THE IMPACT OF MODERN COMMUNICATION TECHNOLOGY ON THE QUALITY OF LIFE AMONG THE ELDERLY

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Abstract:

Adoption of communication devices and technologies among elderly people has been on the increase in recent past. These devices and technologies can be put to better use to enhance elderly's QOL. This research project aimed at establishing the impacts of modern communication devices and technologies on elderly's QOL. A review of ten articles was undertaken to answer the two main research questions. Graneheim & Lundman (2004)'s qualitative content analysis proved useful in the analysis of data from the ten articles. Results indicate a close relationship between modern communication technology and the QOL among the elderly. In addition, modern communication technology was seen to help the older generation in carrying out their everyday activities as well as in monitoring their health, to provide opportunities for creating social networks and in increasing their social participation. The researcher, however, suggests that further studies be conducted to assess the adverse effects of modern communication on the lives of elderly people. Such kind of studies would help policymakers in making more informed decision regarding the elderly.

Keywords:	Modern Communication, Older Generation, Technology, ICT, Quality of life
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1. INTRODUCTION

The world's population is aging at an alarming rate (UN, 2015)). Population aging, which the United Nations (UN) describes as the share of old people in a population, is expected to be one of the major social transformations of the 21st century, with dire implications to every sector of the world economy (UN, 2015). The UN also expects the number of those over the age of 60 to grow by fifty-six percent from 0.9 billion in 2015 to 1.4 in 2030. The development, coupled with the rapid increase of life-threatening illnesses, (World Health Organization, 2015), has created a big demand on the earth's limited resources both in monetary terms and human resources. The utilization of information and communication technology (hereafter ICT) offers a probable solution to this healthcare challenge. ICT has the capability of modifying how people utilize healthcare services both by increasing availability of information and offering other forms of support remotely (Kinsella & He, 2009).

The term elderly refers to the entire population of people aged 65years and over as indicated by the World Health Organization (WHO). For the elderly, it is significant that communication offers a human-centered approach to meet their immediate needs. Elderly people include retirees from jobs who contribute very little to the economy since their health conditions disqualify them from engaging in major tasks (Walker, 2005). Modern technology has a positive influence on the living situation and conventional life activities of the older population (Dwivedi & IGI Global., 2009, s. 10). The aspect is evident the capabilities capture in various literature (Gell, Rosenberg, LaCroix, Patel, & Demeris, 2015). Technology, in this case, is the application of scientific and technical expertise to simplify the conventional activities of the older adults. The older adults housing options fall into three major categories. They encompass independent living, assisted living, and nursing homes (Earp et al., 2008, s. 13). The major role that communication technology has played in enhancing the quality of life (hereafter QOL) is through sustaining independent functioning, security, autonomy, and safety of the old adults. In the same way, the elderly who are using the information technology find themselves wanting to know more about their own health. This has increased the use of computers in a bid to compensate the little information provided by the doctors and other health providers (Gros et al., 2016). An increasing number of elderly patients are continuously searching for the information online about their

health conditions and their medical conditions (Detmer et al., 2003). A plausible reason for the continued usage of technology could be highlighted by the lack of sufficient pharmacological guidelines on sufficient treatment regimes (Singh, 2014). Singh (2014) points out to the fact that existing clinical guidelines fail to adequately explain on the application of treatment recommendatiosn to the elderly.

Recent technological advancements have been made in all the three settings. Independent living is characterized by private housing. Assisted living is a relatively novel kind of residential option. It entails a housing scheme where elderly people with disabilities live privately in homes structured to suit their needs. Nursing homes were initially considered by the public to be the last resort before death. However, many people avoided taking their loved ones to the nursing homes. (Kaufman & Sharon, 2005, s. 20). A range of technologies has been established to augment the security and independence of the elderly thereby enhancing their QOL. They include assistive gadgets, which compensate for their cognitive, sensory and motor challenges, monitor and response devices that aid during emergencies and which provide early warnings for less critical and emerging problems (Sixsmith, 2013, s. 26).

The older population is prone to alterations in a motor movement that comprises slackening down, failure to have continuous movements and absence of variable coordination. Sensory difficulties are also normal for the elderly. Complications in gross motor development are mitigated by gadgets that either carry out the motor function, such as stair climbers and powered wheelchairs or assist the elderly in performing the motor function. There are also power-assisted chairs which do help elderly people with rising and sitting. Low-light visual cues and hearing devices are also available to help the deteriorating senses (Kaufman & Sharon, 2005; Gell;Rosenberg;LaCroix;Patel;& Demeris, 2015).

Technological advancement for cognitive aging is experiencing tremendous growth. The cognitive devices vary from the simple reminder systems to more the elegant interactive robotic assistants. Some of the cognitive devices offer support for extreme cognitive dysfunction such as severe dementia. Locator devices for lost valuables are available to be used by the old adults

with memory loss and their caregivers in a bid to extend their independent living. Some of the monitoring devices address the security and safety of old adults who might wander and get lost in their neighborhood (OECD, 2013, s. 93)

Technology advancement has provided devices that prevent undesirable wandering or remind people to take corrective actions. Several systems have also been developed to go along with the devices. Finally, technological advancement has helped the old adults with their social needs. The old adults can join chat rooms and instant messaging to link up with their friends and family (Leonard et al., 2011, s. 51).

This study is aiming to address the high numbers of elderly people in institutions by coming up with a process that will promote the aging in place and at the same time ensuring that elderly's QOL is ensured. The Main objective of the study assesses how ICT can be used to ensure that elderly people stay longer in their homes while receiving care, monitoring and in this way, minimize the people in the institutional care centers.

2. BACKGROUND

A research by Gros et al. (2016) established that ICT represents pervasive assistive tools for today's life and that their use is set to grow enormously in the healthcare domain. In nursing care, ICT can, for instance, enhance diagnosis and stimulation strategies in several nursing fields. New ICT technologies are progressively used in integrating administrative methodologies in neuropsychiatry to assist obtain reliable assessments (Gros et al., 2016). Today's ICT technologies offer numeric solutions such as computerized tests or technology solutions such as wearable sensors that help measure physiological parameters such as walking quality, posture, health beat, sleep quality and electroencephalogram (Gros et al., 2016)).

