

Information and Communication Technology among Elderly: A Literature Review

Bachelor of Social Service and Health Care, Geronorm (YH)

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<p>Abstract:</p> <p>The rapid development of technology is on the same pace as the growth of elderly in the world. Older people is being considered as a digitally excluded group of the society. The communication technology, computer and Internet are the most demanded part of society to elderly and it is the responsible of society to act for ‘Successful Ageing’ or ‘Active Ageing’, which is key for quality of life of elderly. The aim of the thesis is to determine the attitude of elderly towards information and communication technology (ICT) and the motivation of elderly towards ICT. The study has two questions: 1.What are the factor influencing the use of ICT among elderly people? 2. What are the aspect affecting the attitude of elderly towards ICT?. The method used in the study is qualitative content analysis. The data were collected from scientific databases CINAHL (EBSCO) and PUMED with using the keywords. The information gathered from the data (articles) helped in formation of categories and subcategories on the basis of research questions. The result revealed that the benefits of ICT, limitation among elderly and attitude of elderly are the main factors influencing the use of ICT by elderly and the social interaction is the core benefits of using ICT among elderly, in a mean while ageing is one of the barrier in using ICT among elderly. The training regarding the computer or information technology, perceived usefulness, psychological support or previous education are the factor influencing the attitude of elderly towards ICT? Thus information communication has several benefits for the older people for their social integration and adaptation, independent and active mind, which are the keys for their active ageing and wellbeing. The main limitation of the study was that the author was unable to find the article on related topic done by the health and social worker.</p>	
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FOREWORD

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HAGEL10

LIST OF ABBREVIATION

AAAL: Ambient Assisted Living Deutschland

CELD: Conference on Cognitive and Exploratory Learning in Digital Age

DH: Department of health

DWP: Department of work and pension

EU: European Union

ICT: Information and communication technology

IQOL: Integrated quality of life

No.: Number

PP: Page number

QOL: Quality of life

WHO: World Health Organization

1. INTRODUCTION

In this thesis, information and communication technology for elderly, a literature review that would be a guide not only for the author, but also to the commission party and whoever wants to know how is the perception of elderly towards the new technology and what are the motivation of elderly towards information and communication technology, as well as guide to them who want to do further study.

In this introduction sections, the author will explain the background linking between elderly and ICT. The author will also discuss why the topic in ICT and elderly is relevant topic. Then the aim of the study will be discussed focusing on the research questions.

1.1 Background

Information and communication technology has pervaded the lives of people in all over the world. It has great role in carrying out daily activities of older people together with monitoring their health, create social networks and increase participation in society and augment safety. Thus the technology has helped in wellbeing with social inclusion, improve professional participation and quality of life and eventually lead to an independent living (Sinclair D. et al, 2008, pp.3).

Not all the group of the population has resources and capabilities to support equality of access to use of ICT. Most of the ageing people have got little attention in the world of digital divide. And there is increasing use of Internet to deliver services and information (Goodall et. al, 2010). Information and communication technology has a broad concept which enables people to communicate, gather information and interact with distant services, faster easier and without limits of time and space. It has several applications for the older people, like communication, information, employment, electronic commerce, independent living, intergenerational relationship, distance learning, cost reduction and strengthening the community (M. Lennart et al., 2004).

Promotion of health of elderly could be the process of enabling people to increase control over the determinants of health, to facilitate health improvement. In this context Information communication technology provides the feeling of security, for example through smart phone technology, knowledge and information regarding the health problems, exercises, nutrition, medications through the internet, social contact is also increased through ICT as through email, Skype etc., entertainment for cutting boredom and loneliness like through games and internet and email. Thus ICT leads to the wellbeing and independent of elderly people, which support in quality of living of elderly (Steffen et al, 2008). This concept has become the source of motivation for the study.

As the ratio of older people is increasing with varying morbidity, health care system and social care will have to cope with increasing expenses. But, there are also opportunities that technology and socio-economic innovation can flourish quality of life for older people, reduces economic problems and develop economic and business opportunities. So it is considered that ICT for elderly people will solve the future problem. (Gabner k. and Conrad M. 2010, pp.5) This could be an inspiration for this study as well.

However, older people are heterogeneous group by age, sex, degree of impairment, biography, income, education, religion, culture etc. Their awareness, practical awareness and expectation regarding technology have to be considered. Therefore ICT enhances the independent living of elderly people. ICT decreases the cost of health care and services, it has ability to meet the needs of individual, it improves the living standards, increases social and intergenerational contact, increase the employment in the society (Gabner k. and Conrad M. 2010, pp.5).

This thesis paper was commissioned by Kontula Monipuolinen Vanhustenkeskus, running under City of Helsinki. The contact person was Maija Hyytinen, planner of the Vanhustenkeskus. In the house (first floor), classes of information and communication technology or computer technology to the elderly people are being organized in every

Tuesday, Wednesday, Thursday and Friday, and the tutors were volunteers, expert in Information and communication technology.

1.2 Aim of the study

The aim of this paper is to create a relevant literature review regarding the information and communication technology for elderly and finding out from the literature the attitude of elderly towards the information and communication technology and also to find out the factors influencing the use of information and communication technology among elderly. These all could contribute the readers to overview the interested factors of elderly towards information and communication technology and their perception or acceptance towards it.

1.3 Research Questions

The study is a qualitative literature review. And the research questions for the study are:

1. What are the factors influencing the use of ICT among elderly?
2. What are the aspects affecting the attitude of elderly towards ICT?

2. THEORETICAL FRAMEWORK

The ageing population in the world is increasing rapidly. It is estimated that 2 billion people will be aged 60 and older by year 2050 (WHO, 2014). As compared, in 2011 Europe has highest number of older people in the world comprising of 17.5% elderly people of the total population of EU-27 (Eurostat, 2012). In 1st January 2012, the total population of older people of age 65 and over in EU-27 was 503.7 million. By 2060, it is assumed approximately 30% of the European population will be above 65 years of age and over 80 years elderly will be increasing highly (Eurostat, 2012). This changed demographic feature gives direct impact on health system, social security, and general

working conditions and moreover, there is need of innovation for quality of living or continue of survival (Naumanen M. & Tukiainen M., 2008). In the context, the innovation can be brought in technological system for the older people's health, quality of life and social connection, safety and in economic aspects (Giulia R., 2011). The digital inclusion older people in the EU (27) by 2013 is 72%, which was 51% in 2007. (Eurostat 2014)

Ageing and quality of life maintenance is one of the important aspect of societal goal. Ageing well refers to the concept related to development of inclusive elderly care and services with the objective of increasing independent living. The one of the strategy to make an inclusive society and to improve the quality of life of increasing older people by applying the technology to meet the need of older people has been determined. (EC, 2007) Successful ageing is another concept used with ageing well. Successful ageing means the ageing with well physical, mental, social and psychological wellbeing with maintenance of high cognitive and physical capacity and engagement in life with life satisfaction and social participation. As ageing well is related to aspects of health, it is concerned with health prevention and health promotion. (Wikman A. M. et al, 2008).

The well known definition of health by WHO (World Health Organization) in 1948 as '*Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease and infirmity*' has also the concept of quality of life, which is different for different people and discipline. (Bowlin and Windsor, 2001) Quality of life (QOL) is like a concept of ageing well has been defined by WHO (WHO 1999) as '*The individual perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept incorporating in a complex way the person's physical health, physiological state, level of independence, social relationships, their relationship to salient features of the environment.*' (Wikman A. M. et al, 2008). Quality of life for elderly people has its specific features. The most important part of the life for elderly are their own health, family relationship, health of the close person, standard of living, social activities, spiritual support, and environment. Quality of life also consists of the

possibility and right to be active, to participate, to belong and to be treated as an equal. (Wikman A. M. et al, 2008)

ICT is indicated as any computer-based, computer-assisted device or application used for communication and informational purposes. It is also concerned with Internet-connected computers, mobile communication devices and social media applications (Berkowsky R.W. et. al., 2013). According to Campbell et al, 1999, ICT is defined as ‘a broad concept which enables people to communicate, gather communication and interact with distant services, more easily and without limits of time and space’ (Wikman A. M. et al, 2008)

Therefore ICT in the recent world plays important role in the active ageing of the elderly through improving their physical, functional, psychological and social health problems, which is a vital aspect of ageing. (Phelen et. al., 2004) The use of ICT by older adults contributes to the better results by keeping the mind active, by empowering the individual with the development of new skills and abilities and by reducing social exclusion (Berkowsky R.W. et. al., 2013).

