

Older People's Quality of Life and Role of Home-Based Technology

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ABSTRACT

Background: Household devices may have a positive impact on daily lives by reducing the burden of several tasks and enriching social interaction. There are varieties of assistive devices such as alarms, sensors, detectors, and life style monitoring devices, which can help in compensating for the activity limitations caused by impairments. This study aimed to review the contribution that residential technology devices can make to older people's lives.

Methods: An open-ended literature review following the guidance of the Centre for Review and Dissemination was conducted to establish the current understanding of the topics by using clear and appropriate criteria to select or reject studies. The studies entered into the review were limited by language, topic, and date of publication.

Results: The research literature indicated that residential facilities which appropriately are designed and supplied can have many benefits for older people such as increasing independence, maximising physical and mental health, and improving their quality of life.

Conclusion: Although most of the literature has explored the positive effects of technology devices on older adults' social networks, independence, psychological well-being, and social status, the possibilities of negative consequences have been neglected.

Keywords: Quality of life, Older people, Residential technology, Computer-mediated communication

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Introduction

In the past, age was used in studies into quality of life either as an indicator of functional decline, or as a social category [1]. More recently, studies have focused more systematically on the WHO directive, "years have been added to life and now the challenge is to add life to years" (IBID, p.3).

Quality of life is widely used as an outcome measure of well-being in social gerontology, environmental, health, and pol-

icy research [2]. Moreover, there is international interest in the development and measurement of quality of life in old age. In recent years, increasing the quality of life for older people has also become a key strategic goal, as a goal for public policy (e.g. in the assessment of outcomes of health and social care) in the UK and as advocated by the World Health Organisation (WHO) and the United Nations. Quality of life is also partic-

ularly useful to policy makers and practitioners that wish to monitor the development of services and the benefits to the users [3].

Approximately one-third of the waking time of older people is devoted to the performance Activities of Daily Living (ADL), including personal care tasks such as bathing, washing, feeding and the Instrumental Activities of Daily Living (IADL) relating to shopping, cooking, and laundry [4]. Everyday technology may help older people live independently by supporting these activities, particularly bathing, cleaning, cooking, and shopping. Moreover, staying at home would no longer involve social exclusion because of information and communication exchange through the Internet with the outside world [5].

Our understanding of why older people adopt, reject, or abandon the use of a technology is still rudimentary [6]. Additionally, systematic research has rarely been done on the impact of these technologies as well as other features such as human factors and universal design. For example, Wahl and Mollenkopf noted critically that *"surprisingly or not, [there are few data] on the availability of a telephone in older persons' households and its influence on social [issues]"* (IBID, p.221). Despite the general assumption that older people benefit from whatever type of technology is available to them, the evidence is very general and does not inform researchers about the use or non-use of technology, users' needs and fears, or life quality aspects [7]. Moreover, until now it is not clear which technological devices are available for older adults or which acceptable [8]. This lack of knowledge severely limits the ability of policy makers to make informed decisions regarding adequate and appropriate regulation and the provision of residential devices for older people.

The present study addresses this knowledge gap by justifying the examination of the influence of technology on the quality of life.

Methods

The first task was to establish the current understanding of the topics by conducting an open-ended literature review. The required review covered the empirical, evaluative, research literature, and policy publications.

In order to include a broad range of relevant disciplines, a comprehensive search was carried out between May 2007 and September 2010 following the guidance of the Centre for Review and Dissemination [9] by using clear and appropriate criteria to select or reject studies between 2007- 2010. The Databases of 'All Academic', 'ISI web of knowledge', 'Scirus', 'PsycNET', 'System for Information on Grey Literature in Europe' (SIGLE), 'Social Sciences Citation Index', 'PubMed', 'ELSEVIER', 'CrossRef', 'PsycLIT', 'Database of Abstract of Review of Effectiveness' (DARE), 'Cochrane Collaboration' and 'ScienceDirect' were reviewed. In addition, reports from key agencies with long-standing reputations in the field of older people, electronic sources from 'Google Scholar', books, encyclopaedias, dictionaries, magazine articles, theses, and UK government policy and strategy documents were searched.

The studies entered into the review were limited by language, topic, and date of publication. Therefore, non-English language sources and studies published over 40 years ago were excluded. The search strategy was expanded by combining quality of life, home-based technology, and older people keywords. Moreover, other keywords including kitchen appliances, residential technology, computer mediated communication (CMC), social participation, and assistive technology were employed. A bibliographic software package, Endnote, was used to manage the references, which were assessed and included in the review. Based on the keywords used for searching, identified publications in the very diverse fields relevant to this study are presented in Table 1.