Some of the novel ICT technologies in use today include wearable sensors and environment sensors which are utilized to assess and manage affective disorders in elderly people. Schaefer et al. (2014) for instance has shown that measuring feedback of a heart rate by an elder patient could reduce his or her stress rate. Computerized cognitive tests have also been found to be more applicable in tactile tablet format and may be used at home or in nursing homes while virtual reality could be utilized specifically in speed monitoring and training of visuospatial abilities (Robert et al., 2016). Today a professional nurse could recommend the use of the integrated advanced robotic system in promoting the adherence to medical recommendations among elderly patients (Rantanen et al., 2017).

ICT has in the recent past been a major driver for several enhancements in modern society including public society, transport, education, and healthcare (Hardill & Olphert, 2012). The society has rapidly adopted communication devices such as mobile phones, and through constant innovation and improved functionality, they have empowered users to accomplish new levels of efficacies and social connectedness. Hardill and Olphert (2012) argues that people have realized that modern ICT devices are no longer simple communication tools but rather a means through which they can obtain convenience, access to diverse service portfolios including social networking applications and applications for accessing information

Current studies have focused on analyzing how ICT has been leveraged to improve aspects such as speed, efficiency, and productivity (Berkowsky et al., 2013). However, some researchers have

expressed concern about the lack of focus on how ICT can improve people's QOL or wellbeing, particularly in the case of certain demographic groups such as the disadvantaged (de Jager & Van Belle, 2014), as well as age groups such as the elderly. Hardill and Olphert (2012) propose that these groups have derived most benefits from ICT. This paper sought to address the relative paucity of research connecting modern communication devices use to the overall wellbeing and quality of elderly's life.

2.1 Quality of Life (QOL)

All social and healthcare systems aim at achieving a better QOL for all people. However, there has been no consensus with regard to the definition of the concept of QOL (Priebe & Fakhoury, 2008). This is despite the concept being introduced two millennia ago when Aristotle defined it to mean an individual's welfare or happiness. Aristotle stated that people bear the responsibility of achieving their own happiness by using all the available capabilities and resources available to them. In doing so, people are able to lead a quality life.

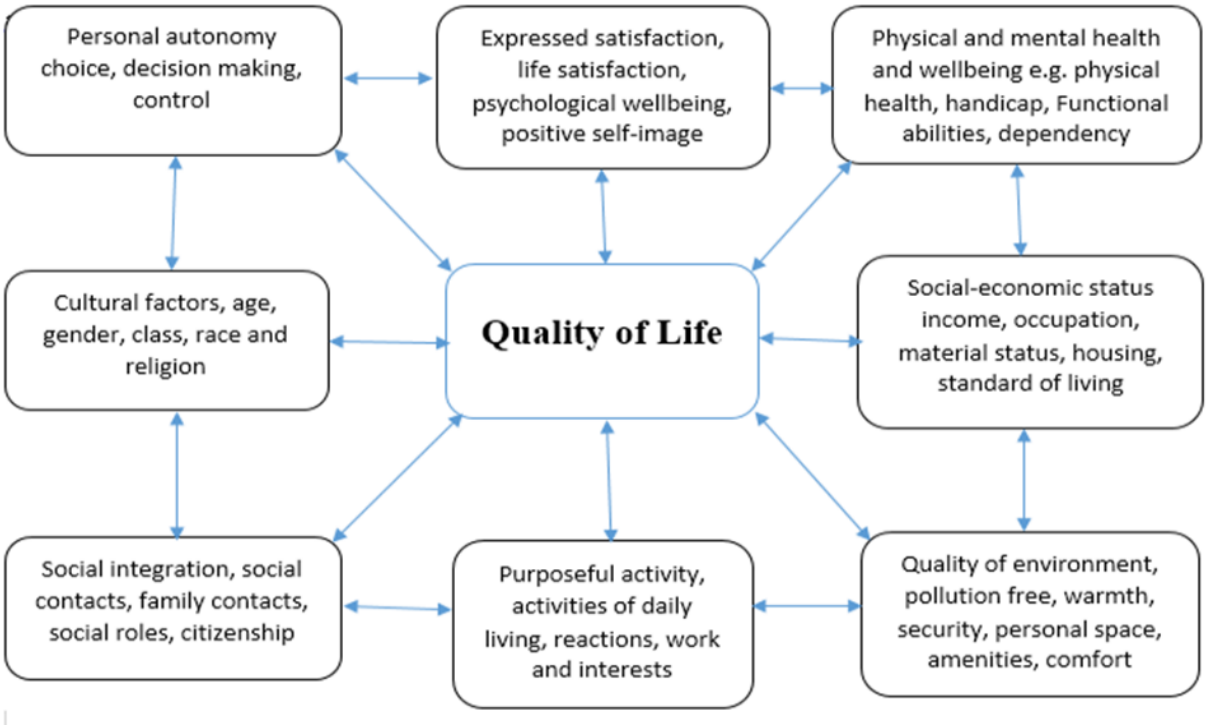
From an elderly person's perspective, quality life encompasses concepts such superb social connections, aid and assistance, living in private homes, involvement in leisure activities as well as sustaining social events and maintaining a key role in the society. The older people require possessing a positive outlook and acceptance of situations happening to them that they do not have the ability to change. Excellent health and mobility and the possession of sufficient money to afford the basic instincts are essential in improving elderly's QOL. However, the definition of QOL should be based empirically on lay views and should reflect individual subjectivity and variation in the concept, whilst at the same time considering wider social circumstances faced by the older generation. Previous data from the QOL datasets indicates that the older generations require good social relationships with their friends, relatives, and neighbors (Walker, 2005).

2.2 Component of QOL

Hughes expected to recognize the segments of QOL that are focal and general. In her perspective, the idea of QOL is multidimensional and thus the description of QOL may change, contingent upon the nature of research (e.g. hypothetical, associated, approach), yet QOL can't be

lessened to a progression of objectively described prototypes, nor would it be able to be incorporated altogether by the subjective fulfillment communicated by the single person (Hughes, Quality of life, 1990). Hughes proposes a system approach, 'an interfacing arrangement of elements, which together characterize and survey the QOL' (Hughes, Quality of life, 1990, s. 54). Hughes (1990, p.55) recognized eight components (see Figure 1) that may be connected to subsystems, these are: purposeful activity, social-economic status, physical and mental wellbeing, quality of the environment, expressed satisfaction, personal autonomy, cultural factors and integration as seen below.