2.1 Integrative Quality of Life Theory

Quality of life (QOL) means a good life the notion of the good life can be found from subjective to the objective, which are being incorporated in existing quality of life theories. For example: The Integrative quality of life theory (IQOL). IQOL theory is an overall theory of eight more factual theories in a subjective-existential-objective spectrum. Those eight theories in a subjective-existential-objective spectrum are wellbeing, satisfaction with life, happiness, meaning in life, the biological information system, realizing life potential, fulfillment of needs and objective factors. The subjective quality of life is how each individual feels about his and her goodness of life. The aspects of subjective quality of life are the happiness and content of individual with life. (Vengtogdt et. al., 2003) The existential quality of life refers to how good is one’s life at a deeper level. Similarly the objective quality of life determines how the one’s life is per-

ceived by the outside world. One aspect of objective quality of life is status of individual as a good member in a certain culture. Thus, these three overall aspects of the quality of life are grouped with the notions relevant to quality of life. (Ventegodt et. al., 2003)

2.2 Well-being

Well-being is one of the theory in the spectrum of the integrative quality of life theory. (Ventegodt et. al., 2003) Well-being is the most natural theory of the subjective quality of life. Well-being is the state of being happy, healthy and prosperous. (Dictionary, Marriam-webster). Well-being is one of the important aspects for health and social policy in relation to older people. Well-being has been one of the concepts as with ‘Active ageing’ (The National Framework for Older People DH, 2001) and independence as well (Opportunity Age DWP, 2005) So nowadays there has been a relationship between well being and independence of older people. There are various factors that influence the well being of older people. For example relationship, feeling of secure, being confident are the important aspect of wellbeing in elderly.

As the older people are heterogeneous group, there are different constituents of quality of life for the older people. Those constituent of quality of life are social relationship, home and neighborhoods, psychological wellbeing, other activities done alone, health, social roles and activities, financial circumstances, independence and others. (Gabriel Z. and Bowling A., 2004)

WHO, 2002, (p.12) mentioned that ‘Active ageing is the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age’. In this context the benefits for the elderly in learning and using ICT are communication with family and friends, opportunity of ongoing learning, improvement of medical services and health issues, encouragement for autonomy and independence and entertainment and fun. (Adler, 2002; Lawhon, Ennis and Lawhon, 1996)

2.3 Earlier study on Information and communication technology with elderly

The interdisciplinary attitude is being an influential approach to bring new frontiers to the human beings and in improving effectively his/her Quality of Life. Quality of life is a vital concept, which is related to human being-centric vision. So this puts the technology as a tool to enhance a better everyday life and promote the health. The maturity of information and communication technology and other advanced tool can provide a significance contribution to support the quality of life approach. The concept of ICT for QOL can be applied in various fields like health, social networks, security and culture. The challenging issue in the present world is improving the quality of life of ageing people and to make a proper use of innovative approaches to increase contributing members in the society. So in this sense we can use Basic ICT as an innovative approach through the implementation in the ageing society (European Parliament, 2011, pp 1&2).

Information and communication technology is the part of Gerontechnology. Gerontechnology maintains the health of ageing people, their multiple diseases, activities of daily life, their wisdom, independency and ultimately quality of living. The technological environment could be considered as a determinant of the life of older people for maintaining their social and living environment. As technology is the driving force behind changes in the daily environment, the environment in which people age is an accelerating dynamic, not a constant one. So, there could be ever-changing opportunities and challenges. And the technology gets the basis from this (Bouman H. et al, 2009).

Neves B.B. & Amaro F. (2012) has allowed us to understand the type of usage and perception of ICT by the elderly of Lisbon. The aim of the study was to understand how the elderly use mobile phones, computers and the Internet and the perception towards them. The study was done by surveying a random stratified sample of 500 individuals over 64 years of age living in Lisbon, which was followed by ten qualitative semi-structured interviews. The article is very much useful to my research topic because the author in the

article has identified the positive perception of elderly living in Lisbon towards ICT by mentioning the expression of the elderly towards computers, mobiles and internet. The limitation of the study was that it is limited to the elderly of Lisbon only and cannot be generalized and the value of intergenerational relationship and faux users's idea are not mentioned. Thus the writer has mentioned to indicate the value of intergenerational relationship and idea of faux users in further study. This study can be basis for my study because the aim for my study is similar to it.

Mikkola K. & Halonen R. (2011) investigated how elderly people experience ICT and social media. The aim of the study was to find out how elderly people perceive ICT and social media in their lives. The study was done by interviewing 12 persons, who were not familiar with computers and social media, and result was done by analyzing the reply of the interviewees. The research has been studied has taken account that how elderly people utilizes information and communication technology. The article is useful to my thesis because it has identified various attitudes of elderly towards information and communication technology. The limitation of the study is it cannot be generalized and the study was done in a very few number of samples. The study has concluded that though the people were aware of benefits of ICT, the elderly people took the machines useless. Also the elderly express the safety issue and the age is not a barrier for learning ICT. This article cab be a basis for my research, as it has explored the attitude of elderly towards ICT and benefits of ICT for elderly. (Mikkola K. & Halonen R., 2011)

Torp et al., 2008 has indicated that information and communication based forms of care support helps the carers of spouse with dementia or cerebral stroke to get more flexible information, education and social contact and support. The main aim of the study was to promote the health of caregivers of elderly living at home. The multi method evaluation model was used. Both quantitative about social contact, burden of care, knowledge about chronic disease and caring, stress and mental health and use of ICT, and qualitative data through focus group interviews of Eastern Norwegian carers of elderly were collected. The research has focused that the use of ICT by care giver helps them in acknowledging about the chronic illness of the client that could help them in caring and

coping and gain social support and contact which reduce their stress. The article is useful to my thesis topic because it has shown how the ICT could contribute in the elderly care. The main limitation of the article was that the study was done in small-scale project and in the quantitative part of the study; it is not a randomized controlled study. The article has concluded that a ICT based intervention for carers enable them to receive more control over their perceived health through gaining knowledge, information and social contacts and support. It has also enable carers to be a part of digital society. (Torp et al., 2008) Though this article will not be a basis for my thesis, it would provide supplementary information on pay structures.

Magnusson et. al. 2005, explains a cost analysis of home base support service for frail older people and their family carers using ICT. The aim of the study is to analyze weather the use of ICT by the older people and their family will reduce the potential cost of other services. A full economic evaluation, including cost effectiveness, cost utility and cost benefit analysis was considered in families who use ICT in home care. The research focuses in the benefits of use of ICT in terms of cost. The article is useful for my topic as it highlights the cost effectiveness of ICT use in homecare. Only two municipalities were used. The research concludes that, researchers, nurses and other community care managers can work together with frail older people and their family carers to develop cost effective support services that provides benefits to user. (Magnusson et. al. 2005)

