some people.

- Using the terms 'people aged over 60' and 'over 60s.'

E-learning

- Module website with content in a variety of formats – web pages, pdfs audio, video (multi-media).
- Email.
- Social media.
- Discussion boards/forums.
- Wikis.
- Online tutoring/webinar software
- Computer marked assignments
- Electronic assignment submission and collection
- Face to face tutorials
- Online library with e-books and e-journals and a variety of referencing and research tools

In essence it is blended learning (or simply just learning) with a mix of face to face, group work and collaboration and whole range of tools to support it.

When we are talking about e-learning for the purposes of this report we are talking about a system which involves a combination of any or all of the above.

Accessibility, Usability and Online Safety

- Is the interface technically **accessible** – can I access the learning content, for example sign-up, read and contribute?
- Is the interface **usable** - does the e-learning software allow me to read and contribute in a way I can use, understand and learn?
- Is the interface **satisfying** - can I get the real feeling of being a "part" of the learning community/do I feel that the learning is of good quality?

We added another dimension to this:-

- Is the interface **safe** – can I interact with tutors and other students and engage in my learning without fear?

Adapted from BS 8878 Web Accessibility Code of Practice (2010, p.66).[6]

Demand for e-learning by over 60s.

## Older People Engaged in Learning

17% of 65-74 year-olds and 13% of those aged 75+ have taken part in learning in the last three years.[7]

168,000 people aged 60+ in England participated in state-funded learning in 2007-08 (90,000 were adult safeguarded).

80% of those 65+ engaged in learning report that they do so for personal and leisure interests (Age UK, 2013).[2]

Over 60s in HE

No. of students in UK HE aged over 60 [8]
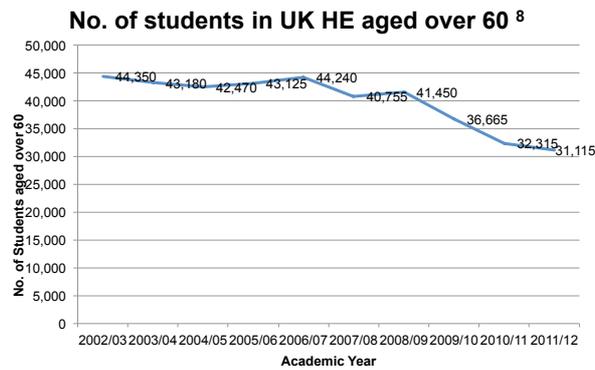
Future demand

- There is an increasing number of older people in general.

- There has been an increase in the number of people working longer. Default retirement age (formerly 65) has been phased out - most people can now work for as long as they want to.

- Some people may not have sufficient income from pensions to their current lifestyle or to do things that they now have time to do.

- People might change careers/direction later in life.

- Older workers value social, psychological and financial benefits of continued employment, organisations dealing with declining number of workers and retirement becoming an outdated concept (Githens, 2007).[9]

- There is an increase in e-learning opportunities such as via Massive Open Online Courses (MOOCs) and the University of the Third Age which are free or relatively inexpensive.

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Non-physical and physical characteristics of over 60s.

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Non-Physical characteristics

- Objectives and motivation for engaging in e-learning

- Experience with technology

- Confidence with technology

- Educational experience

- Support and influence of family and friends

- Flexibility/time

- Income

Craddock in Aging, Adaption and Accessibility (2012, p. 12)[5] argues that a major obstacle in adoption of technology by older generations is that older users are wrongly perceived as a homogenous group.

Physical characteristics

- Deterioration of visual acuity and functioning in low light levels may begin in the mid 40s.
- Hearing loss is common in those over 60, making conversations and instructions harder to distinguish from background noise.
- Aerobic and cardiovascular functions decline with age, and recovery time following exertion increases.
- Musculoskeletal changes lead to reductions in muscle and grip strength, posture and balance.
- Cognitive capacities such as working memory, adaptability to new tasks and problem-solving speed deteriorate after peaking in late 20s.
- Verbal fluency, general knowledge and vocabulary do not decline and may improve if exercised through work.
- Reaction times increase with age but improved accuracy can compensate for loss of speed.[10]

Physical characteristics

In the MyUI project (p. 42)[11] a set of user physical characteristics is put forward as being relevant factors for the design of adaptive interfaces when designing for an older person but which would be equally applicable to the design of e-learning.