Figure 1: A theoretical model of QOL



Source: Hughes, 1990, p. 55

2.3 Philosophical Approaches

QOL is determined using three distinct approaches. The first approach is normative in nature, where an individual's norms or perceptions of their own QOL are impacted or based on their own philosophical and religious views as well as their intrinsic principles and beliefs (Netuveli & Blane, 2008). Utilizing this approach, an elderly can be said to have a high QOL if they live in such a manner that conforms to their own belief system. The second approach involves considering an elderly's preference satisfaction. This encompasses the elderly's capability to obtain and attain their desires with limited capabilities and resources at their disposal. This approach of assessing QOL ascertains an elderly's ability to obtain his or her desires and goals, and in so doing, optimize their respective wellbeing and happiness (Netuveli & Blane, 2008). The third method is subjective in nature. It describes QOL based on the perceptions and experiences of people. Utilizing this technique, a good QOL is attained when elderly experiences it as such. The method is very subjective and depends entirely on the elderly's perceptions of well-being, contentment, and happiness.

2.4 Measuring QOL

Current QOL research has proposed two scientific approaches to measuring QOL. The first technique entails measuring QOL utilizing objective or social indicators. The technique concentrates on observing and measuring particular external factors believed to be related to the concept of QOL, namely: individual's general health status, income, education and standard of living such as their place of residence and immediate environment. The basic assumption with this approach is that there exists an underlying connection between the relative indicators and the QOL for a person (Netuveli & Blane, 2008).

The second approach takes QOL as being dependent on a person's subjective experience of their lives. These factors include such constructs such as people's perceived happiness and their general life satisfaction. The approach defines QOL as a person's perceptions of their present state of living in the context of the value system and culture to which they belong as well as in relation to their concerns, standards, expectations, and goals (Netuveli & Blane, 2008). Most

researchers agree that QOL measures should include both subjective and objective factors. This is because QOL is an interaction of external objective factors which define a person's circumstances, with the internal subjective factors which determine how the individual perceive his or her own life.

2.5 Impact of modern communication technology on elderly's QOL

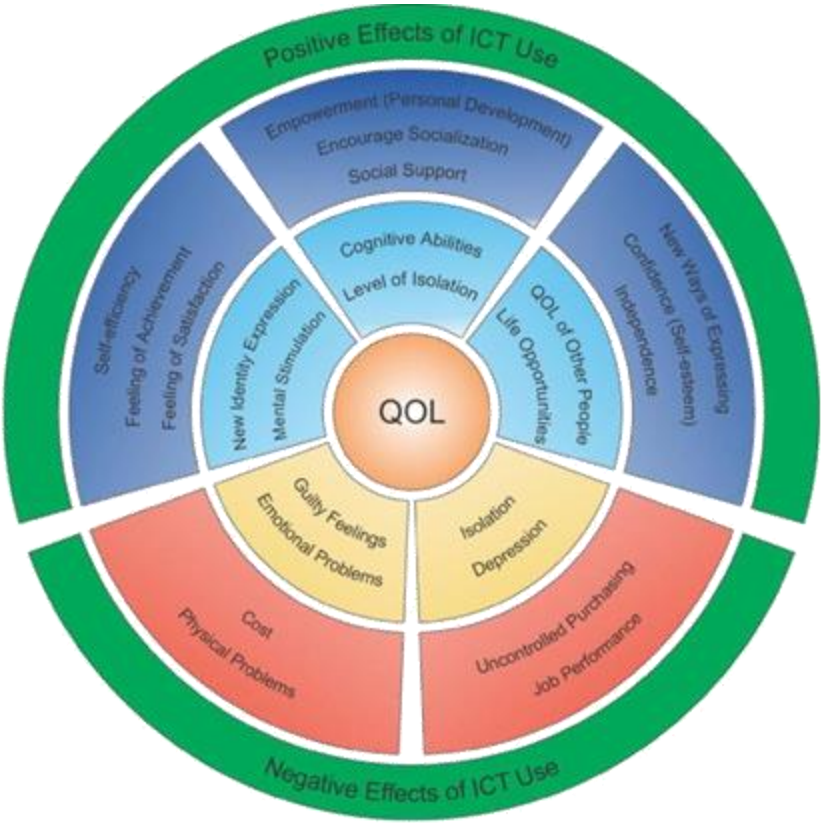
The outcomes of elderly people using modern ICT technologies can be classified as being either positive or negative. This part assesses both positive and negative consequences of the elderly use of ICT devices.

Nycyk and Redsell (2006) established that elderly's interaction with modern communication devices has a positive effect on their mental activity as they positively stimulate their mental wellbeing. Elderly people who use modern ICT devices such as phones feel less isolated and more confident about themselves (Kim, 2008). They also experience more social interaction and social support; feel more comfortable using these devices; and experience enhanced cognitive abilities. Acquisition of computer skills helps the elderly in maintaining an improved sense of efficacy and accomplishment, which in return necessitates individual development. A sense of accomplishment is particularly essential for the elderly people who had not acquired education previously because of challenging individuals and or other reasons (Ng, 2007).

Hernandez-Encuentra et al. (2009) argue that modern communication technology is important in meeting the needs and wishes of elderly people who use them. The researchers note that ICT has become an essential means through which the elderly can initiate, maintain contact and understand themselves in different ways. They can keep up connections and find out about themselves in different ways. Individuals encourage social connections by means of correspondence channels and accordingly have admittance to the novel and intricate interpretations of personality, and also have entry to modern methods of representation and correspondence, which expands their comprehension of proficiency beyond the conventional one (Wyn et al., 2005).

