The effect of technology upskilling on the quality of life of elderly people in Iran

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Seyed Ebrahim Hosseini

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Abstract

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Seyed Ebrahim Hosseini

The impact of smartphones and social media apps on lifestyle, Quality of Life, and well-being among elderly people is an important issue with digital communication becoming the predominant communication mode. The effect of using social media apps on the elderly people's Quality of Life in developing countries including Iran is an important area to address, to understand what future interventions should be recommended to policy makers. A mixed-methods study was designed to determine the impact of training in using smartphone social media apps (including Telegram, WhatsApp, and Instagram) on the Quality of Life of the elderly citizens in Shiraz-Iran. The population of the study was all the senior residents registered in local public health centres located in Shiraz, Fars, Iran in 2018-2019. The qualitative results were based on the analysis of semi-structured interviews, while the quantitative results were based on the changes in the mean scores of the CASP-19 scale and subscales (p-value) in the intervention population measured before the study, after the intervention and again one month later. In the quasi-experimental quantitative study, the intervention group in the CASP-19 questionnaire sub-scales (control, autonomy, pleasure, self-realization) mean values increased and the overall mean score of Quality of Life increased between the pre-test and the post-test and between the pre-test and the follow-up test. The control sub-scale had the lowest effect size (η^2 =0.11), followed by autonomy (η^2=0.13) and self-realization (η^2=0.14). The highest size of the effect was for pleasure (η^2 =0.42) and Quality of Life (η^2=0.46) variables. The control group showed no significant changes in the control, autonomy, pleasure, self-realization, and the level of the Quality of Life variables for the duration of the study. It can be concluded that the significant changes in the level of the Quality of Life in the intervention group was due to the educational program. The result of the qualitative study reinforces this conclusion.

Keywords: Quality of Life, elderly, smartphone, social media apps, educational package, CASP-19

Dedication

To my dear parents, I dedicate this work

"O my Lord! Bestow your mercy on them, even as they affectionately reared me in childhood" (Quran, 17:24).

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Glossary

Health: [A state of complete physical, mental, and social well-being not merely the absence of disease.]m, (WHO, 2015)

Elderly People: [Most developed world countries have accepted the chronological age of 65 years as a definition of 'elderly' or older person, but there are many studies which consider the age of 60 for developing countries including Iran.] (Noroozian, 2012)

Quality of Life: [In this study, Quality of Life is defined as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.] (WHO, 2015)

CASP-19: [The CASP-19 multidimensional instrument was designed to measure Quality of Life in the elderly. The 19-item questionnaire (see Table 2-1) is composed of four domains, and the first initial of each domain makes up the acronym—Control, Autonomy, Self-realization, and Pleasure.] (Hyde, 2003)

Control: [Control as the ability to shape one's own life situation and environment.] (Doyal & Gough, 1984)

Autonomy: [Autonomy refers to self-determination or an absence of unwanted interference from others.] (Doyal & Gough, 1984)

Self-realization: [Self-realization is defined as the ability to identify goals and initiate actions to achieve them, and is identified as a basic human need.] (Doyal & Gough, 1984)

Pleasure: [The pleasure domain deals with aspects of well-being and sense of worth.] (Doyal & Gough, 1984)

Technology upskilling: [Technology upskilling is defined as a opportunities for gaining the knowledge, skills, tools as well as ability that people are required for using ever-changing and advanced technologies in their daily lives.] (Aeschliman, Ross, Chase, & Pechenkina, 2018)

1 Introduction

Demographic statistics released in 2017 show that increases in the number of elderly people are one of the big challenges in communities (Farajzadeh & Gheshlagh, 2017; Gökşin & Aşiret, 2021; Quintana, Cervantes, Sáez, & Isasi, 2018). Just during the last half-century, life expectancy has risen by more than three years every decade.

The World Health Organization (WHO) (2015) calculates that the number of people over 65 worldwide will reach more than 2 billion by 2050, three times more than in 2000. Japan, Italy, and Greece with 26.3%, 22.4%, and 21.4% respectively have the highest percentage of elderly people in their populations (over 65 years old) in the world.

The growth in the aging population in the world increases the need to consider different aspects of health in elderly people. It is not unexpected that with an increase in the average age of the world population, the limitations, disabilities, and age-related illnesses also will rise in various countries (McNaughton, Crawford, Ball, Salmon, & outcomes, 2012; Shrestha, Ojha, Dhungana, & Shrestha, 2020). A high percentage of people encounter a progressive deterioration in health status between 50 and 80 years old and need more medical attention (Grassi et al., 2020; Wang et al., 2016).

According to the WHO, Quality of Life demonstrates a person's perception of their situation in life, with regard to several factors such as cultural background and life values. Therefore, Quality of Life has a direct association with individuals' personality such as life plans, beliefs and standards (Farzianpour, Foroushani, Badakhshan, & Gholipour, 2016) and may be different from one person to another.

Quality of Life is one of the important indexes to assess the quality-of-care services that covers several areas including physiological aspects and personal performance. To determine Quality of Life correctly, it is vital to pay attention to its dimensions. It is also affected by several factors other than health. Therefore, assessment of Quality of Life has become a significant characteristic of several social studies in aging health and social care (Gothe, Ehlers, Salerno, & Fanning, 2020; Jadidi, Farahaninia, Janmohammadi, & Haghani, 2015).

Older individuals, among different age groups, are at increased risk of facing psychological problems such as loneliness and depression, affecting their Quality of Life directly. For example, an elderly person is more likely to lose contact with their relatives and friends due to retirement or moving away, as well as through the death of friends and family. They may also face some problems in communication

because of time or distance limitations. All these factors could affect the Quality of Life in older people (Cotten, 2017; Gothe et al., 2020).

According to the results of previous studies, information and communication technology (ICT) including smartphones may help older individuals maintain a better relationship with their families and community (Bahramnezhad, Chalik, Bastani, Taherpour, & Navab, 2017; Quintana, Cervantes, & Sáez, 2018; Shapira, Barak, & Gal, 2007; Slegers, Van Boxtel, & Jolles, 2008; Szabo, Allen, Stephens, & Alpass, 2018). ICT is defined as a varied set of resources and technological tools used for transmitting, storing, creating, sharing, or exchanging information. These resources and technological tools such as computers, the Internet (blogs, emails, websites), and telephony (mobile or fixed, video conferencing) (Kaware & Sain, 2015).

Since losing contact with family and friends is often related to a reduction in psychological and emotional outcomes (such as feeling lonely or depressed), using ICT may enhance the level of psychological health by helping older individuals overcome time or distance barriers and even build new social relationships to decrease emotional problems and increase the level of Quality of Life (Baraković et al., 2020; Shapira et al., 2007; Winstead et al., 2013). A smartphone is a useful and affordable device that has a special value among different age groups of the community. Moreover, statistics show the growing popularity of using the Internet and mobile phones among elderly people (Marques, Schneider, & d'Orsi, 2016; Szabo et al., 2018).

Smartphone technology is available at any time and any place (Wenze, Armey, & Miller, 2014). Using a variety of smartphone applications helps the elderly people to maintain or expand their social relationships, get the daily news, reduce feelings of loneliness, (Plaza, MartíN, Martin, & Medrano, 2011), or even play games and have fun (Kwan, 2013).

While only 8% of elderly people in developed countries were using the Internet and social networks in 2005, the figure rose to 73% in 2013. Elderly people mostly use the Internet to communicate with friends and acquaintances. In Iran, approximately 9% of the population are elderly people (Farzianpour et al., 2016). Similar to their peers in other countries, one of the significant challenges among Iranian individuals in this generation is the betterment of Quality of Life (Farzianpour, Farokhi, Shojaei, Shafii, & Manafi, 2014).

1.1 Problem Statement

According to the World Health Organisation, the 21st century is the century of elderly people. The aging population of many countries including Iran is growing rapidly. According to the latest statistics

provided in Iran in 2019, approximately 9% of the 75 million population of Iran is over 60 years of age. The growing aging population requires special attention to build and promote self-care and increase Quality of Life among elderly people (Jadidi et al., 2015; Navabi, 2017; Szabo et al., 2018).