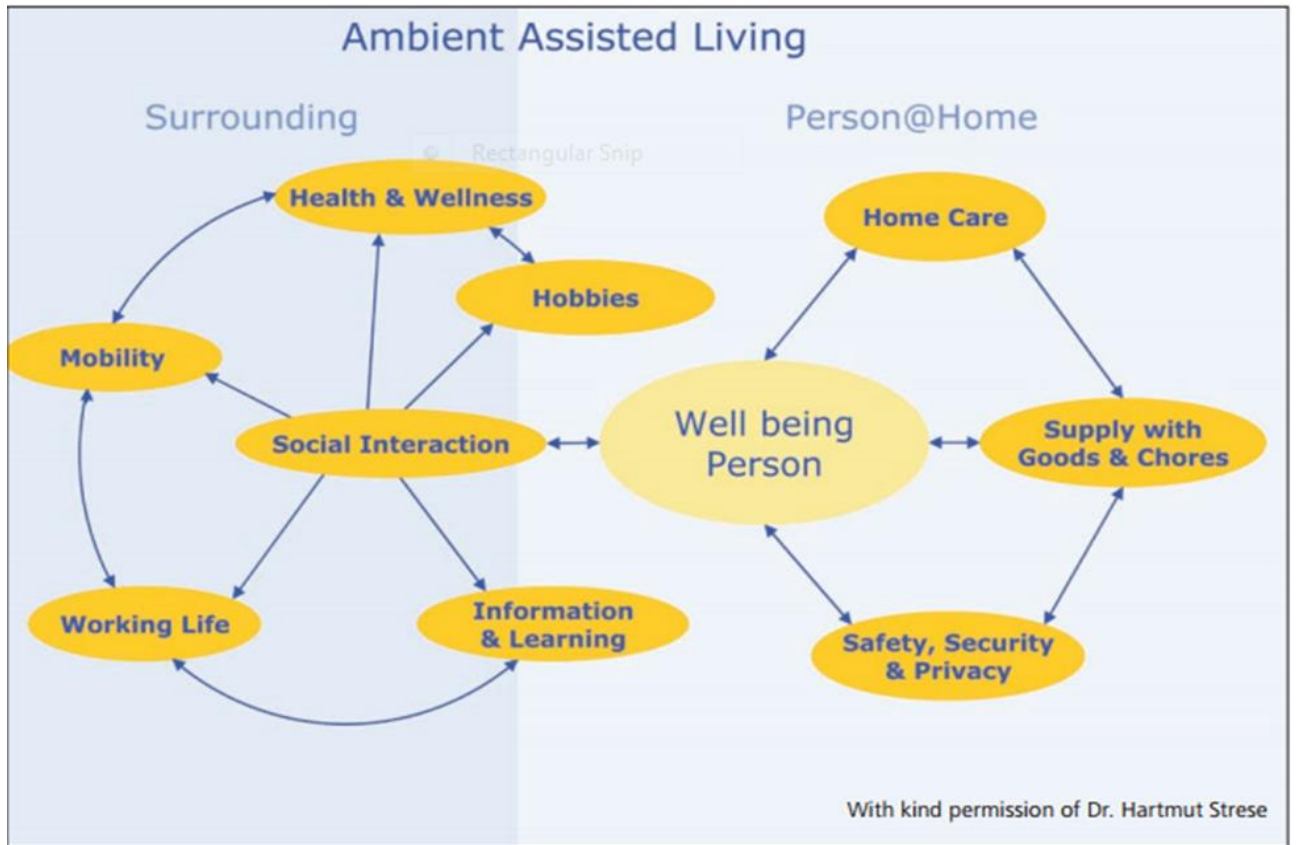


Figure 8: A multi-factor model displaying the needs of (elderly) persons for continued well-being

Figure 1 Outcomes of Social Interaction among Elderly

(Source: Gabner et al, 2010, pp: 16)

In the figure it is shown there are various factors, which are influencing the wellbeing of elderly and the outcomes of social interaction among elderly. And this is aspect for quality of living for elderly that could be contributed by information and communication technology. (Gabner, 2010, pp 16)

3. METHODOLOGY

According to the Thesis Guide of Arcada UAS, the method section is to be started with argumentation of the chosen method with describing the chosen method with references as well as how the study is being used in this study.

The method of study is literature review with use of secondary data. In this study the author could not do other methods of study including primary data due to lack of available resources like research commission, lack of research fund, and contact. As well as literature review does not provide much more comprehensive access to the research topic with a wide range of expert researches, therefore the author preferred this method for this study to other methods.

3.1 Literature Review

According to Aveyard H. (2010), 'A literature review is the comprehensive study and interpretation of literature that relates to a particular topic'. 'Literature review is a written document that presents a logically argued case founded on comprehensive understanding of the current state of knowledge about a topic of study. This method establishes a convincing thesis to answer the study question.' (Machi L. and McEVOY B.T., 2009)

Literature reviews are important as they help to summarize the literature available in any one of the topic. In this method a research question is identified and try to find out the answer to the question through searching and analyzing the related literatures by a systematic way. (Aveyard H., 2010). The purposes of literature review are different according to the nature of the inquiry. If the aim of the inquiry is to advance a position of the current state of knowledge on a topic, then a basic literature review is done and if the purpose of the inquiry is not to take a research problem for further study, then an advanced literature review is done. (Machi L. and McEVOY B.T., 2009)

The given study is summarizing and evaluating the existing knowledge on a given topic. So this study can be referred as basic literature review as it produces a position on the state of that knowledge.

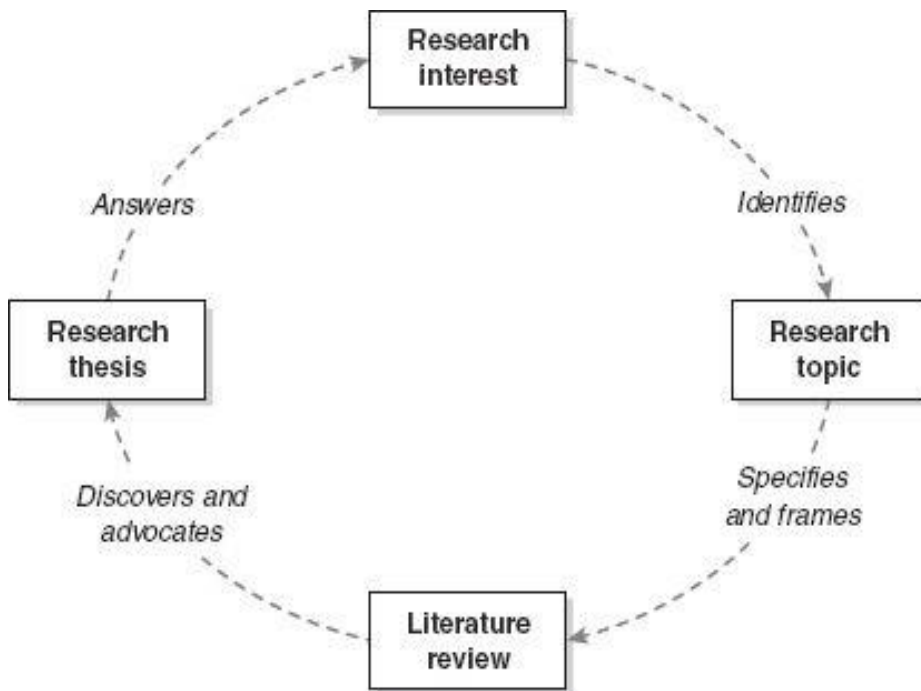


Figure 2 Basic Literature Review

(Machi L. and McEVOY B.T., 2009)

In the basic literature review, at first a research interest or issue for inquiry is identified as a study question. Then the research question is clarified and narrowed into a research topic. The research topic is responsible or contributes to the literature review through specification and framing the literature search. The result of the literature review is the discovery and advocacy of the research thesis that gives the answer of the research questions. (Machi L. and McEVOY B.T., 2009)

3.2 Trustworthiness

The trustworthiness of the study will be examined on the basis of validity, reliability and credibility criteria. Validity refers to the degree to which inferences made in a study are accurate and well founded. (Polit D. F. and Beck C.T., 2008, p: 768) This study is validated as the research aim and questions are clearly defined. Validity of the study is also found in the objectiveness of the author during data interpretation. The results will be present with the vivid reflection of the analyzed materials. No any subjective opinions or thinking are presented. Polit D. F. and Beck C.T., 2008, (p: 764) defined ‘reliability is the degree of consistency or dependability with which an instrument measures an attribute’. It is also stated by Elo and Kyngäs in 2007 (p:112), ‘ to increase the reliability of the study, it is necessary to present a link between the results and the data’. The reliability of this study is evaluated in such a way that the findings were demonstrated correctly and in a detailed form from the data in the form of text and figures. The authentic references were also used throughout the study. Credibility is defined as a criterion for evaluating integrity and quality in qualitative studies, referring confidence in the truth of the data. (Polit D. F. and Beck C.T., 2008, p: 751) Credibility in qualitative content analysis refers to the evaluation how well the categories are coded from the data. Therefore in the given study, the categories are conceptually and empirically grounded. (Zhang Y. and Wildemuth B. M., 2009)

3.3 Ethical Consideration

The author read and reviewed all the necessary text on the ‘Good scientific practice in studied in Arcada’ according to the Arcada’s guideline for thesis writing. The thesis agreement form was signed to confirm adherence to the roles. A short plan of the thesis work was submitted to and approved by the supervisor lecture. Thus the author made a very effort to comply with all the ethical standards according to the Arcada’s guideline for thesis writing.