In addition to these positive impacts of ICT, Grabianowski, (2011) identifies various categories of responses related to the negative impacts of ICT usage such as emotional problems, physical problems, feelings of depression, guilt, isolation and potential influence on job performance. Physical issues occur when elderly spend too much time in front of computers, which could result in eye strain, backaches, neck-aches and stress injuries (Richardson, Zorn & Weaver, 2001). Increased computer use late into the night can result in sleep deprivation which causes difficulties in concentrating, drowsiness and depression to the immune (Grabianowski, 2011).

Figure 2: Positive and Negative impacts of ICT on elderly QOL



Source: Blazun, 2013, p. 44

The figure 2, above outlines the ensuing benefits and arising negative issues of ICT usage. Most of the positive aspects strive towards improving the quality of life by impacting on various fronts including cognitive and empowerment. Negative aspects border on costs and arising isolation (Blazun, Saranto, Kokol, & Vosner, 2012).

3. THEORETICAL FRAMEWORK

A theoretical framework is defined as a compilation of ordered ideas or concepts that direct a research. It gives the specific lens through which a researcher can assess the topic under review. In this study, the author uses the Social Cognitive Theory of Mass Communication. From a socio-cognitive view, human nature may be shaped by both observational and direct experiences. The social cognitive theory insists on the psychosocial mechanisms in which communication affects human actions, feelings, and thoughts (Earp et al., 2008). Communication affects the way people act or think through the messages and images availed. The following concepts have been applied in this research:

Symbolizing capability

Symbolizing capability is responsible for providing human beings with a great tool for understanding their ecosystem and controlling environmental activities from every aspect of their daily living. Most exterior influences impact on human behavior. Communication is an example of an external influence. It is a major source of power with respect to shaping the QOL of the older generation (Milrod & VanDam, 2001).

Social cognitive theory plays an important role in mental processes. Most exterior influences impact on human behavior indirectly through cognitive processes. Cognitive factors determine the environmental activities to be observed, the meaning to be assigned on them, the extent of their impact, their motivation and emotional impacts as well as how their information should be organized for use in the future. People may not largely be affected by observed actions especially when they do not emblematically code and recall them (Grant & Meadows, 2010).

Vicarious capability

Observation is one way through which human beings learn. This means of learning helps people expand their skillset and knowledge through the conveyance of information by use of different models. Much of social education happens either unintentionally or designedly from models in one’s own atmosphere. Widespread modeling within the symbolic environment offers people a

lot of information about behavioral patterns, style of thinking and human values. Largely, people will act based on their perception of reality (Milrod & VanDam, 2001).

Attention Processes

These processes determine what has to be selectively experienced in the profusion of modeling influences and what kind of information should be extracted from continuing modeled activities. Modelled events include things like one-way communication. A number of factors influence what is modeled; value preferences of the observers, preconceptions, cognitive skills, and the attractiveness of the modeled activities themselves (Kaufman & Sharon, 2005).

Social Construction of Reality

Substantial exposure to the symbolic world communication can, in the long run, make the older generation to feel part of the society. Communication effect is best described in respect of the contents people exchange than just the quantity of what they exchange. More individualized measures of exposures to communication indicate that substantial television viewing directs peoples' conceptions and beliefs of reality (Grant & Meadows, 2010).

Social Prompting of Human Behaviour

The information obtained from modern communication methods can also act as social prompts. The effect of models in supporting, channeling and activating the behavior of other people is widely documented in field and laboratory researchers. By exemplification, one is able to have people conduct themselves altruistically, offer unpaid services, delay satisfaction, show more love, choose particular drinks and foods, be passive or inquisitive other things (Milrod & VanDam, 2001). Thus, communication can serve as an efficient tool for making good decisions.

Applicability in the current study

Social Cognitive Theory of Mass Communication appears to be more applicable to current circumstance and secondary research for this study. The ability of human beings to think abstractly positions modern communication devices as an essential means of facilitating observational learning and enhancement of self-efficacy in performing certain actions. In turn,

the social cognitive theory of mass communication provides a vantage point for the examination of the influence of mediated content on elderly's behaviors and altitudes. The theory suggests that for mediated content to favorably influence elderly's behavior, the elderly should be attentive in order to attract truthfully performing applicable behaviors. The models that engage in positive actions should thus be positively motivated and reinforced (Bandura, 2001). As the current study considers the intersection between modern communication devices and elderly QOL, the theory is found to be useful in explaining both intended and unintended effects of ICT devices.

4. AIMS AND RESEARCH QUESTIONS

The overriding objective of the study is to highlight the value of modern communication and the impact it has on an elderly people. By conducting a scoping review, the researcher hoped to identify and pinpoint existing evidence on the link between modern communication and the QOL among the elderly.

Research Questions

The study was guided by two questions in focusing on modern communication technology and QOL:

a) What is the association between modern communication technology and elderly's QOL?

b) How can modern communication technology improve elderly peoples' QOL?

5. METHODOLOGY

Methodology describes the manner through which a research study is to be undertaken. It establishes the techniques for use in carrying out the research study, sample size, target population, research design, as well as the analysis and data gathering techniques. According to Rogers-Dillon (2005), the type of research methodology a researcher uses depends on the nature of his or her research questions.

In this research study, the researcher undertook a scoping review of secondary sources of information to identify the impact of modern communication technology on the quality of lives for elderly people. According to Dijkers (2015), an effective scoping review should make use of only secondary data that is relevant to a particular topic. An overview of what others have said regarding the particular topic under study is described in a scoping review. They have a have great utility for synthesizing research evidence and are usually utilized in categorizing existing literature in a particular field in terms of its volume, features, and nature. Grant and Booth (2009), notes that scoping reviews are preliminary assessments of probable scope and size of available research literature which aspires to establish the extent and nature of research evidence. It is usually used where a body of literature has not yet been reviewed comprehensively or exhibits a large and complex nature that is not amenable to a more precise systematic study (Peters et al., 2015). Inductive content analysis was utilized in the evaluation of related secondary data with a view to quantifying emerging characteristics and concepts. Content analysis can also be defined as the process of evaluating written literature in an orderly manner (Mayring, 2014).