According to previous studies in Iran, reported by Hedayati et al. (2014) and Honarvar et al. (2020), elderly people have a relatively low Quality of Life compared to other age groups. These findings highlight the importance of studies that seek effective action to improve the Quality of Life among Iranian elderly people (Hedayati et al., 2014; Honarvar, Khaksar, et al., 2020).

The different aspects of technology such as ICT may provide an improvement of the elderly people's life, allowing them to maintain their independence, have a longer life span, and better Quality of Life (Szabo et al., 2018). Studies show that older people who deal with modern technologies such as the Internet and smartphone have better brain function and are less likely to suffer from diseases such as Alzheimer's (Ilha et al., 2017). ICT can help elderly people to empower themselves, improve their Quality of Life and enhance their ability to cope with common mental and physical problems (Alhassan, 2021; Farajzadeh & Gheshlagh, 2017; Shapira et al., 2007; Slegers et al., 2008).

The first smartphone arrived in Iran about 10 years ago in 2010. This technology quickly spread in a short time, and nowadays it is inseparable from the lives of many Iranians. A study in 2019 reported that only about 6% of Iranian elderly people were Internet users (Basakha, 2019). Although both the Internet and smartphone user rates are seeing massive monthly growth, the statistics on the rate of using the Internet and smartphone by elderly people is limited (Basakha, 2019). The rate of the Internet use by elderly people in Iran is low due to several reasons such as rapid technological changes, learning problems, lack of sufficient knowledge about using the Internet, and cultural issues (Basakha, 2019; "New technologies are more useful for seniors," 2017).

According to the previous studies, the positive effect of training in different areas of health and social activities on improving well-being and Quality of Life of elderly people have been shown in studies which have focused on improving the Quality of Life of elderly people (Borhaninezhad, Kazazi, Haghi, & Chehrehnegar, 2016; Farzianpour et al., 2016; Jadidi et al., 2015; Khazaei Jalil, Azmoon, Abdohhali, Ghomi, & Shamsizadeh, 2015; Marques et al., 2016; Wang et al., 2016; Zar, Hoseini, & Sukhaki, 2017). For example, the results of a study by Salimi et al. in 2015 showed "self-care education" can help elderly people to improve their Quality of Life (Salimi, Garmaroudi, Hosseini, & Batebi, 2015). These studies have not focused on the impact of the internet and technology in developing countries, despite an increasing percentage of the population of elderly people having internet access and owning a smartphone (Eliasi, Rasi, & Tavakoli, 2017; Khaki et al., 2017)

In addition, in some developed countries, technology focused Quality of Life studies have been conducted (Sinclair & Grieve, 2017; Slegers et al., 2008; Thakur & Han, 2021) and found to have a positive impact on Quality of Life for elderly people. These studies have been predominantly conducted using desktop PC devices on home broadband connections, therefore there remains a question about the impact of training in the use of smartphones and social media apps on the quality of life of elderly people in developing countries. In addition, most of the previous research did not investigate the persistence of training impact and therefore this remains an open question.

1.2 Research Questions

This study aims to answer this broad question:

To what extent does providing training on the use of a smartphone and social media apps change the Quality of Life of elderly people?

After exploring the literature, in Chapter 2, further questions were identified:

1- Do participants viewpoints of smartphone and apps change through training?
2- Do the Quality of Life changes persist?
3- Is the effect of technology on Quality of Life different between developed and developing countries?
4- Is the effect on Quality of Life of a smartphone different from the effect of a desktop computer?

1.3 Significance of Study

Improving the level of wellbeing and Quality of Life has recently attracted the attention of researchers in the field of aging in Iran. Several researchers have investigated the effects of different methods and training programs on improving Quality of Life among Iranian elderly people. Due to the relatively low Quality of Life among Iranian elderly people, the majority of research in the field of aging focus on Quality of Life (Afsharnia, Pakgohar, Khosravi, & Haghani, 2018; Alizadeh, Riazi, Majd, & Ozgoli, 2021).

However, reviewing Iran's related literature shows that although the positive effects of using the Internet and communication devices such as smartphones on improving Quality of Life among elderly people has been mentioned in some reports and studies (Lin et al., 2019; Navabi, Ghaffari, & Jannat-Alipoor, 2016), most are based on traditional education and relying on traditional routine activities of old age in Iran. No studies have focused on the impact of training or educational interventions focused

on technology use on elderly people's Quality of Life (Atri, Pakpour, Khalili, Jafarabadi, & Kharajo, 2020; Honarvar, Gheibi, et al., 2020).

Even though in recent years the studies on this topic have increased significantly, there are very few data and information on the Iranian elderly people population in Iran. Due to the importance and impact of improving Quality of Life of older adults in the community, a mixed-method study was designed with a practical educational package using smartphone including how to use web browser on a smartphone, how to search for information and news on a smartphone, working with Telegram, working with Instagram, and working with WhatsApp (Appendix D1, D2, D3, and D4) was developed. The study was designed with three stages (pre-, post-, and one-month follow-up), at each stage the CASP-19 questionnaire was administered to measure the participants Quality of Life. At the pre- and post-intervention stages a qualitative semi-structured interview which was analysed using two coding approaches including socio-demographic and cultural factors, and based on CASP subcategories (control, autonomy, pleasure, and self- realization).

To the researchers' knowledge, this is the first time that specific smartphone use training is implemented among Iranian elderly people. The findings of this study and the educational training are intended to help families, practitioners in the aging field to develop interventions that increase quality of life for elderly people through the deployment of, and training in the use of smartphones and associated apps.

1.4 Thesis Structure

The thesis is structured into seven chapters. The first chapter (this chapter) introduces an overview of the research including the problem statement, research questions and study significance. In the second chapter (chapter 2), previous studies in the study area are discussed in detail, research gaps identified, and the research questions formulated.

Chapter 3 describes the study design including methods and instruments in detail. The overall approach of the study, the calculation of the sample size, the recruitment process, intervention plan, ethical issues, and data analysis process in both quantitative and qualitative studies are covered in this chapter. The study uses a mixed-methods approach integrating quantitative and qualitative data analysis to achieve the research questions.

In chapters 4 and 5, the results of the quantitative and qualitative aspects of the study are presented. Chapter 4 describes the demographic aspects of the cohort; how missing data has been treated and

then reports statistical analysis of the data including t-tests and ANOVA. Chapter 5 presents the qualitative analysis of data collected through semi-structured interviews.

In chapter 6, the results of both qualitative and quantitative studies are discussed separately and integrated as a mixed-method study. Results of recent relevant studies are also discussed and compared to the results of the current study. The thesis finishes with the conclusion, study limitations, contribution, and future work in chapter 7.

2 Literature Review

This chapter describes Quality of Life as related to elderly people, particularly problems associated with physical and psychological issues. It also discusses the impact of technology on the Quality of Life of elderly people. The chapter concludes by summarising the literature and highlighting the research gap that exists.

2.1 Quality of Life

Quality of Life is a subjective and multidimensional concept which is now widely acknowledged as a useful criterion in research on health and social care (Post, 2014). According to the World Health Organisation's Quality of Life group, Quality of Life is defined as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (Nejati et al., 2008).

Brewster considers Quality of Life an essential index. Because Quality of Life covers various physiological aspects of life such as being and function, to comprehensively assess Quality of Life, these aspects should be considered (Brewster, Hirschman, Riegel, Hanlon, & Huang, 2019). From Sahin et al.'s perspective the factors affecting Quality of Life should be considered in the treatment and health care of elderly people (Şahin, Özer, & Yanardağ, 2019).

An important features of Quality of Life assessment for elderly people include decision-making, self-sufficiency, autonomy, maintaining a social support system, absence of pain and suffering, the preservation of sensory abilities, a sense of usefulness to the other, a certain degree of happiness, and a certain financial status (Kariuki, 2019).