Table 1: Relevant references and subject area

SUBJECT AREA
Commuter-based technology and aspects of quality of life such as social participation and social well-being
Other assistive technology facilities such as telecare, telehealth, residential technology and telemonitoring

The UK and other countries' policies, facts and governmental reports about older people's housing and independent living
Quality of life in old age
Designing criteria

Results

Residential technology devices and their influences on quality of life

"There is considerable literature on the technology of agriculture, transportation, warfare, factory machinery, and sources of power; however, until recently,

little could be found in the literature that specifically addresses technology in the household"[10].

From a historical perspective, most of the technological devices used nowadays by older people are now regarded as essentials to any home. As can be seen in Table 2, almost all older people in the United States currently have access to basic items of home technology such as radios, refrigerators, and telephones. The availability of many other items including microwave ovens, dishwashers, and personal computers is less than 50% [6].

Table 2: Prevalence of selected items of everyday technology in households (Source: Wahl and Mollenkopf, 2003, p. 219)

Kind of technology	Availability for serial production	Widespread household adoption	Availability in 2003
Radio	1890s	1940s	nearly 100%
TV	1920s	1950s	nearly 100%
Refrigerator	1910s	1950s	nearly 100%
Telephone	1870s	1930s	around 95%
Central Heating	1880s	1930s	around 60%
Air conditioning	1940s	1950s	around 70%
Washing machine	1910s	1950s	around 80%
Dishwasher	1920s	1970s	around 40%
Microwave Oven	1960s	1970s	around 40%
Video Cassette Recorder	1960s	1980s	around 50%
Personal computer	1970s	1980s	around 24%

Discussion

In the UK, the Family Expenditure Survey has shown that the use of new household technology such as personal computers and mobile phones is increasing rapidly [11]. In 1994-95, just one per cent of households used a mobile phone while the share rose to 15% in 1997-98. However, the use of technology declines as people get older. For example, whilst 70 per cent of young older people possessed mobile phones in the UK, the figure dropped to 53 per cent for age group of 65-74 and 24 for people aged 75 and above (IBID).

Common sense suggests that the introduction of household devices may have a positive impact on daily lives by reducing the burden of several ADLs/IADLs tasks and enriching social interaction. These advantages are particularly valuable for older people because of the age-related decline in competencies and social inclusion. Furthermore, there are varieties of assistive devices such as alarms, sensors, detectors, and life style monitoring devices, which can help in compensating for the activity limitations caused by impairments [6].

Residential technology devices influence our daily lives, affect the social and economic environment of the household and in turn, the members of the household affect the development, sales, and use of technology. However, this impact has not affected everyone equally. These influences are different based on various characteristics of technology users particularly in terms of impairment in hearing, vision, neuromuscular and skeletal systems, and cognition [12].

Ideally, in order to evaluate conclusions of a specific device, various outcomes such as social exchange patterns, safety, security, ADLs/IADLs performances and other key predictors of quality of life should be assessed [6]. In terms of this approach, few studies have been conducted to assess quality of life amongst older people. One of these studies that introduced assistive technology to older people and evaluated the impact of this intervention

was conducted in England by Blackburn and colleagues in 2006 [13]. Forty residents were chosen from a sheltered housing scheme to install household technology devices including 'lifestyle reassurance packages', 'fall packages', and 'specific devices'. The results showed that lack of appropriate information was the main reason why participants could not handle the newly installed technologies. In terms of care maintenance and hospital admission, a general positive benefit has been reported (IBID).

Technology may create a safer environment, give more control to the individual, and provide better information (Table 3). For example, some devices can monitor, prompt, assist visually or hearing impaired people, give greater freedom, support independence, provide a means of social contact, and improve privacy and dignity in many instances [14].

Table 3: Ways that assistive technology can support older people (Source: Audit Commission, 2004, p.5)

User Characteristics	Possible Provision
People supplied with equipment to support earlier discharge from hospital, people with chronic conditions	Blood pressure monitor, fall detector panic pendant, environmental control systems, equipment for daily living and virtual consultations
Patients with muscular sclerosis	Wheelchair with integrated electronic technology,
People receiving palliative care at home	environmental control systems
People undergoing needs assessment, perhaps following a change in personal circumstance	Simple equipment to support activities of daily living, environmental control systems
People who require some basic assurances and support in order to lead an independent lifestyle in their own homes	Panic pendant, fall detector, video doorbell, and medicine dispenser
People with dementia requiring support to lead an independent life	Reminder unit and general long- term monitoring
Older people living at home requiring reassurance	Panic pendant, chair occupancy monitor, room occupancy monitor, security system, event analysis system, and fall detector

Quality of life and computer-mediated communication (CMC)

A number of information and communication technologies (ICT) can be used to enhance the quality of life for older people [15,16]. For example, the Internet can be used to communicate frequently with families and relatives outside the home. It can also help older people find new interests, access marketing informa-

tion, and join local institutions [17]. Moreover, ICT has perhaps the greatest potential to provide care, social and housing services. For instance, it may be used to monitor vital signs of patients suffering from chronic diseases such as chronic heart failure or diabetes. By using telemedicine and videophone consultations, home

visits may be reduced [18]. Furlong [19] and Nahm et al., [20] reported that computer-mediated communication (CMC) might provide valuable information, improves interpersonal relationships and interaction with peer groups.