5.1 Data collection

Before collecting data, the researcher sought approval of the supervisor. Thereafter, several articles were retrieved from a number of databases through the Arcada University of Applied Sciences. The articles provided background information regarding the subject under research and answered the research questions. The search used keywords such as modern communication technology, QOL for the elderly and information technology use among elderly people. Words with similar meaning with the keywords were considered while undertaking the article search.

The EBSCO database is configured in a manner that uses AND during the search process. Rows of AND can also be added when necessary to further expand the search. The researcher used the Boolean logic. Operators such as 'AND' and 'OR' were utilized in linking search terms. An asterisk was used to truncate words throughout the search, allowing multiple endings for the words.

Contrastingly, ScienceDirect and PUBMED have their interfaces designed in sentence forms. The researcher used keywords to construct well-designed sentences for search on the two databases. Examples of the sentences used include "how does modern communication affect the QOL of elderly", "ICT and elderly`s quality life" and Modern communication role in elderly`s QOL". For the database search, please refer to the appendix for the hits as per the respective database.

Research questions were formulated before the start of the research study to establish the articles that would help with relevant information. The researcher formulated an inclusion criterion with a view to making sure that only selected articles met the established criteria. The researcher did not intend to incur costs while collecting data and therefore the research used English-written articles that were accessible at no pay. Academic databases used to search the articles included Academic Search Elite (EBSCO), Cinahl (EBSCO), Cochrane Library, PubMed, Sage, ScienceDirect, and SportDiscus (EBSCO). The researcher established a criterion for excluding articles to ensure that only relevant and reliable articles were reviewed. Articles bearing non-scientific and irrelevant material were not used or reviewed. Any data source published earlier than 2000 was disqualified even if it had all the relevant information for the study. Subjective articles were also eliminated for the study to be credible and reliable. A thorough assessment of how the ten articles were arrived at is found in Appendix 1.

The researcher's intention was to use current secondary literature and thus the articles used had to be published between 2000 and 2017. A total of ten articles were selected for review. Table 2 summarizes the ten articles that were picked on the basis of inclusion and exclusion criteria for analysis.

Table 1: List of chosen data sources

1.	Chen, Y. R. & Schulz, P. J., 2016. The effect of information communication technology interventions on reducing social isolation in the elderly: A systematic review. *Journal of medical internet research*, p. 18.
2.	Rantanen, P., Parkkari, T., Leikola, S., Airaksinen, M. and Lyles, A., 2017. An In-home Advanced Robotic System to Manage Elderly Home-care Patients' Medications: A Pilot Safety and Usability Study. Clinical therapeutics, 39(5), pp.1054-1061.
3.	Gros, A., Bensamoun, D., Manera, V., Fabre, R., Zacconi-Cauvin, A.M., Thummler, S., Benoit, M., Robert, P. and David, R., 2016. Recommendations for the use of ICT in elderly populations with affective disorders. Frontiers in aging neuroscience, 8, p.269.
4.	Bolton, M., 2010. *Older people, technology, and community: the potential of technology to help older people renew or develop social contacts and to actively engage in their communities.* s.l.: Independent Age.
5.	Age, U., 2010. *Technology and older people evidence review*, London: Age UK.
6.	Blazun, H., Saranto, k., Kokol, P. & Vosner, J., 2012. Information and communication technology as a tool for improving the physical and social activity of the elderly. *American Medical Association,* p. 2012.
7.	Orlov, L., 2011. Technology survey age 65 to 100: Extending technology past the boomers. A Study Sponsored by Linkage.
8.	Vincent et al., 2006. Public telesurveillance service for frail elderly living at home, outcomes and cost evolution: a quasi-experimental design with two follow-ups. *Health and QOL outcomes,* p. 41.
9.	Blazun, H., 2014. Elderly Peoples QOL with Information and Communication Technology (ICT): Toward a Model of Adaptation to ICT in Old Age. University of Eastern Finland.
10.	Smith, A., 2014. Older adults and technology use: Adoption is increasing, but many seniors remain isolated from digital life. *Pew research center,* pp. 208-211.

5.2 Data Analysis

Data analysis process is the basic element through which credible results can be established in a qualitative research. It consists of transforming raw into themes and categories or narratives. According to Elo et al. (2014) there exist various approaches to data analysis that can be used by researchers.

The qualitative content analysis was used in the analysis of research data. It is a research technique for a non-objective explanation of data content via an orderly classification process of coding and recognizing patterns or themes (Neuendorf, 2016). The technique seeks to provide understanding and knowledge of the topic under examination. Through content analysis, researchers are able to comprehend social realities in a scientific manner through assessing contents and recurring themes in a certain volume of data. Neuendorf (2016) assert that unique themes can be detailed to show the set of meanings of research phenomenon as opposed to showing the statistical implications of happenings of certain concepts.

Content analysis is systematic and objective. Valid and replicable inferences can be drawn from data with an objective of providing a working action guide, knowledge and insights (Elo et al., 2014). Content analysis is content sensitive and flexible with respect to research design. Critics, however, say that the methodology is not adequately qualitative and that it is too simple. Others note that the methodology is difficult or simple depending on the way the user takes it. The research used qualitative analysis because it is un-obstructive and content sensitive. The method is inexpensive and can also be used in the analysis of large volumes of data. It can also be utilized to analyze data for a wider range of purposes and especially in nursing care.

The data analysis method has drawbacks just like any other technique. A manual content analysis may be very labor intensive and erroneous especially when the data used is large and complex (Vaismoradi et al., 2016). The researcher allocated adequate time to studying and establishing categories.

Worth noting is the study by Elo et al. (2014) that contend that content analysis is useful in the analysis of both qualitative and quantitative, either deductively or inductively. The inductive

approach is applicable where previous knowledge about a phenomenon under investigation is scarce or fragmented. Deductive method, on the other hand, is applied where there is sufficient existing knowledge.

Previous studies on the impacts of modern communication technology on the QOL for the elderly were scarce forcing the researcher to apply the inductive approach. Data analysis in the inductive method is based on existing knowledge whereas in inductive approaches concepts are derived from data. In an inductive approach, particular cases are considered and later put together to form a greater whole. The essence of content analysis is the ability to explore questions which may not be answered through quantitative approaches (Vaismoradi et al., 2016).