Considered physical/motor; sensory; and cognitive characteristics.

For example range for hand strength, dexterity and finger movement the range would be fully able to little or no ability; sometimes with tremor, sometimes use of one hand only, or weak grip.

Cognitive Load

In an ethnographical study of older people using email found that cognitive load is the most significant barrier for older people in online interactions (Sayago and Blat, 2010). [12]

For older adults the primary issue that one needs to consider in designing multimedia learning systems concerns limitations in attention that can arise for processing information presented in different ,modalities and from capacity constraints associated with working memory .

10 guidelines to consider including sensory aspects – do not overload visual and sensory channels simultaneously (Czaja and Shark, 2012, p. 201). [13]

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Summary

The physical and non-physical characteristics set out above will directly or indirectly influence whether or how the older person engages in e-learning.

We are particularly concerned with designing to optimise ease of access and use once the person has decided to engage so that the learning experience is satisfying and enjoyable.

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Incidence of disability/age-related difficulty

- Over the last 25 years the percentage of the population aged 65 and over increased from 15 per cent in 1983 to 16 per cent in 2008, an increase of 1.5 million people in this age group. Over the same period, the percentage of the population aged 16 and under decreased from 21 per cent to 19 per cent.

- By 2033, 23 per cent of the population will be aged 65 and over compared to 18 per cent aged 16 or younger.[14]

- The incidence of disability rises with age. Around 6 per cent of children are disabled, compared to 15 per cent of working age adults and 45 per cent of adults over State Pension age in Great Britain. [15]

- Chappell and Cooke (2013) [16] posit that with increasing age comes increased likelihood of disability and that this is, because as people live longer and do not encounter fatal diseases, their illnesses are chronic instead.

- Currently life expectancy increases by 77 days each year while healthy life expectancy increases by only 49 days. So in the next 20 years the life expectancy for a 20-year-old will, on current trends, increase by 4.2 years but healthy life will increase by only 2.6 years. [17]

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Implications of age-related difficulties

- Age related difficulties may affect a person's ability to engage in e-learning in a number of ways.

- Some people aged over 60 will have more than one difficulty and/or disability.

- Some of these difficulties may be slow onset and so not recognised and may be 'put up' with although there may be a solution such as use of assistive technology.

- This solution could be as simple as a screen overlay to reduce glare to software such as text to speech and/or a combination of solutions.

- Some people may not experience any difficulties at all.

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Physical/Motor Difficulties

- There are an estimated 9 million people in the UK suffering from arthritis. This may affect a person's ability to use a keyboard for example. This will cause difficulties with most aspects of e-learning.

- 18% of adults aged 60-69 have a mobility difficulty, and 38% of adults aged 70 and over do. This is compared to 12% of everyone aged 16 and over. This might affect attendance at any face to face tuition. It might also affect speed of engagement.[2]

- E-learning design should enable students to access resources in their own time, read them at their own speed and manipulate them with their own assistive technologies.[18]

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Hearing Impairment

- About 6.4 million people aged over 65 have some form of hearing loss; around 685,000 of these are severe/profound.[2]

- Some subject areas can pose more difficulties for learners with certain types of hearing impairment. Audio-rich subject areas like music, film and media studies can pose significant difficulties for learners with no hearing, though there are impressive precedents of people with hearing difficulties excelling in these fields. Less obvious are the secondary difficulties for sign-language users.

- Lacking the immersion (via background radio, TV, overheard conversations, etc.) of speech-based language and literacies deaf people may struggle with nuances, abstract concepts and technical terms.

- They might experience difficulties in webinars, synchronous communications, videos and face to face situations. In some cases a signer might be required and for online resources or in a webinar live captioning might be required.