Socioeconomic factors may affect health and Quality of Life on different levels, for instance, individual, household, and neighbourhood levels. People with the highest and upper intermediate earnings and levels of education are healthier than the poorest and less educated. Physiological, environmental, and psychosocial pathways are some causal pathways which are suggested to explain this relationship (Matthews & Gallo, 2011).

In addition, older adults living in underprivileged neighbourhoods are in danger of becoming frail and dependent, with unfavourable results for a person's Quality of Life (John, Montgomery, & Tyas, 2013). Hence, effective pathways to maintain or improve Quality of Life for elderly people living in underprivileged neighbourhoods need to be developed. Detailed discernment of the relationship between the socioeconomic position and Quality of Life are required to draft guiding principles to

make interventions to improve Quality of Life in elderly people. Furthermore, providing effective care may be possible through the understanding of older adults' views on ageing.

The difference between the Quality of Life of male and female elderly people in Spain was examined by Orfila et al. (2018) . The sampled females' Quality of Life was less than the males due to higher rates of chronic disease and disabilities in women (Romera-Liebana et al., 2018). An extended examination of the Thai elderly people depicted that single life and weak economic status are the two main factors causing a low Quality of Life (Aghajani, Nazari, & Zahrakar, 2018). Participating in meaningful activities, usually in the form of friendship and organised participation (like attending different classes), is one of the key elements in increasing the Quality of Life (Awick, Wójcicki, Olson, & Fanning, 2015). Extended research on the elderly people's Quality of Life in China affirmed the varying effect of living arrangements and social interaction on health-related Quality of Life. According to this research, the most vulnerable elderly people are those who live alone (Afshar, Asgari, Shiri, & Bahramnezhad, 2016). Inadequate education, unemployment, and low family income are reported in the US to be indicators of elderly people's low Quality of Life (Mirzashahi, Aghajani, Mirbazegh, Zebardast, & Ghasemi, 2018).

Due to an increasing elderly people population, their problems such as frailty (Parmar, Law, Carter, & Hewitt, 2019), depression (Ou, Liang, & Tan, 2018), loneliness (Pitt et al., 2014), and anxiety (Comijs, van Zelst, Schoevers, & Voshaar, 2014) are also increasing with no satisfactory solution in sight. These issues will be discussed in the following sections.

2.1.1 Depression, Loneliness, and Anxiety in elderly people

The process of demographic transition is an obvious cause of an ageing population. Developed countries have already gone through the repercussions of ageing while developing countries are trying to confront them now. Since the traditional family system is eroding quickly, the Quality of Life of elderly people is degenerating owing to rapid modernisation, migration and urbanisation (Liebig & Rajan, 2003). Therefore, in almost every society, elderly people must meet challenges and different types of insecurity. Additionally, in Iran, issues such as depression, isolation, loneliness, physical weakness, uncertain future, are factors contributing to the suffering of elderly people (Sheykhi, 2019).

Loneliness and depression are factors which reduce the Quality of Life (Cavallero & Morino, 2007). According to research by the World Health Organisation (2016), 350 million people suffer from depression. A review and meta-analysis in Iran revealed that the prevalence of depression and loneliness among Iranian elderly people is 43% (Sarokhani, Parvareh, Dehkordi, Sayehmiri, & Moghimbeigi, 2018). Elderly people suffering from chronic illness and low levels of health and well-being are the most susceptible social groups to depression (Thompson, Syddall, Rodin, Osmond, &

Barker, 2001). Almost a quarter of suicide cases amongst elderly people are due to depression (Conn & Steingart, 1997).

A longitudinal survey conducted in Taiwan confirmed that depression in elderly people reduces significantly when they enjoy independence in their daily life activities and have life satisfaction (Lue, Chen, & Wu, 2010). An independent life requires physical, mental, and social capacities. Similarly, other studies identified that the negative effects of mental problems on basic activities of daily living (BADL) such as eating and toileting (Dunlop, Manheim, Song, Lyons, & Chang, 2005; Jiang, Tang, Futatsuka, & Zhang, 2004).

According to Chan (2011), elderly patients who experienced depression had an earlier and higher rate of physical and morbidity decline. Their study indicated that elderly patients had increased physical disabilities and diseases after they became depressed. Many studies show that depression and loneliness affect the mental capacity of elderly people in private living homes. According to Lawrence et al. (2006), cognition and depression are interrelated, and loneliness and isolation is a direct reason of depression in the life of elderly people. Vance et al. (2005) noticed a decrease in processing speeds owing to depression. With depression and loneliness as important influences in the mental health of elderly people, any activity that can help prevent depression and loneliness is encouraged. According to Liang et al. (2018), depression and loneliness without timely treatment can have serious consequences such as increasing cancer levels, increasing mortality levels as well as a significantly higher risk of suicide.

Several factors contribute to the significance of the risk of depression. They include chronic disorders and disability, pain, destruction, individual traits (dependency, anxiety or avoidance), and insufficient suitable social support) (Hayward, Owen, Koenig, Steffens, & Payne, 2012). One study reported the prevalence of anxiety in elderly Iranian people as 44% (Pinder & Harlos, 2001). In addition, factors like loneliness, financial problems, dependency, and anxiety on daily activities influence depression (Pitt et al., 2014).

Anxiety is one of the most prevalent mental health problems of elderly people (Yan, Xin, Wang, & Tang, 2014). Studies have revealed that in clinical settings, widespread anxiety affects 15% to 56% of adults (Therrien & Hunsley, 2012), and depressive disorders and increased risk of mortality are associated with it (Comijs et al., 2014).

It is argued that an elderly person's Quality of Life is seriously affected by anxiety (Barrera & Norton, 2009). In turn, low Quality of Life might affect mental, physical as well as social well-being (Megari, 2013). Good Quality of Life for old people can be defined as performing routine life activities

comfortably and staying in touch with family and friends (Steptoe, Deaton, & Stone, 2015). As such, it seems that measuring anxiety in the life of elderly people is significantly relevant to Quality of Life.

People with poor Quality of Life are expected to have higher levels of anxiety and depression. Consequently, anxiety and depression can be categorised as impact indicators of Quality of Life. Nonetheless, classifying depression and anxiety as impact indicators does not mean that these people are strictly affected by poor Quality of Life, but people are manifestations of challenges in Quality of Life, and more complicated relationships can transpire between Quality of Life as well as diverse mental phenomena (Cardona, 2010).

2.1.2 Quality of Life - Iranian Elderly People

Iran is known as a developing country. This country will be one of the countries with the oldest population and is experiencing an ageing population along with decreasing birth-rate (Wilson & Cleary, 1995). According to population projections, Iran's proportion of elderly people will increase to 25% of the population in 2050 (Bhamani, Karim, & Khan, 2013; Da Silva, Scazufca, & Menezes, 2013). This demographic change is a global and grave matter such that the WHO referred to the 21st century as the century of ageing people (Bahram, Pourvaghar, & Sadeh, 2014). The WHO, report, as of 2019 approximately 10% of the Iranian population is over 60 years old.

Review results indicated that only 7% of elderly people in Iran had a high Quality of Life, 43% low, and 50% moderate Quality of Life (Farajzadeh & Gheshlagh, 2017; Salehi, Salaki, & Alizadeh, 2012). Iranian elderly people living in residential care had a lower Quality of Life compared to elderly people living at home. A study revealed that 42% of elderly people living in residential care in Tehran suffer from depression (Sadeghi & Kazemi, 2004), while elderly people living in rural areas had a higher Quality of Life (Heidari & Shahbazi, 2012; Khoshraftar Roudi et al., 2016).

A study conducted to investigate the Quality of Life of elderly people at home and nursing homes in Isfahan, Iran. Their findings showed that elderly people who live in their own homes have better scores in three different dimensions of physical, mental, and social function (Ghasemi, Harirchi, Masnavi, Rahgozar, & Akbarian, 2011).

Almost 28% of elderly people in Iran face limitations in physical activities and need help to fulfil their daily activities (Awick et al., 2015). In Iran, along with a reported decline in the health of elderly people in the process of ageing, the ability of elderly people to fulfil their health needs seems to be worsening. One reason for this is financial where most people lose their economic independence when ageing and become dependent on others (Sheykhi, 2019).