The author was completely objective in reviewing the scientific literature and analysis to get the results. All the findings were evidence-based. As the study was literature review, the author was considering the reliability of the articles during data collections. The correct author, articles and date of publication were acknowledged in the study during citation and referencing. Therefore, the author is fully strived to maintain high ethical standard in the study.

4. QUALITATIVE CONTENT ANALYSIS

Content analysis is the analysis of texts and other writing, images, interview, recordings and cultural artifacts. Content analysis is mostly used qualitative research technique, including both qualitative and quantitative approaches. It is used for attribution of texts to authors, testing of hypothesis, theory building and evaluation research. (Hsieh H. and Shannon S. E., 2005) The process of qualitative content analysis is started with data collection. There are set of systematic and transparent procedures for processing data in order to support validity and reliability. (Zhang and Wildemuth, 2009)

5. DATA COLLECTION

The data were collected from databases systematically with use of related key words or search items between the period of 2004-2014 under certain filtration.

5.1 Search strategy

A search was carried out using the following electronic databases: EBSCO (CINAHL), PUBMED and OVID. The search was focused on the literature published during the year 2004 to 2014 in order to reduce the number of study or narrow down the large number of studies in the database and to include the relevant current studies on the related topic. As the non-related studies were found from Ovid, only the studies from EB-

SCO and PUBMED were included. The search keywords used during the search in the databases were: CINAHL - ("information technology" OR "communication technology" OR "mobile technology" OR computers) AND (elder* OR "old* people" OR aged) AND (attitude* OR motivat*) NOT "patient record*" and in PUBMED is ("information technology" OR "communication technology" OR "mobile technology" OR computers) AND (attitude* OR motivat*) NOT "patient record*", with filter under theme Age (65+).

5.2 Inclusion and exclusion criteria

The studies were limited to English language publication only and undertaken between the time periods of 2004 – 2014. The elderly included in the study were above the age group of 65 and above. The literatures from EBSCO were peer reviewed and in Boolean/Phrases, while from PUBMED, the articles were since 10 years till the date and reviewed only. The full text related articles were chosen from databases. The exclusion criteria were study done in other languages.

5.3 Search Outcomes

There were large numbers of studies were found in the given keywords from different electronic databases. From the CINAHL there were 190 articles and from PUBMED seven articles were searched and only the closely related ten studies performed in the recent ten years were undertaken for the study, where eight articles were chosen from EBSCO and two articles were from PUBMED.

Databases	Search Items	Year	Results	Used articles
CINAHL (EBSCO)	("information technology" OR "communication technology" OR "mobile technology" OR computers) AND (elder* OR "old* people" OR aged) AND (attitude* OR motivat*) NOT "patient record*"	2004-2014	190	8

PUBMED	("information technology" OR "communication technology" OR "mobile technology" OR computers) AND (attitude* OR motivat*) NOT "patient record**",	2004-2014 Filters under theme Age : 65+, peer reviewed	7	2
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Table 1 Number of articles used in Content Analysis from each of the Databases

5.4 Quality appraisal

Quality appraisal is a careful evaluation of study to identify its strength and weakness. (Polite D.F. & Beck C. T., 2008). It is a critical analysis how well the study represents the issue and therefore new knowledge on previous research can be developed through critical analysis (Torraco R. J., 2005). In this essay, quality of the studies was appraised through carefully studying the abstract and analyzing the relevance to the given aim of the study and topic.

6. DATA ABSTRACTION AND SYNTHESIS

The table below summarizes the extracted articles from databases in a detailed form for further data analysis to find out the result of the research questions.

6.1 Summary of Research Articles used in Content Analysis

Location	Name of articles	Author	Year	Content	Results
Content Analysis	Attitude of the Elderly Towards Information	Antonio Gonzalez, M. Paz Ramirez	2012	The article is to understand the attitudes of the elderly to-	The results determined the relationships between implication in the ac-

	and Communications Technologies	and Vicente Viadel		wards information and communication technology during a training course about the use of digital platform.	tivities, experience with computers and belief of the usefulness of learning technologies.
Content Analysis	Attitude Towards and Limitations to ICT use in Assisted and Independent Living Communities: Findings from a Specially-Designed Technological Intervention	Ronald W. Berkowsky, Shelia R. Cotton, Elizabeth A. Yost, Vicki P. Winstead	2013	This study sought to identify the effects of learning ICT among older peoples living in assisted and independent living communities (AICs) and their attitude and view towards ICT.	The results showed that the older peoples in AICs were feeling more comfortable and confident with the computer technology and very few got problem in using and access of computers and internets after the training. Most of the older peoples appreciated the training for their need as the training has increased their knowledge of computer and internet and they were being able to be in connected

					with their family members and friends living at a distant, as a result felt better about themselves and ability.
Content Analysis	Technology: Education and Training Needs of Older Adults	Lesa Huber, Carol Watson	2014	The article helps to understand the perception of older adults towards technology and the way the technology used by them.	The surveyed on technology and education among a sample of 77 adults age between 52 and 92 was done and the result showed that familiarity with technology, age, education and gender were correlated with new technologies and operating and shopping for new electronic devices.
Content Analysis	A literature review study of Information and Communication technology as a	Lennart Magnusson, Elizabeth Hanson and martin Borg	2004	The study discussed and gave the overview of the current 'state of the art' about the in-	The articles expressed that unaccess and unavailability of the computers, lack of confident due to perceived ageing are

	support for frail older people living at home and their family carers			formation and communication technology as a support for frail older people living at home and their family carers. It has also focused on the attitudes of older people that affect their acceptance or rejection of new technologies in their daily lives.	the factors for negative attitude of elderly towards ICT, while the positive attitudes are strongly related to the personal usefulness of IT and internet in their daily living, such as for communication, leisure activities, banking and shopping as well as the involvement and enjoyment of benefits from learning ICT increase self-esteem, sense of wellbeing and reduced social isolation due to increase of social networks and intergenerational ties.
Content Analysis	OLDER ADULTS' ACCEPTANCE OF INFORMATION-	Lin Wang, Pei-Luen Patrick Rau and Gavriel Salvendy	2011	The article presented the factors explaining and predicting older adult's in-	The four factors as need satisfaction, perceived usability, support availability and public acceptance were

	MATION TECH- NOLOGY			formation technology acceptance be- haviors.	found using factor analysis. The need satisfaction and support availability were relatively more important according to the older people's self reported score. The linear regression found that the fac- tor of needs satis- faction and per- ceived usability are significantly related to the ac- ceptance of infor- mation technology.
Content Analysis	Factors in- fluencing acceptance of technolo- gy for aging in place: A systematic review	Peek S. et. al.	2014	The study sought to in- vestigate the factors that affect the in- tention to use electronic technology for ageing in place. Sixteen articles ful- filling the in- clusion criteria were used in	The result showed that in the pre- implementation stage, the 27 fac- tors influenced the acceptance of technology pre- sented in six themes. The six themes are: con- cern regarding technology, ex- pected benefits of technology, need

				the study. The articles discussed the acceptance of technology, which gives the safety and provides social interaction.	for technology, alternatives to technology, social influence, and characteristics of older adults.
Content Analysis	Social Media Use of Older Adults: A Mini Review	Anja K. Leist	2013	The study discussed on current knowledge of prerequisite in social media use of older adults, for example prerequisites are functional capacity, information and communications technology-related knowledge, and favorable attitudes towards social media	The result showed that online communities are best in providing and receiving social support during difficulty life situation, regardless of geographical location or time. And social media can be used to forward health related knowledge, to overcome loneliness, relieving stress and raising feelings of control and self -efficacy. It showed that the possible negative consequences could be misuse of

					personal data and distribution and uncritical adoption of harmful information through online communities.
Content analysis	How older people account for their experiences with interactive technology	P. Turner, G. VAN DE WALLE	2007	The article sought examination on range of causal explanation presented by older people who are facing the challenges of learning to use computers (PCs) and internets.	Through the interview to the subjects and analysis, the result showed that the elder people voiced difficulty of learning of interactive technology by expressing the factors, like anxiety, age related issues, being too busy to learn, and the need for a purpose for the new tools and other themes includes issue around alienation, identity and agency.
Content analysis	Gerontechnology acceptance by elderly Hong	KE Chen and Alan Hoi Shou Chan	2014	The article sought the investigation on the usage and	The result showed that there is a strong support of STAM and only