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Visual Impairment

- In the UK 42% of people over 75 will develop cataracts, and almost 50% will have some symptoms of age-related macular degeneration.

- 13% of people aged over 65 have difficulties with their eyesight.

- 64% of people aged 75 or over have an eye complaint. [2]

- Visually based subjects like fine art and film pose obvious difficulties for learners with no vision. Less obvious but no less problematic, are the difficulties in making sense of mathematical, statistical and engineering notation to people with no vision.

- There is a range of assistive technologies available, some of which are free, including screen readers and magnification software.

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Cognitive difficulties

- Over 820,000 people are estimated to be suffering from late onset dementia in the UK in 2010

- Depression affects 22% of men and 28% of women aged 65 or over. This would be just over 2 million people aged 65+ in England.[2]

- Many people aged over 60 may be dyslexic but this may be unidentified as it is only in more recent years that this has been assessed adequately likewise for autism.

- Using the whole range of sensory experience to deliver information to learners helps them to understand; hence sounds, podcasts, recordings, videos and interactive opportunities will enhance the chance of success.

- Multimedia resources can offer real benefits in attracting attention, but care should be taken to avoid overloading the learner's senses which can lead to confusion.

- Using one option at a time without distraction will help focus attention. Small successes should be celebrated; they build the confidence of the learner to try and to believe they can succeed.

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Guidelines

- BS 8878 Web Accessibility Code of Practice. [6]

- Making Your Website Senior Friendly from the National Institute on Ageing (NIA) Designing User Interfaces for Older Adults: Myth Busters. [19]

- Designing Training and Instructional Programs for Older Adults. [20]

- Sharit et al (2011, p. 11:4) – summary of guidelines. [21]

- The American Association of Retired Persons (AARP) Heuristics [22]

- W3C (2010) states that age-related difficulties 'overlap with the accessibility needs of people with disabilities.' Web Accessibility and Older People: Meeting the Needs of Ageing Web Users. [23]

Stoltz-Loike et al (2005) [24] conducted tests to see if web design guidelines were applicable to e-learning – good starting point but older people require interesting and engaging content and aesthetics important.

Study

Purpose

- Validate the desk-based research on online social interactions, accessibility, usability and online safety considerations, and e-learning.

- Consider the implications for future research in terms of questions to be asked and methodology.

Study

Methodology

Six males aged over 60 all currently or very recently engaged in e-learning with the OU were recruited.

Hour-long, semi-structured interviews were then carried out via telephone or Skype ® calls.

Questions set within a framework of the original research project areas of interest in terms of over 65s engagement in online social interactions - motivations, obstacles, advantages and risks.

Study

Interviews
- Employment background and current work and voluntary. Experience specifically focusing on the use of computers in their work.
- Use of computer – what technologies they use and what they use them for.
- Any physical difficulties they experience including any changes – covering sensory, manual and cognitive difficulties.
- Motivation or engaging in e-learning and where they might get support with technical issues.
- What advantages they have found and how they have found it different form previous learning experiences.
- What obstacles they have found.
- Whether they have encountered or think are any risks.
- Whether they are planning to engage in any more learning.
- Anything else they would like to raise.

Study

- All of the participants had engaged in a Level 1 or Level 2 technology related course with the OU. Experience with IT and e-learning was diverse ranging from a Professor of Computing with over 50 years of experience with computers to someone with 'O' Levels with 5 years' experience.

- Four of the participants had used technology extensively at work, for example and aside from the Professor, one was an IT tutor, one had worked in cutting edge technology industry and one had worked in a technology-rich environment. One participant who had hardly used a computer at work had been using one at home for 33 years.

- It should be noted that all of the participants were very confident in their use of technology with all of them using a range of technologies in their learning.

Validation of previous research

- Designing to reduce cognitive load – cognitive difficulty was the most significant physical difficulty identified by the participants and would indicate that this is a very important issue.

- Training involving repetitive strategies – this links to the aspect above and although not specifically identified memory was identified as a difficulty.