Iran is experiencing a continuous increase in medical expenses and prices, 25% to 30% of elderly people in Iran do not have medical insurance (Teymoori, Dadkhah, & Shirazikhah, 2006). This makes it more difficult for elderly people to pay for their medical needs (Sheykhi, 2004).

Vahdaniniya et al. (2006) investigated Quality of Life in elderly people of Tehran. Their findings showed that the level of Quality of Life of the elderly people in Tehran has a statistically significant relationship with age, education, marital status, and employment status. Among the factors that reduce the Quality of Life are affliction with chronic disease, reduced social connections resulting in loneliness and isolation, lack of social support and reduced personal independence due to physical and mental disabilities (Afshar et al., 2016). Rosenberg et al. (2019) stated that in developing countries, the majority of the elderly people do not live with their children, which directly affects their Quality of Life.

Quality of Life is difficult to measure. The literature presents many viewpoints towards Quality of Life, and multiple measures are developed. Measures of health status are often used as a representative for Quality of Life (Hyde, 2003).

2.2 Measuring Quality of Life

Measuring Quality of Life is linked with various challenges (Sim, Bartlam, & Bernard, 2011). Each tool has to be appropriate for the population being researched (Sim et al., 2011). Measuring the Quality of Life of elderly people is a multifaceted and complex phenomenon (Higgs, Hyde, Wiggins, & Blane, 2003). Inventories need to be sensitive to various social aspects, physical, and mental, of Quality of Life. In several studies, generic instruments were developed to assess the general Quality of Life of elderly people. In different studies, researchers have used specific tools to evaluate the Quality of Life that have explicitly been designed for this purpose. Findings have revealed that since 1970, the number of instruments that measure Quality of Life have exponentially increased (Netuveli & Blane, 2008). These tools are currently available in major languages and used in many countries, including Iran.

The most common questionnaires used for Iranian elderly Quality of Life are OPQOL-35 (Nikkhah, HERAVI, Rejeh, SHARIF, & Montazeri, 2017; Nikkhah, Heravi, Montazeri, & Rejeh, 2018), SF-36 (Doosti-Irani, Nedjat, Nedjat, Cheraghi, & Cheraghi, 2018; Eshaghi, Ramezani, Shahsanaee, & Pooya, 2006; Tajvar, Arab, & Montazeri, 2008), Leiden-Padua (LEIPAD) (WHO, 1996), and CASP-19 (Payoun, Fadayevatan, Lotfi, & Foroughan, 2020).

OPQOL-35 is one of the popular instruments used to measure Quality of Life in elderly people. This questionnaire includes 35 items tapping into eight domains such as independence, overall life, social relationships and participation, health, control over life and freedom, psychological and emotional

well-being, home and neighbourhood, culture and religion, and financial circumstances (Nikkhah, Heravi-Karimooi, Montazeri, Rejeh, & Nia, 2018). The Persian version of this questionnaire was validated for assessing elderly Iranians' quality of life (Feizi & Heidari, 2020). Experience with using of OPQOL-35 tool reveals that answering 35 items is comparatively too many for most elderly people. For using the questionnaire in regular clinical practice, it is essential to establish a shorter version (Bowling, Hankins, & Windle, 2013; Mares, Cigler, Vachkova, & outcomes, 2016).

The SF-36 Health Survey contains 36 items representing eight generic health concepts: role disability due to physical health problems, physical functioning, bodily pain, vitality, general health perceptions, social functioning, general mental health, and role disability due to emotional health problems (McHorney, Ware Jr, Rogers, Raczek, & Lu, 1992). This survey was initially constructed for use in the longitudinal component of the Medical Outcomes Study, a four-year observational study of health outcomes among patients with chronic psychiatric and medical conditions (Tarlov et al., 1989). The Persian version of SF-36 has been validated in Iran (Mohammadpour & Yousefi, 2008). SF-36 questionnaire has some limitations. For instance, it is not very appropriate for the geriatric population group, particularly elderly people with physical and complex disability (Parker et al., 1998).

Leiden-Padua (LEIPAD) is a specific tool for assessing the Quality of Life in elderly people. Leiden-Padua (LEIPAD) is a subjective and international appraisal survey, designed in 1998, and was used first in Netherlands, Italy, and Finland (De Leo et al., 1998). This tool was constructed and designed by the WHO. It encompasses 49 self-assessment items and seven subscales (such as self-care, physical function, anxiety and depression, cognitive functioning, sexual functioning, and social desirability). This tool was validated in numerous settings. The score range for each scale in the LEIPAD survey is between 0 and 21, 0 demonstrating the lowest score and 21 the highest score of Quality of Life (De Leo et al., 1998). The LEIPAD questionnaire does have some limitations. For example, De Leo et al. (1998) mentioned that 49 items are relatively too many for elderly people to answer.

CASP-19 is another tool researchers used to measure the Quality of Life of Iranian elderly people. Ryff and Keyes originally developed CASP-19 in 1995 (Ryff & Keyes, 1995) and then a shorter version (CASP-12) was used for the Survey in Health, Ageing and Retirement in Europe (SHARE) study (Borrat-Besson, Ryser, & Gonçalves, 2015). It was designed to cover the active and beneficial experiences of later life rather than simply focus on the medical and social care issues that had traditionally been seen to typify ageing research. The scale is composed of four subscales, the initials of which make up the acronym: Control, Autonomy, Self-Realization, and Pleasure.

Doyal and Gough (1991) define control as the capability of forming an individual's personal conditions in life and surroundings, whereas autonomy refers to free-will or a lack of intervention. The pleasure domain captures the self-reflexive and active aspects of living that bring happiness and reward to people in their future life (Hyde, Wiggins, Higgs, & Blane, 2003). The ability to set aims and take actions to accomplish them is the explanation of self-realisation, and is recognised as a basic human need (Doyal & Gough, 1991). Laslett (1991) identifies contentment and self-realisation as achieving pleasant activities when you get old such as raising children and professional advancement. Contentment is related to welfare and feelings of significance.

Participants for each of the 19 statements are asked to self-rate their level of agreement with the statement, for example, "My age prevents me from doing the things I would like to do" or, "I enjoy the things I do" by means of a 4-point Likert scale. One who takes part in survey would reply with one of the subsequent alternatives: often = 0, sometimes = 1, rarely = 2, or never = 3. Thirteen items were optimistically phrased (3, 5, 7, 10–19) which were coded in reverse order. The final CASP-19 score is between from 0 to 57. The higher the score, the higher the Quality of Life.

Researchers have used the CASP-19 tool in many different countries including the "English Longitudinal Study of psychometric assets in grown-up adults suffering from dementia" (Stoner, Orrell, & Spector, 2019), "the quality of old people's sleep" (Muragod & Sreenivas, 2019), "reasonableness in the new version of CASP-19 for Brazilians at the age of 55 years and over" (Neri et al., 2018), "Psychometric Properties of the Persian Version of the Quality of Life in Early Old Age" (Heravi, Rejeh, Garshasbi, & Montazeri, 2018), "Reliability and Validity of the Lithuanian Version of CASP-19: A Quality of Life Questionnaire for the Elderly" (Černovas, Alekna, Tamulaitienė, & Stukas, 2018). This questionnaire presents an alternative definition of Quality of Life that is less concentrated on physical health of elderly people. It also incorporates concepts including purpose in life and self-determination that are gradually seen as fundamental to wellbeing (Nikkhah, Heravi-Karimooi, Rejeh, Nia, & Montazeri, 2017). The CASP-19 questions are reported in detail in Table 2-1.