	Kong Chinese: a senior technology acceptance model (STAM)			acceptance of technology by older people in Hongkong.	68% of variance in the use of gerontechnology. The personal attributes like age, gender, education, gerontechnology self efficacy and anxiety, and health and ability characteristics, facilitating condition directly influence the acceptance of technology for older Hong Kong Chinese.
Content Analysis	Understanding and Changing Older adults' Perception and Learning of Social Media	Bo Xie, IvanWatkins, Jen Golbeck, and Man Huang	2012	The exploratory study which explore the perception of older people towards social media and also investigated educational strategies to facilitate their learning of social media.	The result showed that a thematic map developed, which demonstrate the change of perceptions from initial unanimous negative to the more positive and also showed that privacy was the key and main perceptual barrier to the adoption and for this effective

					education strategies were developed such as Introducing the concepts before introducing the functions, responding to privacy concerns and making social media personally relevant.
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Table 2 Summary of Searched Articles for Content Analysis

6.2 Theme formulation using conventional qualitative content analysis

The author in this data analysis section formulated the themes from the data on the basis of conventional qualitative content analysis. Conventional content analysis is usually used with a study design that has an aim to describe phenomenon, like in a given study. In this design, the investigator allows the categories and names for categories to flow from the data. In other word, coding, categories are directly and inductively derived from raw data in conventional content analysis. (Hsieh H. and Shannon S., 2005)

Through the reading of articles for many times, the author created themes, on the basis of the concept of the research questions as shown in the figure.

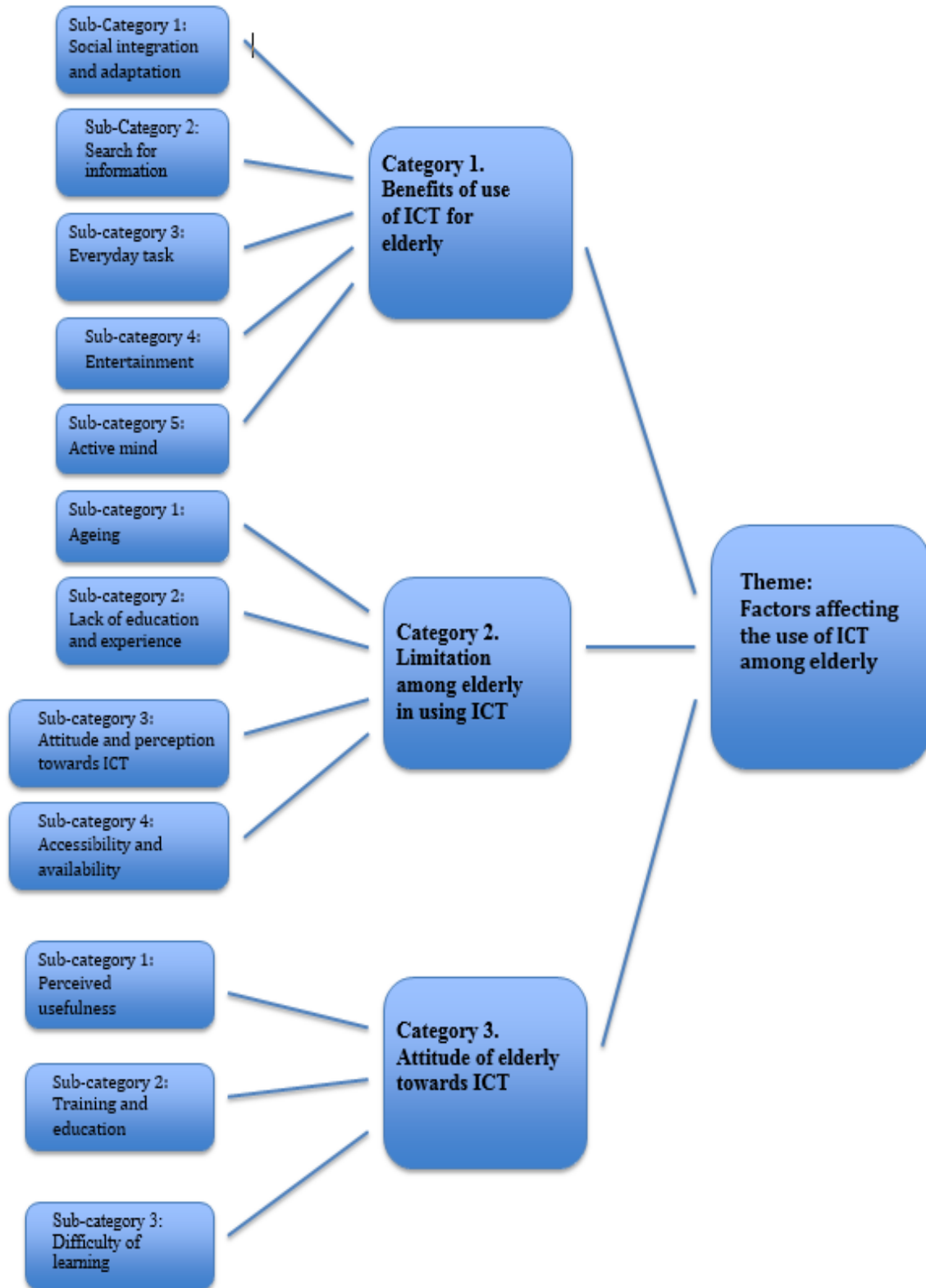


Figure 3 Categories and subcategories of theme

7. RESULTS

The results are discussed in the categories. The categories consist of benefits of ICT for elderly, barriers of using of ICT among older people and attitude of elderly towards ICT. These three categories examine the factors affecting the attitude of elderly using information and communication technology.

7.1 Benefits of use of ICT by elderly

ICT is related to any computer-based or computer assisted device or application using for communication and informational purposes. ICT is most refers to Internet connected computers, can be mobile communication devise or social media application. ICT has the potential benefits on the quality of life of the older peoples. Those benefits were mentioned as increased socialization, greater productivity, enhance physical and mental functioning, and increased self-esteem. (Berkowsky et al, 2013)

There is a current increase of interest of elderly towards learning and use of information and communication technology due to the demand in the society for social integration and adaptation. And this demand of social interpretation acts as a factor for successful ageing related to wellbeing and quality of life and of the adaptation to the changes part of their ageing. (Gonzalez A. et al, 2012, pp: 585) In the research by Gonzalez et al, 2012 about the attitude of elderly towards information and communication technology, the result showed that the some older people who develop self-confident and trust are more interested in participation of learning and using of ICT. Thus attitude and behavior is also the factor in learning and use of ICT by older people as mentioned in Gonzalez article. (Gonzalez A. et al, 2012)

The other benefits of ICT use for older adults that were mentioned in Berkowsky et al study, 2013, are decreased feelings of loneliness, decreased level of depression, decreased feelings of stress, increased feelings of personal growth and purpose in life and

increased feeling of independence. (Huber & Watson, 2014) It is mentioned in the study that if older adults are to be acknowledged about the benefits of computers or ICT, they are motivated and encouraged in the learning and use of technology. (Berkowsky et al, 2013)

The ICT can be used in the shopping and purchase of the things. In this case, older adults ask for the help from family or friends to search information on the Internet for making purchase of new technology. (Huber & Watson, 2014) The older people are to be prepared through training and education of ICT to be independent or to do their things by themselves with help of ICT. (Huber & Watson, 2014)

It is mentioned in the article that social media empowers the older adults, with global sense of connectedness, increases control and self-efficacy. (Leist A.K.)