At a basic level, social well-being is the key element of quality of life [21]. Making new relationships is often one of the serious issues that older people have to consider when they lose a spouse or other confidants [22]. Furthermore, the findings of a study by Karavidas et al., [23] revealed that those older adults who suffer from alienation and loneliness are mostly frail. The use of CMC may extend a person's social network, reduce loneliness, enhance the performance of daily activities, and improve cognition [24].

As computer networking becomes increasingly important, researchers from different disciplines have been interested in exploring the impact of CMC on the older people's quality of life [25-29]. Some authors believe that CMC may improve social interaction by placing people in a network where they can share common interests, thoughts and experiences [30]. According to Katz et al., [31], the use of the Internet encourages older people to join groups with shared interests rather than that are most accessible. Additionally, it can improve self-efficacy, decrease computer anxiety, and therefore improve life fulfilment.

There is controversy about whether CMC improves psychosocial well-being and how it may change interpersonal communication [32]. For instance, Goulding [33] states that although CMC may reduce people's interaction and interpersonal relationships, shy individuals can use the facility to try their social skills in a relatively anonymous and safe environment. Their confidence, therefore, to engage in later face-to-face interactions will develop. In addition, the use of electronic mail may help older adults contact and socialise with family, relatives, friends, and colleagues overcoming social isolation through location, illness, or disability (IBID.).

Further studies appear to suggest that the Internet as a communication medium has paradoxical effects [34]. An American study was

conducted by Kraut et al., [35] to measure and compare social support, family communication, size of local network, and quality of life amongst 169 participants. The findings revealed that the use of Internet decrease communication with family members and increase depression and loneliness. However, in a follow up study that took place three years later the indication was that the Internet use had a positive effect on social involvement, communication and well-being (IBID.).

Although most of the literature has explored the positive effects of CMC on older adults' social networks, independence, psychological well-being, and social status, the possibilities of negative consequences have been neglected [36]. However, Colvin et al., [37] investigated both the advantages and the disadvantages of online social support. The advantageous attributes of online social support can be categorised into "*asynchrony, anonymity, ability to personalise use and connectivity*". On the contrary, the disadvantages of online social support were identified as being "*any unique disadvantages as contrasted with face to face social networks*," such as no physical contact, lack of auditory and visual context cues, desire for more social contact, and inability to offer assistance needed to other people (p.54).

Moreover, other issues such as the quality of relationships, frequency, depth, and effect of on-line relationships might influence the advantages of CMC [38]. For example, excessive Internet use might cause interpersonal difficulties in households, physical discomfort, and technological vulnerabilities. On the contrary, Walther [39] found that older people who spend more time communicating on the web are more satisfied than others who spend less.

Further research on the quantity of the use of Internet was carried out by Wright [40]. One hundred and sixty-six participants were involved in an on-line survey. The majority stated that the use of 'SeniorNet' improved their quantity of interaction through using message board posting, chat facilities, and e-mailing forums. Data analysis showed that 86% communicated daily on the web for an average of 17.27 hours a week. The Social Support Questionnaire [41] showed that older people who con-

nected more gained greater online social support than individuals who used the Internet less (IBID).

To summarize, the problem with interpreting this literature is that most of the reviewed studies focused on both advantages and disadvantages CMC. Having gained more understanding this paradox and about the ambivalent attitudes towards those technologies amongst older people may help us understand their responses to other home-based technologies.

Conclusion

The reviewed references indicated that although technology is as old as the first tool that was made by human beings, the field of gerontechnology is very recent. The role of technology in the home environment is a particular feature of the relationship between ageing and technology [42].

The increasing number of the older people and rapid innovations in household devices means that technology is becoming more familiar in the everyday life of older people [43]. The research literature indicates that buildings and residential facilities that are appropriately designed and supplied can have many benefits for older people, such as increasing independence, maximising physical and mental health, and improving their quality of life. Moreover, improving care, housing and social services for older people by suitable home-based technology devices would also lead to the creation of more inclusive environments that are suitable for everyone, regardless of age or ability [44]. Technological solutions may promote independence levels and allow older people to remain at home by coping with age-related difficulties such as falls, isolation, medication management, sensory impairment, and diminished mobility [45].

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