In addition, a study measured related mental qualities and abilities of elderly people to Quality of Life using the Persian version of CASP- 19 (Heravi et al., 2018). They included 200 participants in their study. The Persian language version of the CASP-19 was developed through a method of translation and translation-back. Subsequently, they measured the reliability (internal consistency and test-retest) and validity (including content validity, face validity, known groups, factor analysis, and criterion validity), through considering the association between the Persian version of the CASP-19 questionnaire, founded on reliability of Cronbach's alpha (Cronbach > s α). In general, a score of more than 0.70 is usually acceptable. However, some authors suggest higher values of 0.90 to 0.95 (Tavakol & Dennick,

2011). The internal consistency for CASP-19 was 0.97 and for the four subscales ranged from 0.93 to 0.97. Test-retest internal consistency (Pearson's correlation coefficient) for the Farsi version of the CASP-19 questionnaire ranges from 0.87 to 0.94. Assessment of distinguishing validity signifies that the power of the CASP-19 differs based on the presence or absence of limiting the self-sufficiency of an individual. A considerable relationship between many dimensions of the CASP-19 questionnaire and the SF-36 (The 36-Item Short Form Survey) was revealed based on criterion validity. The validity of the CASP-19 questionnaire founded on convergent, known groups, construct, and face validity was confirmed by their study. In addition, it indicated satisfactory reliability.

Table 2-1 CASP-19

Item No.	Sub-domain Item No.	
1	Control 1	My age prevents me from doing the things I would like to do
2	Control 2	I feel that what happens to me is out of my control
3	Control 3	I feel free to plan for the future
4	Control 4	I feel left out of things
5	Autonomy 1	I can do the things I want to do
6	Autonomy 2	Family responsibilities prevent me from doing the things I want to do
7	Autonomy 3	I feel that I can please myself what I do
8	Autonomy 4	My health stops me from doing the things I want to do
9	Autonomy 5	Shortage of money stops me from doing things I want to do
10	Pleasure 1	I look forward to each day
11	Pleasure 2	I feel that my life has meaning
12	Pleasure 3	I enjoy the things that I do
13	Pleasure 4	I enjoy being in the company of others
14	Pleasure 5	On balance, I look back on my life with a sense of happiness
15	Self-Realisation 1	I feel full of energy these days
16	Self-Realisation 2	I choose to do things that I have never done before
17	Self-Realisation 3	I feel satisfied with the way my life has turned out
18	Self-Realisation 4	I feel that life is full of opportunities
19	Self-Realisation 5	I feel that the future looks good for me

C: Control; A: Autonomy; P: Pleasure; SR: Self-Realisation

The summary of tools for measuring Quality of Life is reported in Table 2-2.

Table 2-2 Summary Table of Tools

Tools	Items	Focus	Validated in Iran	Limitations
OPQnOL-35	35	Quality of Life in elderly people	Yes	Too many items
SF-36	36	Aged between 16 and 64 years (Burholt & Nash, 2011)	Yes	Not appropriate for elderly people with physical and complex disability
LEIPAD	49	Quality of Life in elderly people	Yes	Too many items
CASP-19	19	Quality of Life in elderly people	Yes	Not often used for physical health

In the above sections of this chapter, we reviewed the Quality of Life related to elderly people and the physical and psychological challenges they face while explaining available tools for measuring quality of life. In the next sections, we discussed the effects of using technology in the life of elderly people, review the finding of other studies regarding technology in elderly people's Quality of Life, and explored in detail the impact of a variety of technology and technology education interventions on the Quality of Life of participants.

2.3 An overview of technology usage among elderly people

A growing population of elderly people in developing and developed countries, means technologies to support healthcare for the elderly people are becoming essential. Information and communication technology holds promise in terms of improving the Quality of Life for elderly people. In general, technology is helping seniors to improve their Quality of Life through increased connectivity and a sense of community (McLaughlin, Pryor, & Feng, 2019)

Older adults also use the Internet to find answers to health-related issues, accessing health-related information or services, communicating with health care providers, and filling and refilling medications (Chang, McAllister, & McCaslin, 2015; Wagner, Hassanein, & Head, 2010). Despite younger people still

outnumbering their older counterparts when it comes to technology use, elderly people are rapidly jumping on the digital bandwagon. In 2017, 67% of those aged 65 and above in the U.S. used the Internet, while 43% own smartphones (Anderson & Perrin, 2017). Though these numbers have increased significantly in 2017, they are lower than the 90% of the United States adult population aged 18 and above that uses the Internet, and the 77% who use smartphones. Though the rise in usage over the previous decade represent more digital inclusion for elderly people in general, the general statistics overestimate the percentage of elderly people who use smartphones and the Internet (Cotten, 2017)

One of the ways the elderly people maintain connectivity with their families and friends is through smartphone applications. The use of tablets and smartphones has different advantages for older people. They are able to connect with their families and friend through social media (Charness, 2019), including WhatsApp (Rosales & Fernández-Ardèvol, 2016), Viber (Kiat & Chen, 2015), and WeChat (Charness, 2019). Among these advantages are developed social interaction, moderated feelings of loneliness, and entertainment (Kwan, 2013).

Studies confirm that the use of smartphones can increase the ability of elderly people in different physical and mental conditions and social situations of life by enhancing their knowledge, simplifying their communication with friends, getting emotional support, and making joining social networks easy (Morris & Aguilera, 2012).

2.3.1 Influencing Factors and Outcomes of Social Media Use Among Elderly People

Social media is one of the most powerful tools to connect friends and family over long distances and connect people with similar interests. Among various samples of social networking and social media are Facebook, Twitter, Instagram, LinkedIn, Snapchat, Tumblr, Quora and WhatsApp. Younger people widely adopt social media, but elderly people use such mobile applications less than younger generations (Haan, 2019). Rosales et al. (2016) state that WhatsApp is currently the most common application that people of all ages, including elderly people use in their life. Telegram is the most well-known social media app in Iran. Instagram and WhatsApp came second and third, respectively (Newman, Stoner, & Spector, 2019; Nikkhah, Heravi, et al., 2018). The role of smartphones in older users' lives is increasing, though the frequency of app access is correlated negatively to age (Collins, Cox, & Wootton, 2019).

Facebook and Twitter as social networks can help construct and maintain social relationships and have been recognised as influencing senior’s health. Loneliness among seniors may be the result of weakened ability to move or physical remoteness from family members (Collins et al., 2019).

Elderly people have started to use social networks and social media widely (Newman et al., 2019). The central focus of studies, to date, on social network has been on adults and teenagers (Deters & Mehl, 2013). Nonetheless, the results of the studied groups and various characteristics of experiments and people's connections in their youth and when they age deserve research on the use of social media from an elderly point of view (Carstensen, 2006). Elderly people believe that social media could reinforce social relationships (Campos et al., 2016), and may be beneficial for cognitive functions (Quinn, 2017).

Older users of social networking are more typically women (Yu, Ellison, McCammon, & Langa, 2016) and younger seniors (generally from early to mid-sixties) (Yu et al., 2016). One study indicated that users of social networks were less educated than those who did not use them (Richter, Bannier, Glott, Marquard, & Schwarze, 2013). Ellison et al. (2016) stated that a large number of social network users aged 60 to 62 were more probably white, employed, and married. Social network use has no connectedness with cognitive functioning and self-related health (Yu et al., 2016). Bell et al. (2013) discovered that there is no relationship between social network use and ethnicity or income. Nevertheless, their sample was not very heterogeneous in relation to ethnicity, which weakens the results of the study. Social network users trusted technology more, (Clayton Hutto, 2015), used the Internet more (Yu et al., 2016).

Elderly people are primarily motivated to use social networks in order to maintain close relations, e.g. family and friends (Jung, Walden, Johnson, & Sundar, 2017; Rylands & Van Belle, 2017). The advantage of using social network is that they can stay in contact with younger generations (Quinn, Smith-Ray, & Boulter, 2016), they can also remain cognitively active (Quinn et al., 2016), as well as being curious about others' lives (Jung et al., 2017; Rylands & Van Belle, 2017). Besides, they can play games and meet people with similar interests (Hope, Schwaba, & Piper, 2014).

While a number of studies reported that developing or making relationships continue with 'weaker ties' such as casual friends or social contacts was helped by social networks (Jung et al., 2017), this was not generally the primary reason for using social network. A small number of participants showed interest in using Facebook to make friends with new individuals (Rylands & Van Belle, 2017).