7.1.1 Social participation and integration

The main benefit of ICT use among elderly is social interaction or social contact. (Magnusson et al, 2004, Berkowsky et al, 2013, Leist A.K., 2013, Peek S.T., 2014, Wang L. et al, 2011) As more number of older people is living alone, joining the online social networks and online discussion forums older people gets the meaningful social support from the social media. (Leist A.L., 2013) In the study of Gonzalez, it has been showed that the elderly are learning computers in the view of social participation and integration. Therefore the most of the answer by the elderly in the study revealed that the purposes of learning ICT were just learning, to make active mind and communication. (Gonzalez et al, 2012) The learning of ICT help older people to communicate, share and reestablish their connection with their friends, family, and community in large. (Berkowsky et al, 2013, Magnusson et al, 2004, Chen K. et al, 2014) So as a result of social networks and intergenerational contact, there is reduce social isolation, increase of self-esteem, sense of wellbeing among the elderly. (Berkowsky et al, 2013, Magnusson et al, 2004) The evaluation of Internet training for the older people indicated the positive effects on mood and isolation. (Magnusson et al, 2004, Leist A. K., 2013)

In the articles of Leist A.K., 2013, it was mentioned that older adult could use social media or computer-mediated communication for receiving or providing social support. It means that Internet offers manifold possibilities for older people with similar background to get in touch regardless of time and geographical restriction. (Leist A.K., 2013)

7.1.2 Leisure activities

It is expressed in the literature that the older adults who are engaged in social networking, they are motivated by the feelings of enjoyment and fun during use. (Wang L. et al, 2011, Leist A.K., 2013) They use Internet and computer technology for recreational activities like playing game as well. (Leist A.K., 2013) It is studied that activities being done with Internet and computer engage elderly with active participation and make active mind. (Magnusson et al, 2004)

7.1.3 Everyday task

Result showed that elderly use ICT for shopping and banking. (Magnusson et al, 2004, Huber & Watson, 2014) The technology can be used for safety of older adults. (Peek S. T., 2014)

7.1.4 Search for Information

The elderly people use information technology to access to information. (Wang L. et al, 2011) The older people over 65 years old use the Internet for email and searching news, health information, product information, family research and travel reservation. (Huber & Watson, 2014) With the use of social media, older adults and their family get the information on health-related knowledge such as information on prevention, diagnosis and treatment of specific conditions and disorders. (Anja K. Leist)

The gaining of information and knowledge, connectedness of emotion, support exchange in online social networks and discussion boards enhances the life satisfaction, wellbeing, connectedness and empowerment of older people. (Anja K. Leist)

The above experiences with ICT positively influence the belief in the usefulness of technology and affect the intention of use of technology. (Chen K. et al, 2014) Thus active lifestyle and participation in social activities of older people increase the interest of learning new things and acceptance of new advance in technology and their attitude to ageing and life satisfaction will be positively developed with usage behavior of technology. (Chen K. et al, 2014)

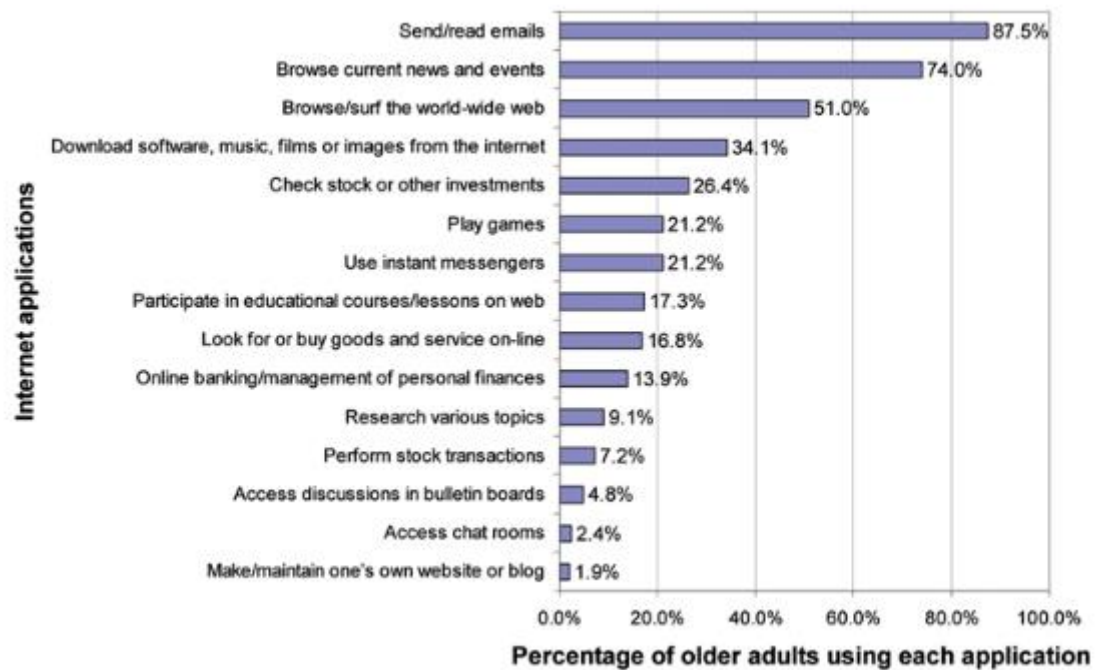


Table 3 Uses of Internet by Elderly

(Source: Wang L. et al. 2011, PP: 1090)

The above data in the result of the study done by Wang et al (2011) also shows that the older people use Internet mostly for sharing of information between family, friends and relatives, for social contact, as well to get information and for entertainment.

7.2 Limitation or barriers in using ICT by elderly

Though elderly are interested in learning and use of ICT, there are certain limitation or barriers that prevent the use of ICT and learning. (Berkowsky et al, 2013) The perception of being too old to learn, embarrassment over a lack of ability, cognitive decline

and or difficulties and declines in dexterity and visual ability are the barriers for the elderly to learn ICT. So it is said physical and cognitive decline of older people (loss of memory) are the factors challenging in learning and use of ICT for the older people. (Berkowsky et al, 2013, Huber and Watson, 2014, Turner et al, 2007, Leist A.K., 2013, Chen K. et al, 2014) The physical changes like declining eyesight, decreased ability to differentiate colors, decline of fine motor skills, hearing loss etc lead to the difficulty in learning of use of technology or ICT. (Berkowsky et al, 2013, Chen K. et al, 2014) It means effects of ageing is the reason in problem of using ICT (Magnusson et al, 2004, Chen K. et al, 2014)

It is also found in the study that, previous educational experiences of the older people effects in using and learning ICT. So the elderly who are involved in learning process for whole of their life time are able to use and learn computer system and have good positive effects towards using computer system. (Berkowsky et al, 2013)

Attitude towards computers, perception, experiences and lack of confidence towards new and emerging technology challenges their learning and using of new technology. (Berkowsky et al, 2013, Magnusson et al, 2004, Turner et al, 2007, Leist A.K., 2013)

The result of the study by Berkowsky et al, 2013 and Magnusson et al 2004 revealed that the access to the computer, feeling of complication and difficult with the use of computer and internet, difficulty of use of keyboard and mouse, unknown of use of computer and internet and difficulty of being access to the location of computer to use were the problem raised by some of the older peoples in the study.

Cost and fear of using technology are another barrier in use of technology among older adult, as the price of the technology system is expensive. (Peek S.T. et al, 2014, Leist A.K., 2013)

7.3 Attitude and perception of elderly towards ICT

The older over 65, who have learnt to use Internet, they said the main benefit is usefulness. (Huber & Watson, 2014) The study revealed that intervention programme like training and education about ICT to elderly developed the positive attitude and perceived the usefulness of ICT. (Berkowsky et al, 2013, Magnusson et al, 2004). The per-

ceived usefulness of technology leads the older people towards use of computer and technology. (Chen k. et al, 2014) As well as education or training will help older people to use their learning with new technology and remove the troubles with existing technology. (Gonzalez et al, 2012, Huber &Watson, 2014, Magnusson et al, 2004,) It means that the older people are to be prepared to be independent or to do their things by themselves. (Huber &Watson, 2014) It is also studied that elderly without or less computer experience felt difficult of computer learning and use. (Gonzalez et al, 2012, Huber &Watson, 2014) As the experience with technology increases, the comfort and confident level of using emerging technology increases. (Huber &Watson, 2014) The older people who feel more self-confident and trust, they are being able to use and learn ICT. The result of the study also presented that older people from the rural are feel more confident towards leaning and using ICT. (Gonzalez et al, 2012) The lack of full understanding of the technology changes older people's perception towards social media use and technology. (Xie B. et al, 2012)