5.2.1 Inductive vs. Deductive

Data is condensed into themes and categories in qualitative content analysis depending on valid interpretation and inferences. It is not only utilized with qualitative data but also with quantitative data. Inductive reasoning is applied where themes or categories arise through the author's thorough assessment and constant contrasting (Elo et al., 2014).

Elo et al. (2014) also discovered that there are three techniques to qualitative content analysis depending on the extent inductive reasoning involvement. The first technique is the summative content analysis whereby a researcher begins by counting words and latter extends the evaluation to take care of latent themes and meanings. This technique appears quantitative in the initial steps but aims at exploring the utilization of word pointers in an inductive way. The direct content analysis is the second approach to qualitative content analysis in which a researcher begins by coding a theory and then makes an allowance for themes to emerge as he or she analyses the data (Elo et al., 2014). This approach validates and extends a conceptual framework. Third, is the conventional quality content analysis whereby coding of categories is derived inductively and directly from raw facts and figures. The approach is used mostly in developing the grounded theory. Qualitative content analysis enables researchers to allocate units of texts to more than one theme simultaneously. This is not the case in a quantitative content analysis as

categories and subcategories are mutually exclusive and thus a word or a sentence must always belong to one category (Elo et al., 2014).

While using content analysis in data analysis, the researcher paid much attention to the research questions, “What is the association between modern communication technology and elderly’s QOL?” and “how can modern communication technology enhance elderly’s QOL?” The author had to thoroughly understand the data in its entirety in order to be able to easily concentrate on the relevant and specific elements of the content.

The researcher used the open coding process in organizing the relevant articles, whereby numbers from one to ten represented the articles. The open coding system required the analysis of data by first having a deeper understanding of the material in order to establish the critical words relevant to the research question. The researcher had to repeatedly read articles while taking relevant notes and headings from the articles. On completion of notes taking, the notes were reread and important information listed and reexamined with each item being classified in a manner that provided a description of what the class talked about (Elo et al., 2014). The researcher later determined whether there were any associations between the categories which were listed as either minor or major theme. The author further examined the themes in detail to determine whether they fitted, was useful, and whether the information was as it was supposed to be. An assessment was also undertaken to determine whether to sub-categorize the themes or not. Lastly, the author had to review the original article texts in order to ensure that all useful information was incorporated into the developed themes.

In order to answer the research questions, categories were developed and a categorization that would result in the provision of adequate responses to the research questions. The researcher, using the inductive content analysis approach, developed the theme for the research and then classified it into categories and subcategories.

5.3 Ethical Consideration

Ethics describes the principles and standards that guide the actions and they work by establishing the kind of conduct and behavior that is forbidden, compulsory and allowed (Johnstone, 2015).

According to Artal & Robenfeld (2017) every kind of research must confront an ethical issue. The issues arise whenever researchers generalize information in relation to the benefit of the public while avoiding harm to the rights and privacy of research participants or other researchers. The amount of harm can be minimized or eliminated by using a set of proper ethical standards (Artal & Rubenfeld, 2017)

Throughout the research, the researcher maintained the instructions and standards of scientific research as established by the Arcada University of Applied Sciences. The topic of the research was identified and discussed with the subject supervisor for proper guidance. The researcher, being a member of Arcada University of Applied Sciences, used his right and freedom to access articles from academic databases.

The researcher strictly avoided quoting other authors directly without referencing their work honestly and correctly. Quotations were paraphrased to avoid any sort of plagiarism. Other others` right to privacy in regard to names, addresses, and dates of birth were respected and kept secret throughout the study.

Concepts, ideas, and themes in all the articles were not falsified in any manner by the researcher. Evidence-based concepts and ideas were not influenced by the researcher's opinion and emotions. Ethically sustainable means of gathering data and analysis conforming to scientific criteria was taken into account. The researcher was objective in collecting, analyzing and interpreting data to avoid any form of prejudice or bias. Through the whole process of content analysis, each and every article was analyzed independently in such a manner that other articles had no impact on the interpretation of the particular article constituent information (Elo et al., 2014).

6. RESULTS

In this chapter, the author determines the categories that were developed for the study and how the outcomes from the research helped answer the research questions. The researcher uses data from the collected articles to answer the research questions. On reading and analyzing the identified articles, the association between modern communication technology and QOL among the elderly emerged as the main theme. All other intervention aimed at enhancing the quality of elderly's QOL was centered on the main theme. Generally, the researcher looked at the main theme from a nursing perspective. The researcher developed the main theme and provided answers to the research questions using the data collected from the articles. Table 3 below shows an example of how the research theme was formulated.

Table 2: The major categories and their distribution in the 10 articles of analysis and theme formation

Themes	Relationship between communication technology and elderly people					How modern communication improves the QOL for elderly people	
Major and Minor Categories	Effects on QOL		Nature of the Association			Measurement	Nurses' role
	Mental	Physical	Unidirectional	Bidirectional	Correlation		
Units of Analysis	1,2,3,4,5,6,7,8,9,10	1,2,3,4,5,9	1,4	2,3,5,6,7,9,10	2,3,5,6,7,8	5,8	3,5,9

6.1 What is the association between modern communication technology and elderly's QOL?

The study established that modern communication technology is associated with the QOL for the elderly people [1, 2, 3,4,5,6,7,8,9, and 10]. With regard to the nature of the relationship, the researcher found that there is a close and positive association between modern communication technology and the QOL among elderly people [3, 6, 9, and 10]. Modern communication technology reduces isolation and loneliness, improves independence among the elderly and helps them to fully participate and contribute to their society [6, 9]. These aspects enhance their quality of lives as they partake of their day to day activities. Several articles show unidirectional association [1, 6], some bi-directional association [2, 3, 5, 6, 9, and 10] and others a correlation [5, 6, 7, and 9]. In general, the research finds that modern communication technology enhances the QOL for the elderly. This means that increased use of modern communication technology is positively connected to high-quality elderly lives.

6.2 How modern communication technology enhances the QOL for old people?

Information and communication technology has been seen to pervade elder people's lives all over Finland [6, 9]. ICT assists elder people in carrying out their everyday activities with ease as well as in monitoring their well-being, formation of social network systems and enhancing their engagement in societal activities and improve their safety [1, 2, 3, 4, 5, 6, 7, 8, 9, and 10]. Elderly's use of communication technology enhances social inclusion, improves professional participation and QOL and consequently improves their independent lives [1, 2, 3, 6, 9, and 10].