- Consideration of time needed to complete tasks – again this aspect relates to the above points. This would be in relation to short-term tasks and may be particularly relevant in online synchronous situations and face to face.

- On-going trustworthy technical support –this group of participants were confident technology users and would not represent the vast majority of over 60s.

- Involvement of older people in the design process – the participants in the study put forward a range of useful suggestions that could be incorporated.

Additional Points

- Paper format where possible.

- Keyboarding skills.

- Avoid the use of social networks.

- Consider face to face situations paying attention to pace of the lecture, group activity particularly where screen work is involved and sound and noise levels.

- Level of formality in terms of content and communication.

- Assessment of skills in technology and learning alongside support needs (learning and assistive technology) may be necessary in some cases to optimise the learning experience.

Future research

- A study involving those who are less confident.

- A study or series of studies with over 60s with age–related difficulties and or disabilities to identify how best to mitigate against the additional cognitive load from using the technology.

- A comparative study between a standard e-learning environment and one optimised for over 60s would further validate recommendations from this and the previous study.

- A study based on the use of learning analytics focusing on over 60s

   Learning Analytics may be defined as the measurement, collection, analysis, and reporting of data about learners and their contexts, for the purposes of understanding and optimising learning and the environments in which it occurs.

Digital Inclusion Lens

Seale (2013)[25] writes in the context of e-learning and disability in higher education.

- An accessibility lens focuses on barriers and what a person cannot do rather than the digital inclusion lens which focuses on opportunity and what a person can do.

- The digital inclusion lens embraces user ability, agency and motivation, control and choice.

- This can be a useful tool in considering the wider student experience such as recruitment, selection and support.

Strengths

- Better time management ability, working independently and maturity, self-awareness of limitations.

- Reasoning ability may enable older adults to compensate for declines in other abilities.

- Despite age declines if they have a reasonable amount of time and computer/Internet experience they can be as successful though typically slower than younger adults (Sharit et al, 2009 and 2011).[21]

Future work to bring more focus to the strengths of older users, rather than their weaknesses (Hanson, 2010).[26]

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Recommendations

- The design of e-learning environments needs to consider older users' physical characteristics (age-related difficulties including declining vision, hearing, manual dexterity and memory) and non-physical characteristics (such as confidence and experience with technology and their motivation for engaging).

- Designers should take into account older peoples' perceptions of online safety. The risks, identified as being of importance in the project, are scamming, spamming, security and privacy concerns as well as hurtful comments by others.

- Designers should recognise that older peoples' needs will change with age, more rapidly than perhaps other age groups – lifelong learning implications and particular need where people have existing disabilities.

- Simply meeting the needs of disabled people will not address all of the needs of over 60s.

Measures

- Involvement of older people in the design process,.
- Designing to reduce cognitive load.
- Training involving repetitive strategies.
- On-going trustworthy technical support.
- Design to build on strengths.
- Consideration of time needed to complete tasks.

are fundamental to ensuring that over 60s can access and engage successfully with e-learning.

Conclusion

- The demand for e-learning by older people will increase. E-learning platforms and content are not designed to meet the needs of older people.

- Older people may experience age related difficulties which they are not aware of (for example slow onset) and which could be improved by assistive technology but they may not be aware of this either.

- They may have limited support if they are studying at home but even if they are in the workplace providers may not be aware of their needs and they (the older person) may be reticent to voice them.

- All of which will have an impact on the quality of the learning experience including enjoyment and achievement. In turn this may affect their confidence and opportunities at a time when they may become increasingly vulnerable.

- Industry is increasingly dependent on an ageing workforce and if training materials do not meet the needs of the workforce then this will have an effect on general skills levels and therefore the economy.

The advantages (with e-learning) are unbelievable. I could go on forever. I can go on at my own pace. ……...If I don't understand something I can go back over the blocks. I can go to the library and I can get my own explanations in my own time……I need that extra time. I could not get that with f2f teaching……...A fantastic learning system I can't praise it enough.

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Any questions?

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