Though the older were interested in learning computers, smartphones and new technology, they perceived difficulty of learning them. (Huber &Watson, 2014, Berkowsky et al, 2013) The result was presented in the study by Magnusson et. al, 2004, the attitude of elderly towards ICT leads to the acceptance and rejection of new technology. (Magnusson et al, 2004) Therefore positive attitude is strongly related with the personal usefulness of ICT and Internet in the daily living of elderly. (Magnusson et al, 2004)

7.4 Acceptance of ICT by elderly

The result was presented in the study by Magnusson et. al, 2004, the attitude of elderly towards ICT leads to the acceptance and rejection of new technology. (Magnusson et al, 2004) In the result of the investigation by Peek S.T., 2014 on factor influencing the acceptance of technology on ageing, it has been reveled that there are 27 factors influencing the acceptance of technology which are grouped in six themes: concern regarding technology (high cost, privacy implications, and usability), expected benefits of technology (increased safety, perceived usefulness), need for technology (perceived need and subjective health status), alternatives to technology (help by family or spouse), social influence (influence of family, friends and caregiver), and characteristics of older

people (desire to age in place). The satisfaction with technology and affect towards technology also play role in the acceptance of technology by elderly. The previous level of education knowledge also affects the accepting the use of ICT in later life. (Peek S.T., 2014, Berkowsky et al, 2013) The need satisfaction, perceived usability (Chen K., 2014), support availability and public acceptance were the factors that lead the older people to the acceptance of information technology, which were found by factor analysis as shown in figure. (Wang L. et al, 2011)

No.	Items	Factors			
		Needs satisfaction	Public acceptance	Perceived usability	Support availability
1	Enjoyment	0.898	0.008	-0.015	0.071
2	Connecting to others	0.810	0.052	0.092	0.137
3	Accessing information	0.668	0.314	-0.225	0.313
4	Being younger	0.603	0.466	0.221	-0.233
5	Comfort/Convenience	0.558	-0.161	0.539	0.145
6	Efficiency	0.461	-0.147	0.359	0.374
7	Innovativeness	-0.049	0.763	0.000	0.030
8	Word of mouth	0.077	0.721	0.093	0.145
9	Visibility	0.188	0.586	0.313	0.342
10	Keep up to date	0.402	0.525	0.302	-0.333
11	Behavioral control	0.042	0.201	0.838	0.024
12	Ease of use	0.123	0.353	0.652	0.042
13	Family and friends' support	0.143	0.215	-0.015	0.710
14	External support	0.353	0.056	0.165	0.665

Table 4 Results by Factor Analysis for Identification of Factors Influencing Older's People's Acceptance of ICT

(Source: Wang L. et al. 2011, PP: 1091)

Thus acceptance of information technology by older adults reflects their positive attitude towards ICT. (Wang L. et al, 2011) It is also revealed in the result of the study by Xie B. et al, 2012, privacy is one of the primary and key perceived barriers in accepting the social media and ICT as older participants were expressing the unprotection of personal information on social media sites. (Xie B. et al, 2012)

Turner et al, 2007 investigated the results, which reveal negative experiences of the older people with technology, which reflect older people's rejection towards technology. This study presented the themes of negative experiences with technology as alienation, identity, agency, anxiety, age related, being too busy. (Turner et al, 2007). There was a narration of the older adult in the study as ' I don't understand this, I don't ... this is... no this is not my world at all', 'In fact, they are so time consuming that they are getting in the way of ...', 'There are other things that I'd rather do.' (Turner et al, 2007) Thus these narrations regarding use of technology in the study by Turner et al, 2007 represent negative experiences and attitude towards use of technology among older people. Thus this negative experience towards technology is challenges in the learning and engaging with the technology for elderly.

8. DISCUSSION

This is a literature review to find out the factors or condition affecting the use of ICT by elderly. The search of articles was done on the basis of attitude of elderly towards information and communication technology. The quantitative content analysis was done, where the conventional content analysis was used for the data abstraction and synthesis. The categories were created from the data with reading multiple times and on the basis of the research questions. The categories are: 1. Benefits of use of ICT among elderly, 2. Barriers and limitation of using ICT among elderly and 3. Attitude of elderly towards ICT. According to these categories the answers of the research questions were identified and searched from the data (articles). Regarding the benefits of use of ICT among elderly, most of the article had focused on the social integration and adaptation to the society. As there is increase number of elderly in the society and the demand of use of technology or communication technology has encouraged them to use the computer system to do their daily activities and to be stayed in social connection with family, friends and relatives. The social connection and social support are the important benefits of use of ICT among elderly. This social integration are concerned with the purpose of decreasing isolation feeling, decreasing depression, decreasing stress, active mind with participation among the older people. The other benefits of use of ICT among elderly are search for

information, doing everyday task like shopping and purchase, safety of their own, entertainment and finally the activities the elderly with ICT lead them to become independent or develop feelings of independent and ICT helps in become active mind in social participation and activities. Thus the ICT is responsible for the physical, cognitive and social development of the older people in the society. And thus with the perception of the usefulness and benefits of the ICT, older people are more motivated towards it and develops the feeling of personal growth, get the purpose in life, and life satisfaction, which are the part of active ageing or wellbeing. Conclusively, this wellbeing of elderly gives quality of life to them.

The some older people are not using or not motivated towards information technology or computers. The reason behind this is due to presence some barriers and limitation of using ICT among elderly. The barrier of using ICT among elderly is ageing itself. Due to ageing, older people have physical problem like poor eye-sight and loss of hearing, cognitive decline and psychological problems, like fear, loss of confident etc. These lead to difficulty of learning and use of ICT. The other limitation of using ICT among older adults were found as lack of previous education or lifelong learning process, lack of experience and knowledge towards computer or technology in previous life, the poor perception and attitude towards ICT of older people, accessibility and availability of computers or information technology, high cost of the computers. These limitations of use of ICT among elderly distract the use of the ICT in the older age and of course there is declination in the wellbeing of older adults.

Attitude of elderly towards ICT also influences the use of ICT among elderly. There are different factors that explain attitude of elderly towards ICT or computer. Those factors found in the study were usefulness of Information technology, perceived usefulness after the education or training of ICT, Training and Education programme themselves, difficulty of learning or use of computer or ICT, previous experience and education and lack of self-confident and trust. Therefore these factors bring either positive or negative perception towards ICT so that the older people decide or motivate towards using of ICT. If they are interested or accept the using ICT, they will continue to use of ICT for their wellbeing and satisfaction.

9. CONCLUSION

Thus, to conclude, the literature review highlighted the factors affecting the use of information and communication technology among older people and determined as attitude and perception of elderly towards information and communication technology, benefits of use of ICT among elderly, barriers of use of ICT among elderly affected in the use of ICT among elderly or acceptance of information and technology. These ICTs are taken truly as the innovative models for the older people in the society, which are responsible for the active and successful ageing of older people. Thus older people also have the feeling of well-being and satisfaction due to which quality of life of older people is gained and improved.

10. RECOMMENDATION

The author would like to recommend further more collaborative researches about the technology and older people in the future for formulation of the policy and strategy regarding the information technology for older people. This create a responsive support services to the older adults in the society to deal with the ICT or new emerging technology, which is used to enhance quality of life of older people in their daily life.

As during the literature review, it was difficult for the author to find out the study in health and social field, the author would recommend the health and social care researchers to conduct the research on the topic related to the older people and technology. This would give a some hints or idea to related the topic with health and social field as well and it would be easier to get information for other future researchers and students.

11. LIMITATIONS OF THE STUDY

There are challenges arose during conduction of this study. As the author was involved with other study, there was limited time for this study. During the period of data collection, there was limitation faced by the author and there was problem of finding the relevant data available in the databases. There were only very few study found in the field of health and social care. The author had to accept the data studied in other field of Education Gerontology, Technology and Bio-informatics.

The data analysis process was also difficult in the study because the author was using for the first time with this literature review method. The challenge in this process was coding process of data. Selecting the categories and subcategories during the process was very comprehensive and straightforward procedure. Though, it was very difficult to collect the subcategories from the data and belonging them to the category, because sometime one subcategory was related to other sub category as well. However, with critical analysis through the literature review, the author is understood the data analysis process.