Some people identify social networks as a medium for unimportant discussions or information rather than converse individually or emotionally support them (L. B. Erickson, 2011). Some participants mentioned that as they were primarily interested in developing their close contacts, social network sites could not strengthen this and as a result, it was just a medium of communication with 'weaker ties' that did not make sense (Hope et al., 2014). The interviews related to quality showed that some

individuals who did not use social networking were not really interested in the communication or information contained on the social network (Jung et al., 2017; Rylands & Van Belle, 2017), which was considered insignificant, of no great concern, self-centred and untrustworthy.

Lack of access and familiarity with social networking were other reasons that stopped people from using them. Despite the fact that the main reason of non-users was their inability to use social network (Jung et al., 2017; Quinn et al., 2016), this did not seem to be the most important factor (Hope et al., 2014). Concerns about privacy (both concerning loss of management of shared information online and social privacy) were recognised as a preventive factor to use social network (Jung et al., 2017). It was not clear (no one understood clearly) whether these worries were particularly related to social network or affected Internet use more generally.

Several studies considered the association between social network use and well-being (characteristics of social relationships that are relevant to mental well-being)(Erickson & Genevieve, 2011; Gustafson et al., 2015). Fewer studies considered other standards of well-being, for instance, psychological health and Quality of Life.

A characteristic of the participants chosen for many studies was that they were socially at high levels of well-being (Clayton Hutto, 2015), which makes it difficult to determine the effect of social networks on social well-being among socially isolated and alone people. The majority of research used simple metrics of social network use (use versus non-use; frequency of use), making it challenging to determine the relatedness of various kinds of social networks to welfare (Rylands & Van Belle, 2017; Yu et al., 2016).

Evidence for the relationship between social network use and loneliness was mixed, with two studies concluding no evidence for an uncomplicated connection between social network use and isolation (Sil Aarts & Sebastiaan Peek, 2015) and one research with an investigational pattern which discerned no change in lonesomeness as the result of social networking (Myhre, Mehl, & Glisky, 2017). A study relating to quality rather than quantity suggested that the individuals involved with social networks experienced less loneliness (Ballantyne, Trenwith, Zubrinich, & Corlis, 2010). Another research indicated that utilising social networks decreased the effect of practical disability on ‘social’ isolation (rate of social communication) (Rylands & Van Belle, 2017).

One study confirmed that social network users compared to non-users, were superior in ‘feelings of connectedness’, although not ‘isolation’ (Yu et al., 2016). Hutto et al. (2015) realised that social network users who became involved in advanced levels of specific activities on social networks

experienced less loneliness, signifying that higher social network use may be connected with social well-being.

McCammon et al. (2016) supported the connectedness of social network use to higher levels of supposed community collaboration from children (for participants aged < 60) and friends. Myhre et al. (2017) did not notice any variation in perceived social support following their involvement. Richter et al. (2013) learned that those who did not use social networks were less socially involved than social network users. Nevertheless, social network users and non-users were no different in social loneliness. Social network users scored higher on 'social satisfaction' (degree of satisfaction with social roles and activities) especially those who interacted actively on social network (Clayton Hutto, 2015).

Social networking users and non-users suffered from the same amount of psychological health problems (Aarts, Peek, & Wouters, 2015). Findings suggested that greater time spent on social network reduced the impact of practical disability on state and trait well-being (van Ingen, Rains, & Wright, 2017). Despite this, a similar connection was discerned for online shopping, signifying this impact was not restricted to social network use. Sundar et al. (2011) discovered no association between social network use and Quality of Life.

The next section explores the impact of a variety of technology and technology education interventions on the Quality of Life of elderly people in detail. Studies selected for inclusion have been published since 2000 with a preference for studies published since 2010 recognising that the technological landscape has evolved rapidly with widespread high-speed connectivity via public Wi-Fi, broadband technologies, and mobile Internet. Studies use the CASP-19 tool and other mechanisms to determine the impact of the interventions.

2.4 Impact of Technology and Technology Education Interventions on Quality of Life of Elderly People

The association between mental health and the Internet usage in older adults was explored through a sample of 2314 contributors in the English Longitudinal Study of Ageing (Quintana, Cervantes, & Sáez, 2018). They interviewed participants aged 50 years and above every two years between 2006 and 2015. The relationship between the Internet and email usage and the key features of psychological well-being (evaluative, hedonic, and eudemonic) were analysed through three generalised estimating equation models. The outcomes confirmed that there was a direct connection between using the Internet and email as well as better mental health (p= 0.01).

A representative sample of 502 participants aged 50 and older living in northern Israel in 2016 were interviewed to investigate the indirect and direct impacts of using the Internet on Quality of Life (Khalaila & Vitman-Schorr, 2018) in a descriptive-correlation study. Quality of Life was assessed using the CASP-19 scale (control, autonomy, self-realisation, and pleasure). A positive relationship was found between the use of the Internet and Quality of Life ($p=0.00$). According to Khalaila et al. (2018), although using the Internet and social media/apps can improve the level of Quality of Life among older adults both directly and indirectly (mostly due to decreasing loneliness and improving independence), these influences could be dependent on other factors including time that elderly people spend with their families (Khalaila & Vitman-Schorr, 2018).

Feedback from those who responded in the Mealor & Van Belle (2014) survey signified that this harmful effect could be described via issues such as privacy with mobile phones. Using mobile multimedia content including music and videos showed a statistically significant positive influence on overall well-being and Quality of Life ($p<0.01$). Evidence suggested that social media can contribute to maintaining elderly individuals' connections, which improve social relationship and reduce the feelings of social exclusion and isolation (Mealor & Van Belle, 2014).

The association among changes in a commonly used predictor of depression and the Internet use among retired elderly people in the USA was examined. 3075 candidates aged 50 years and above participated in this study. They found that isolation and loneliness were reduced through the Internet usage ($p <0.00$)

How leisure activities helped reduce social isolation among elderly people was determined through a cross-sectional survey of 1171 elderly people (Toepoel, 2013). They found that spending time working with a computer (passive activities) was not related to social connections ($p=0.12$).

The influence of financial literacy and health on decision-making in community-based elderly was examined by James et al. (2012). Results of a cross-sectional survey with 661 elderly people respondents showed a correlation between the higher frequency of the Internet usage and lower levels of loneliness ($p <0.00$).

The Internet use and psychological wellness during late adulthood among 122 elderly people 60 years old and examined by Erickson et al. (2011). Participants answered a questionnaire that measured three characteristics: (a) regularity and patterns of the Internet use, (b) well-being (life satisfaction,

loneliness, social support, and depression), and (c) demographics (education, income, and age). They found that the Internet decreases loneliness (p=0.01) (Erickson & Genevieve, 2011).

A research is carried out to examine whether training provided to elderly people age 60 and over would increase the use of ICT, including the Internet and email and influence participants' mental health and social support (Woodward et al., 2011). A total of 45 participants for intervention and 38 participants for control group attended Woodward et al.'s (2011) randomised controlled trial study. The experimental group from this study stated more self-efficacy in executing computer-related tasks and used more information communication technologies, reported significantly higher Quality of Life and perceived greater social support from friends than the control group ($p < 0.00$).

The effect of the Internet usage and computer training on the Quality of Life and well-being of 123 elderly people participants in the intervention group and 68 participants in the control group examined by Slegers et al. (2008). The intervention group received four hours training over two weeks. Participants learned how to use basic computer concepts including folders and documents as well as word processor in the first session. In the second session, they learned how to use some Internet applications and send emails as well as how to use the Internet browser. In the last session, they did a quiz on all the topics that were learned in the first and second sessions. No main difference in isolation among the two groups was seen ($p = 0.03$).

The psychosocial effect of providing the Internet access to elderly people over a five-month period was measured by White et al. (2002). They studied 39 participants for the intervention group and 45 participants in the control group in a randomised controlled trial. Volunteers were randomly assigned to receive the Internet training or to a waiting list for the control group. No statistically significant difference in the change variable on the scale of loneliness between the control and intervention group was observed. Nevertheless, a tendency towards less loneliness in the intervention was seen ($p = 0.52$). The summaries of the CASP-19 studies along with the statistical results and findings is reported in Table 2-3.