It has been established that the use of modern communication technology, especially the internet, to establish and maintain social contact among the elderly people is on the increase [2, 4, 5, 6, 9, and 10]. The use and access of modern communication technology are changing year on year especially because older people have had in one way used information and contact technology in their previous jobs [1, 6, and 9]. Those who can access email and social networking sites from their homes find it easy to stay in touch with relatives and friends as with a telephone [2, 3, 5, 7, 8]. Most elderly people (69%) participate in cultural events over the internet [6, 9]

Also, the older population, aged over 58 years, is progressively using modern communication technologies for more functional roles [1, 6, and 9]. Daily usage of communication technology among elderly people includes sending and receiving e-mails, accessing banking services, searching information and utilizing services for accommodation and traveling [6, 9]. 70 percent of people aged between 55 and 64 pay bills over the internet, compared to 22% of elderly people. For those above 65 years, the major purchases include holiday accommodation (44%), newspapers, magazines, books (40 percent), sports goods and clothes (38%), and household goods (37 percent). Interestingly, these older people also make travel arrangements (car hire, tickets, and transport) by use of modern communication technologies [6, 9].

The use of modern communication technology enables elderly people to live independently in their homes for longer [2, 3, 4, 6, and 9]. Assistive technology which includes a wide range of devices provides healthcare services to elderly people at a distance. The efficacy of ICT-based assistive technology in the prevention of cognitive impairment in the elder generation has been found to provide assurance to caregivers that their elder clients are secure and performing essential daily activities and, where not, notifying the caregivers, to help the elders compensate for their impairment, by helping in carrying out daily activities; and evaluating the elder's cognitive abilities [2, 4, 5, 6, 7, 8, 9].

7. DISCUSSION

This literature review addresses the potential impacts of modern communication technology on elderly's QOL. The outcome of the analysis of the ten articles has established that modern communication technology enhances the QOL among the aged, minimizing isolation and loneliness by keeping them socially connected with their acquaintances. Communication technology helps prevent or reduce social isolation, a condition that signifies an increased risk of worsening psychological and physical fitness for these elderly people. The absence of this state among elderly implies enhanced quality lives and prolonged lives among the elderly people (Blazun, Saranto, Kokol, & Vosner, 2012). The outcomes of this literature study provide emerging qualitative evidence to support the usage of modern communication technology in enhancing quality living among people aged above 55 years. The review advances the mechanism of how modern communication technology can improve the QOL and prolong the aging in place among the elderly.

7.1 Modern communication technology and the elderly's QOL

According to the analysis of the 10 articles, the utilization of ICT has a positive effect on the QOL among elderly people. Acquiring computer skills can help the elderly maintain an improved sense of efficacy and accomplishment which in return necessitates individual development. A sense of accomplishment is essentially critical for the elderly people who may not have acquired education previously due to the individual's challenges and other reasons.

The study highlights ICT as an essential tool through which elderly people can use to develop and maintain social contacts as well as understand themselves in the varied manner of ways. These individuals encourage social connections by means of correspondence channels and accordingly have admittance to the novel and intricate interpretations of personality, and also have entry to new methods of representation and correspondence, which expands their comprehension of proficiency beyond the conventional means (Czaja et al., 2006)

Modern communication technology is used by nursing caregivers to keep track of the health records for the aged generation. ICT helps elderly people to live in their homes thereby

eliminating the need for them to live in care homes that they sometimes find uncomfortable and think that their family has abandoned them (Czaja et al., 2006). Modern communication thus ensures that these old people stay in their own homes while accessing the same health services that they would have received when they lived in at their caregiver's premises. QOL among the elderly is improved with the provision of instant information about their geographical locations (Gilhooly et al., 2009). Their caretakers can track them down and bring them home to safety.

In addition, modern communication technology has been seen to aid the older people in performing their everyday activities as well as monitoring their fitness, forming social network systems and increasing their society engagement (Karimi & Neustaedter, 2012). The use of modern communication devices has the potential to foster social inclusion, enhancing their professionalism and QOL, and eventually enhance independent living of the elderly hence making them stay at home for longer periods (Karimi & Neustaedter, 2012)

7.2 Implying research findings through the theoretical framework

The study reviewed ten articles with a view to assessing the impact of modern communication devices on elderly QOL. All the articles reviewed suggested that modern communication devices have a positive effect on elderly's QOL. The research used the Social Cognitive Theory of Mass Communication as the base theory as indicated in the theoretical framework section. According to the theory, communication affects the way people act or think through the messages and images availed.

The study found that modern ICT devices are critical tools through which elderly people understand their ecosystem and control environmental activities from every aspect of their daily living. Elder people are able to communicate using modern communication devices such as cell phones, an aspect that enhances their happiness and wellbeing. Modern communication devices were also established to augment the security and independence of the elderly which enhance their QOL. Assistive ICT gargets compensate for their cognitive, sensory and motor challenges while response devices aid during emergencies and provide early warnings for less critical and emerging problems.

As per the social cognitive theory, the study found that communication devices enable the elder generation to feel as being part of the society. ICT devices are essential tools through which elderly people can develop and maintain social contacts as well as understand themselves in varied manner of ways. These individuals encourage social connections by means of correspondence channels and accordingly have admittance to novel and intricate interpretations of personality, and also have entry to new methods of representation and correspondence, which expands their comprehension of proficiency beyond the conventional means (Czaja et al., 2006).

In addition, modern communication technology was seen to aid older people in performing their everyday activities as well as monitoring their fitness, forming social network systems and increasing their society engagement (Karimi & Neustaedter, 2012). The use of modern communication devices has the potential to foster social inclusion, enhancing their professionalism and QOL, and eventually enhance independent living of the elderly hence making them stay at home for longer periods.