These results were collected from very few data studied from specific part of the world, thus all the information related to the topic could not be included from the data and this study can not be generalized. As all the designs and methods of study have their own limitation, as this process is also not far away of the limitation.

REFERENCES

- Adler, R. P., 2002. 'The age wave meets the technology wave: Broadband and older Americans'. [Online] Available at: <http://www.seniornet.org/downloads/broadband.pdf> [Accessed 8 November 2014]
- Arcada. 2014. *Degree Thesis*. [Online] Available at: <http://start.arcada.fi/en/degree-thesis> [Accessed 1 September 2012]
- Arcada. 2014. *Thesis Guide 2009 Version 1.2*. [Online] Available at: http://studieguide.arcada.fi/en/webfm_send/584 [Accessed 6 November 2012]
- Aveyard, H. 2010, *Doing a Literature Review in Health and Social Care: A Practical Guide*. 2nd ed. London: Open University Press.
- Berkowsky, R., W., Cotton, S., R., Yost, E., A. & Winstead, V., P. 2013, "Attitudes Towards and Limitations to ICT Use in Assisted and Independent Living Communities: Findings from a Specially-Designed Technological Intervention", *Educational Gerontology*, vol. 39, no. 11, pp. 797-811.
- Bouma H., Fozard J. and Bronswijk J., 2009. Gerontechnology as a field of endeavor. *Gerontology*, 8(2), pp. 68-75.
- Chen, K. & Chan, A.H.S. 2014, "Gerontechnology acceptance by elderly Hong Kong Chinese: a senior technology acceptance model (STAM)", *Ergonomics*, vol. 57, no. 5, pp. 635-652.
- Dictionary. *Merriam-Webster*. [Online] Available at: <http://www.merriam-webster.com/dictionary/well-being> [Accessed: 3 November 2014].
- European Parliament, 2011. Innovation for Quality of Life and Healthy Ageing. *Alliance LIBERALS and DEMOCRATES for Europe*, pp: 1-4
- Eurostat, 2012. *Europe in figures- Eurostat yearbook 2008*. [Online] Available at: <http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes> [Accessed: 11 November 2013].
- Fujii C., Okahisa R., Matsushita Y., & Tada T., 2012. Health behavior of elderly people engaged in agriculture in conjunction with information communication technology. *The Journal of Medical Investigation*, vol.59, pp. 195-205.
- Gabner K. and Connad M., 2010. ICT enabled independent living for elderly, A status- quo analysis on product and the research landscape in the field of Ambient Assisted Living (AAL) in EU-27. *AAL*, pp: 1-91
- Gabriel Z. & Bowling A., 2004. Quality of life from the perspectives of older people. *Ageing and Society*, 24, pp: 675-691
- González, A., Ramírez, M., Paz & Viadel, V. 2012, "Attitudes of the Elderly toward Information and Communications Technologies", *Educational Gerontology*, vol. 38, no. 9, pp. 585-594.
- Hsieh, H. & Shannon, S.E. 2005, "Three approaches to qualitative content analysis", *Qualitative health research*, vol. 15, no. 9, pp. 1277-1288.

- Huber, L. & Watson, C. 2014, "Technology: Education and Training Needs of Older Adults", *Educational Gerontology*, vol. 40, no. 1, pp. 16-25.
- Lawhon T., Ennis D., & Lawhon D. C., 1996. Senior adults and computers in the 1990s. *Educational Gerontology*, 22 (2), pp.193-201.
- Leist A. K., 2013. Social Media USE of Older Adults: A Mini-Review. *Gerontology*, 59, pp. 378-384.
- Machi L. and McEVOY, 2009. *The Literature Review: six steps to success*. 1st ed. Corwin Press: A SAGE company.
- Magnusson, L. & Hanson, E. 2005, "Supporting frail older people and their family carers at home using information and communication technology: cost analysis", *Journal of advanced nursing*, vol. 51, no. 6, pp. 645-657.
- Magnusson, L., Hanson, E. & Borg, M. 2004, "A literature review study of information and communication technology as a support for frail older people living at home and their family carers", *Technology & Disability*, vol. 16, no. 4, pp. 223-235.
- Mikkola K. and Halonen R., 2011. "NONSENSE?" – ICT PERCEIVED BY THE ELDERLY. *European, Mediterranean & Middle Eastern Conference on Information System 2011*, Divani Apollon Palace and Spa, Athens, Greece, pp. 306-317.
- Naumanen M. & Tukiainen M., 2008. Practises in old age ICT- education. *IADIS International Conference and Exploratory Learning in Digital Age (CELDA 2008)*, pp. 261-269.
- Older People, National Service Framework for Older people, 2001. *Department of Health*. [Online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/198033/National_Service_Framework_for_Older_People.pdf [Accessed: 3 November 2014]
- Opportunity – Opportunity and security throughout life, 2008. *DWP*. [Online] Available at: http://webarchive.nationalarchives.gov.uk/20081021225600/http://dwp.gov.uk/opportunity_age/ [Accessed 3 November 2014]
- Neves, B., Amaro, F. 2012, "Too Old For Technology? How The Elderly Of Lisbon Use And Perceive ICT", *The Journal of Community Informatics*, vol. 8, no. 1.
- Peek, S.T.M., Wouters, E.J.M., van Hoof, J., Luijkx, K.G., Boeije, H.R. & Vrijhoef, H.J.M. 2014, "Factors influencing acceptance of technology for aging in place: A systematic review", *International journal of medical informatics*, vol. 83, no. 4, pp. 235-248.
- Phelan, E.A., Anderson, L.A., Lacroix, A.Z. & Larson, E.B. 2004, "Older Adults' Views of Successful Aging??How Do They Compare with Researchers' Definitions?", *Journal of the American Geriatrics Society*, vol. 52, no. 2, pp. 211-216.
- Polit D. F & Beck C. T., 2008. *NURSING RESEARCH, Generating and Assessing Evidence for Nursing Practice*. 8th Ed. Lippincott Williams and Wilkins.
- Sinclair D. et al, 2008. 'Older people and Information and Communication Technologies, An Ethical Approach'. *AGE, The European Older People's Platform*, pp: 1-8.
- Torp, S., Hanson, E., Hauge, S., Ulstein, I. & Magnusson, L. 2008, "A pilot study of how information and communication technology may contribute to health promotion among elderly spousal carers in Norway", *Health & Social Care in the Community*, vol. 16, no. 1, pp. 75-85.

- Turner, P., Turner, S. & Walle, V.D. 2007, "How older people account for their experiences with interactive technology", *Behaviour & Information Technology*, vol. 26, no. 4, pp. 287-296.
- Ventegodt, S., Merrick, J., & Andersen, N.J., 2003. Quality of Life Theory I. The IQOL Theory: An Integrative Theory of the Global Quality of Life Concept. *The Scientific World Journal*, 3, pp. 1030-1040.
- Wang, L., Rau, P., Patrick & Salvendy, G. 2011, "Older Adults' Acceptance of Information Technology", *Educational Gerontology*, vol. 37, no. 12, pp. 1081-1099.
- Wikman A. M., 2008. Ageing well, Mobile ICT as a tool for empowerment of elderly people in home health care and rehabilitation. *Doctoral thesis. Luleå University of Technology*. [Online] Available at: <http://epubl.ltu.se/1402-1544/2008/44/LTU-DT-0844-SE.pdf> [Accessed: 8 November 2013]
- World Health Organisation, 2002. Active ageing A Policy Framework. *WHO*. [Online] Available at: http://whqlibdoc.who.int/hq/2002/WHO_NMH_NPH_02.8.pdf. [Accessed: 3 November 2013].
- World Health Organisation (WHO). 2014. 10 facts on the ageing and life course. *WHO*. [Online] Available at: <http://www.who.int/features/factfiles/ageing/en/> [Accessed: 8 November 2014].
- Xie, B., Watkins, I., Golbeck, J. & Huang, M. 2012, "Understanding and Changing Older Adults' Perceptions and Learning of Social Media", *Educational Gerontology*, vol. 38, no. 4, pp. 282-296.
- Zhang Y. and Wildemuth B.M., 2009. *Qualitative Analysis of Content*. [Online] Available at: https://www.ischool.utexas.edu/~yanz/Content_analysis.pdf [Accessed: 5 December 2014]. pp. 1-12.