Table 2-3 Summary of Quality of Life and Internet Use studies

Source	Number of Participants	Method	Intervention/Technology	Statistical Findings	Findings
(Quintana, Cervantes, & Sáez, 2018)	2314	Interview /Survey	The Internet/ Email usage	p= 0.01	There was a direct connection between using the Internet and email as well as mental health.
(Khalaila & Vitman-Schorr, 2018)	502	Intervention/ Survey	The Internet usage	p=0.00	Positive relationship was found between the Quality of Life and use of the Internet.
(Loureiro, Mendes, Fernandes, Camarneiro, & Fonseca, 2015)	11,391	Interview	The Internet usage	p<0.01	The Internet made a better relationship to social and family activities that permit people to break away from the possible loneliness after retirement.
(S. Cotten, Ford, Ford, & Hale, 2014)	3,075	Survey	The Internet use	p <0.00	Isolation and loneliness were reduced through the Internet usage.
(Toepoel, 2013)	1171	Cross-sectional-Survey	Using computer	p=0.13	Spending time working with a computer (passive activities) was not related to social connections.
(James et al., 2012)	661 elderly people	Cross-sectional-Survey	The Internet use	p <0.00	There is a correlation between the higher frequency of the Internet usage and lower levels of loneliness.
(Erickson & Genevieve, 2011)	122 elderly people 60 years and above	Cross-sectional Survey	The Internet use	p< 0.01	Surfing the Internet decreases loneliness.

(Woodward et al., 2011)	Intervention group: 45 - Control group:38	RCT	Computer and the Internet training Duration: 12 sessions in 6 months	p <0.00	The experimental group from this study, stated more self-efficacy in executing computer-related tasks and used more ICT reported significantly higher Quality of Life and perceived greater social support from friends rather than the control group.
(Slegers et al., 2008)	Intervention group: 123	RCT	Computer training and the Internet use	p= 0.03	No main difference in isolation among two groups was seen.
(White et al., 2002)	Intervention group: 39 - Control group: 45	RCT	The Internet training and use. Duration: two weeks	p= 0.52	No statistically important differences in the change variable on the scale of loneliness between the control and intervention group were observed. Nevertheless, a rather better tendency towards less loneliness in the intervention was seen.

2.5 Impact of Social Media on Quality of Life

The studies examining the impact of networking sites on elderly people's social isolation and loneliness are listed in Table 2-4. Most of these studies used a survey methodology.

Table 2-4 Impact of Social Network Sites on Elderly People's Quality of Life

Reference Source	Number of Participants	Study Method	Intervention / Technology	Statistical Results	Findings
(Momeni, Hariri, Nobahar, & Noshinfard, 2018)	9 seniors with average age of 68 years old	Qualitative/ Phenomenological/ Colaizzi's 7-steps	Social networks		A direct significant relationship between social network and Quality of Life among the elderly people.
(Rylands & Van Belle, 2017)	59	Survey, CASP-19 and Kleine's Choice Framework.	Facebook usage	$p < 0.05$	Solid relationship exists between the Quality of Life and use of Facebook and for the elderly people living in Cape Town.
(Clayton Hutto & Bell, 2014)	268 - age over 55	Survey – Cross-sectional	Using social network sites		Usage of SNSs enhanced the level of social satisfaction and lowered loneliness.
(Mealor & Van Belle, 2014)	89	Survey	Mobile phone	$p<0.01$	Use mobile multimedia content, including music and video, has a statistically significant positive influence on overall Quality of Life and well-being.
(Brandtzæg, 2012)	440 -aged 61–75 years old	Survey – Longitudinal	Using social network sites	$p<0.00$	Compared to non-users, users of SNS experienced higher level of loneliness.

The experiences of the elderly people when facing challenges and barriers of using social networks in Iran measured by Momeni et al. (2018). Nine seniors including six females and three males with an average age of 68 years participated in this study. The data were analysed using Colaizzi's 7-step method. Participants reported difficulties and barriers using online social networks. The outcomes of this study showed a direct significant relationship between social network and Quality of Life among the participants. In addition, it revealed that the high price of a new smartphone/tablet/personal computer was one of the limitations of using online social networks among older aged people in Iran.

The effect of Facebook usage on the Quality of Life of elderly people living in Cape Town was examined by Rylands (2017). Their study used a model based on parts of Kleine's Choice Framework (Kleine, 2010) and CASP-19 as the theoretical lens to evaluate how Facebook affects senior citizens' Quality of Life in Cape Town. Outcomes obtained from an anonymous survey with 59 responses from elderly people showed that participants who answered the survey were users that did not use Facebook very much, using only a small number of characteristics. Their research also found that the participants used Facebook principally to get socially involved with their family and friends which improves well-being (the state of being happy) in their lives and eventually to an enhanced Quality of Life ($p < 0.05$). Another study is carried out whether there is any difference between social media-based communications and traditional communication channels on social satisfaction using Patient Reported Outcome Measurement Information (PROMIS) scale (Clayton Hutto & Bell, 2014). The PROMIS is a well-validated eight item instrument for assessing satisfaction with activities as well as social roles. 268 participants age over 55 participated in a cross-sectional study. The result of this study was that usage of SNSs enhanced the level of social satisfaction and lowered the level of loneliness.

A study about the influence of mobile phones on the Quality of Life of elderly people in Western Cape, South Africa was conducted by Mealor et al. (2014). An approach based on a model developed from the CASP-19 Quality of Life instrument was combined with components from the Choice Framework Kleine (2010) to carry out a survey with different kinds of social class among the elderly people in the Western Cape. The Choice Framework was developed by Kleine (2010). It provides a description of an individual's ability in making use of his or her own agency or available resources while working under particular circumstances or within specific structures. It was particularly significant that using social media and multimedia had a constructive, although weak effect on the Quality of Life as experienced by the elderly people ($p<0.03$). Media use reduced the causes of isolation and social exclusion by maintaining outside relationships. Nevertheless, they did not suggest that all cell phone use had a positive effect on Quality of Life.

A study was carried out to examine social media use among elderly people (Bell et al., 2013). A total of 142 elderly people aged between 52–92 years old in the USA participated in this cross-sectional study. No significant difference in the level of loneliness between SNS users and non-users was reported ($p > 0.05$).

A representative sample of 441 participants aged 61–75 years old interviewed by Brandtzæg (2012) to determine how SNS users and non-users differ in social capital sizes of 1) absence of loneliness, 2) bridging capital and 3) informal sociability as well as how this changed. The result showed that users of social networking sites experienced higher levels of loneliness ($p<0.00$) than the non-users.

Most of the studies as shown in Table 2-4 in this category used survey methods. Two studies showed no relationship between loneliness and social networking sites use, and one study demonstrated increased loneliness among SNS users, compared to non-users. Four remaining study, three using a survey method and one using in-depth interviews, showed that use of social networking sites reduced loneliness and increased seniors' social satisfaction.

2.6 Impact of Tele-Care on Quality of Life

Tele-Care systems use ICT to evaluate health status and deliver care anytime and anywhere (Leist, 2013). Tele-Care provides monitoring, communication, and support for seniors. It promotes the delivery of social and health services by decreasing the cost of health care everywhere. A summary of these studies is shown in Table 2-6.

Table 2-5 Tele-care in Elderly People's Quality of Life

Source	Participants	Method	Intervention /technology	Statistical results	Findings
(van der Heide, Willems, Spreeuwenberg, Rietman, & de Witte, 2012)	130 average age of 73.2 years	Intervention study; one year trial period	Care TV	p<0.00	Feeling of loneliness expressively diminished after intervention.
(Tsai & Tsai, 2011)	Experimental: 40 Control group: 50	Quasi-experimental study; 3 months	Videoconference for older nursing home residents	6 months (p =0.03) and 12 months (p = 0.03)	Experimental group had a meaningfully lower level of mean loneliness after intervention than control group.
(Arnaert & Delesie, 2007)	71 60 years and older	Intervention study; 6 months	Video-telephone nursing care	p < 0.001	Participants experienced decrease in the level of loneliness after the study.