7.3. Expected Significance of Research Findings

Some nurses have been in the dark when it comes to making using modern ICT devices. They are unable to use advanced ICT technologies for fear of causing more harm to their elderly patients under their care. Results of this scoping review could be used by nurses to develop a broad picture of the dimensions of nursing care that enhances or supports the wellbeing of elderly people. The paper shows the importance of modern ICT devices in enhancing the quality of life among the elderly and therefore nursing professionals can rely on it to make informed choices regarding the use of modern ICT devices. They could for instance use findings from this research to defend their use of ICT devices to that ICT in carrying out their daily nursing activities and evaluating the elder's cognitive abilities (Rouleau et al., 2015)

8. CONCLUSION AND RECOMMENDATIONS

The study had the intention of answering two main questions, one of which was "How can modern communication technology enhance elderly's QOL? And what is the association between modern communication technology and elderly's QOL? The study established that ICT has been playing an enabling role when it comes to elderly's life. ICT assists elder people in carrying out their regular activities with ease, monitoring their wellbeing, creating social network systems and enhancing their engagement in societal activities and improve their safety. By using ICT, elderly people have social inclusion enhanced and their independent living improved.

Elderly people were found to use modern ICT devices to send and receive e-mails, access banking services, search information and use services for travel and accommodation. 70 percent of them aged between 55 and 64 pay bills over the internet, compared to 22% of elderly people. Others use ICT devices to make travel arrangements. Further the study found that ICT helps caregivers in combating cognitive impairment in older people, as they provide them with an assurance that their patients are secure and performing essential routine activities and, where not, notifying the healthcare provider, to help the elders compensate for their impairment, by assisting in carrying out daily activities; and evaluating the elder's cognitive abilities.

In relation to the nature of the relationship between ICT and elderly QOL, the study established that there is a positive relationship between the two variables. Modern communication technology reduces isolation and loneliness, improves independence among the elderly and helps them to fully participate and contribute to their society. These aspects enhance their quality of lives as they partake of their day to day activities. An increase in the use of ICT devices leads to an increased QOL.

The study has established that quality life among elderly people is an essential concept that does not require many resources to fulfill. The older people only need to be in a position to perform simple tasks without any help from their loved ones. They see themselves as burdens to their family members especially when they are unable to undertake basic tasks like going to the washrooms. Memory loss, for example, causes the old people to stray from their geographical

location and away from the people who watch over them. They end up facing undesirable scenarios like being robbed of their belongings or being run over by vehicles.

Modern communication technology has however led to the advent of devices that are used by medical caregivers to keep track of the changes that occur in the lives and assist accordingly. ICT also helps the elderly stay in their homes which eliminate the need for them to live in foreign homes that they sometimes find uncomfortable. These modern communication technologies aid the older generation in performing their day to day activities as well as monitoring their wellbeing, creating social networks and augmenting their participation in the societal activities. The use of modern communication has the ability to facilitate social inclusion and improve their QOL, and consequently improve their living independently hence making them stay at home for elongated periods.

The research concludes that communications technologies have a favorable influence on the QOL for the elderly, and therefore to realize the potential intrinsic in these communication technologies, there is the need to establish and motivate intermediaries who should encourage elder people by training on communications technologies and their associated benefits. With the family presence and encouragement, elder people can have the capability to become part of the solution, for instance, by engaging in peer-to-peer support programs.

8.1. Critical Analysis

Johnson (2006) established that the introduction and expansion of new information technologies are usually met with general suspicion and at times panic about potential negative results. The introductions of the TV and phone technologies were met with anxiety concerning the consequences for the self and the society at large. Initial research regarding social integration and impact of modern information technology is frequently influenced by mythologies and negativity (Johnson, 2006). Such are sustained by the media. Research has likewise demonstrated a “Digital generation gap” (Livingstone & Bober, 2004).

To eliminate instances of negativity in this research, a review was done only on peer-reviewed scientific articles to answer the research questions that had been formulated. The questions

would have been responded to properly had the researcher been able to access all the articles on sale. Elderly's QOL is the wide topic and the effects that modern communication technology has on it cannot be exclusively be articulated in a single article. The researcher had to comb through various academic databases to come up with a relevant list of articles for the study.

The study area was wide, entailing a background analysis of what modern communication technology and QOL are and what areas of elderly people`s life needed to be addressed. Many articles addressed single aspects concerning the effects of modern communication on the QOL for the elderly people. This meant that the research had to consolidate most of the information and come up with a more unified whole. During the search process, the researcher could not find an article that talked about the relationship between modern communication technology and the QOL among the elderly people. The search was limited to articles from 1995 and 2016 from only academic databases. Most recent articles from 2006 and above did not have all the relevant information needed to carry out the study and thus the researcher had to extend the search criteria to the year 1995.

All evolving themes were given equal attention to eliminate bias and help achieve objectivity for the study. The researcher however encountered some issues, especially during the search process. The articles that could provide most recent information had passwords or needed a subscription. The research is of the view that had he accessed the articles, he would have understood the topic of study better which would have enabled him to come up with a better analysis. This does not, however, mean that the results of this study are unsatisfactory since the author fully utilized the available resources and is thus satisfied with the results.

Reliability and validity issues were taken care of in this research. Choosing the most relevant content was the foundation of attaining research credibility. The researcher used articles that had relevant information and disregarded those that had unrelated information with respect to the research subject. Dependability which is described as the degree to which data varies over time was achieved by utilizing data from different time periods. Transferability was achieved by clearly describing the analysis, data collection and unit selection processes.

Validity of the research is described as the extent to which the research approach has helped achieve the objective of the research study. The researcher aimed to elicit understanding and knowledge of the modern communication technologies that improve the QOL among the elderly. The researcher believes that the use of understanding and knowledge from scientific articles helped achieve validity in the study. Also, the researcher is of the view that this study is reliable since he used scientific articles from academic databases.

8.2. Recommends for further studies

The researcher recommends future research to be conducted to establish the negative effects of modern communication devices on elder people's lives. Such kind of research would help policymakers in making more informed decision regarding the elderly. Also, further research should be conducted to establish the extent to which modern communication technology is used among the older generations.

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APPENDICES

Appendix 1: Demonstration of data collection processes and implication of the including and excluding standards

The following flow chart demonstrates the processes of data collection and implying the including and excluding criteria