A representative sample of 130 participants aged average 73 years were interviewed to examine whether CareTV (video network which allows users to communicate with a nurse 24/7) is an effective instrument for the elderly people to engage in meaningful social contact through a video connection to avoid isolation (van der Heide et al., 2012). They found that feelings of loneliness diminished after intervention (p <0.00).

Long-term effectiveness of a videoconference intervention in improving nursing home residents' social support, loneliness, and depressive status over one year between two groups of experimental (n = 40) and control (n = 50) through videoconference for older nursing home residents is evaluated by Tsai et al, (2011). The research team found that in comparison to the control group, the experimental group had a meaningfully lower level of loneliness after intervention (p = 0.03). Tsai and Tsai (2011) pointed

learning and using the technology is important as it has positive impacts on loneliness/social relationship.

These studies evaluated the role of Tele-Care in mitigating loneliness among the elderly people. All studies found a decrease in the level of loneliness, demonstrating the usefulness of this tool for seniors dealing with social isolation, as shown in Table 2-5.

2.7 Impact of Application of Smartphones on Quality of Life

One of the ways elderly people connect with their families and friends is through smartphones. They can connect with their families and friend through social media (Charness, 2019).

Studies confirm that the application of smartphones can increase older people's ability in different physical and mental as well as social situations of life by enhancing their knowledge, simplifying their communication with friends, getting emotional support, and make joining social networks easy (Chan, 2015; Hong, Trimi, & Kim, 2016; Morris & Aguilera, 2012).

Table 2-6 The impact of Smartphones on Elderly People's Quality of Life

Source	**Participants**	**Method**	**Intervention /Technology**	**Statistical Finding**	**Findings**
(Rotondi, Stanca, & Tomasuolo, 2017)	50,000 people (around 24,000 households	Large sample survey/ Interview	Smartphone	(p=0.00)	Time spent with friends is less important for those who use the smartphone.
(Hong et al., 2016)	225	Empirical study	Smartphone	p=0.01	The use of smartphones does significantly impact the Internet literacy and use on older individuals. Educational background and the duration of smartphone use enhance the ability of seniors to use the Internet.

For investigating the use of smartphones measuring subjective well-being and quality of social interactions, a research was carried out by Rotondi et al. (2017). They tested their hypothesis in a representative and large sample of Italian people (148,088 people). Rotondi and his team noticed that time spent with friends is less important for those who use the smartphone (p=0.00).

The impacts of smartphone use on the Internet literacy for 225 elderly participants analysed by (Hong et al., 2016). Hong and his team found that the use of smartphones does significantly impact the Internet literacy and use in older individuals (p=0.00). They also discovered that educational background and the duration of smartphone use enhance the ability of seniors to use the Internet (p=0.01).

In summary, two studies, one using a large sample survey and interview, showed that time spent with friends is less important for those who use the smartphone showed that the use of smartphones has a significantly positive impact on elderly people's life. Table 2-6 shows the impact of smartphones on the quality of life of elderly people.

2.8 Dark Side of Social Media Application

One concept to be concerned widely is over time social media through smartphone application can be, a reason for depression. Research on users of social media including samples of all ages, revealed that social media addiction highly increases risk of depression. It may be assumed that this is worse when it comes to the elderly. However, research has made it clear that compared to others, seniors who are active in social media are less depressed(Llorente-Barroso, Kolotouchkina, & Mañas-Viniegra, 2021; Lutz & Hoffmann, 2017).

A study done by researchers from the University of Missouri explains the reason. The researchers in this study found that the risk of depression was meaningfully higher in the social media users who were checking sites like Facebook to mostly compare themselves to others. It increased depression through raising jealousy and feeling of lower self-esteem. Yet, in the case users were using social media primarily to stay in touch with others, the risk of depression was cancelled. Since majority of seniors rely on social media stay connected with family and friends, it makes sense that these seniors do not experience depression as a result of social media use(Cao & Yu, 2019).

A much bigger concern is about the influence of social media on in-person interactions. Senior isolation is one of the critical problems of the elderly's life, having devastating health effects. Being active in social media can lessen some of these effects, but it cannot fully address this concern. Seniors are in serious need of being attended by others to tackle the emotional, mental, and physical effects of isolation as a common experience among them(Baccarella, Wagner, Kietzmann, & McCarthy, 2018).

Another point is that seniors and their families shall not replace in-person interaction with social media because it will afflict the life of a greater percentage of seniors with the risk of isolation and feeling loneliness (Llorente-Barroso et al., 2021).

If social media through mobile application is used for augmenting in-individual contact, that's amazing. However, there is a clear concern that elderly people as well as their family members may have less of these interactions the more they trust on social media including senior isolation and depression(Cao & Yu, 2019).

2.9 Research Gap

Worldwide, populations are aging (Gökşin & Aşiret, 2021; Thakur & Han, 2021), this is more pronounced in developing countries where this is the fastest growing segment of the population. In Iran in 2020, 10% of a population of 75 million is over 60 (Hamedanchi, Momtaz, & Khankeh, 2020).

Studies that have examined Quality of Life in Iran have focused on the effects of different methods on improving Quality of Life (Gholamzadeh, Sharifi, & Zarshenas, 2018; Sharif, Jahanbin, Amirsadat, & Moghadam, 2018). These studies have not focused on the impact of the internet and technology, despite an increasing percentage of the population of elderly people having internet access and owning a smartphone (Eliasi et al., 2017; Khaki et al., 2017).

In some countries, technology focused Quality of Life studies have been conducted (Sinclair & Grieve, 2017; Slegers et al., 2008; Thakur & Han, 2021) and found to have a positive impact on Quality of Life for elderly people. These studies have been predominantly conducted using desktop PC devices on home broadband connections, therefore there remains a question about the impact of access via smartphones.

Existing research on the impact of technology has looked at both providing access to technology and training on the use of technology in developed countries, and has shown a positive impact on Quality

of Life for elderly people (Khalaila & Vitman-Schorr, 2018; Quintana, Cervantes, & Sáez, 2018; Rylands & Van Belle, 2017), there remains an unanswered question, if the impact of training translates into developing countries and to the use of smartphones. Much of the existing research did not investigate the persistence of training impact and therefore this remains an open question.

This highlights several gaps in the current research namely,

- The impact on quality of life for elderly people of using smartphones to access the internet.
- The impact on quality of life for elderly people in developing countries on using smartphones to access the internet.
- The impact of training in the use of smartphones, on the quality of life of elderly people in developing countries.
- Whether the impact of training in technology use persist, particularly for elderly people in developing countries.

This gives rise to the following research questions in addition to the main research question we identified in the introductory chapter.

Main question

To what extent does providing training on the use of a smartphone and social media apps change the Quality of Life of elderly people?

Sub-questions

RQ1: Do participants viewpoints of smartphone and apps change through training?

RQ2: Do the Quality of Life changes persist?

RQ3: Is the effect of technology on Quality of Life different between developed and developing countries?

RQ4: Is the effect on Quality of Life of a smartphone different from the effect of a desktop computer?

2.10 Summary

In this chapter, we reviewed the Quality of Life related to elderly people and the physical and psychological challenges they face while explaining available tools for measuring the Quality of Life. In addition, we discussed the effects of using technology in the life of elderly people, reviewed the findings of other studies regarding the impact of technology on the Quality of Life of elderly people, and explored in detail the effect of a variety of technology and technology education interventions on

the Quality of Life of participants. The research gap is also examined, and the main research question is broken down further into four sub-questions.

In the next chapter, we will discuss the method for our study. Then, we will clarify how our selected method will offer answers to our research question.

3 Method

This chapter describes the methods and instruments that were employed in the study including the location of the study, study design, and sampling technique that was used in the study, the calculation of the study sample size, recruitment process, intervention plan, ethical considerations, and data analysis process. A diagrammatic overview of the study process is shown in Figure 3-1.

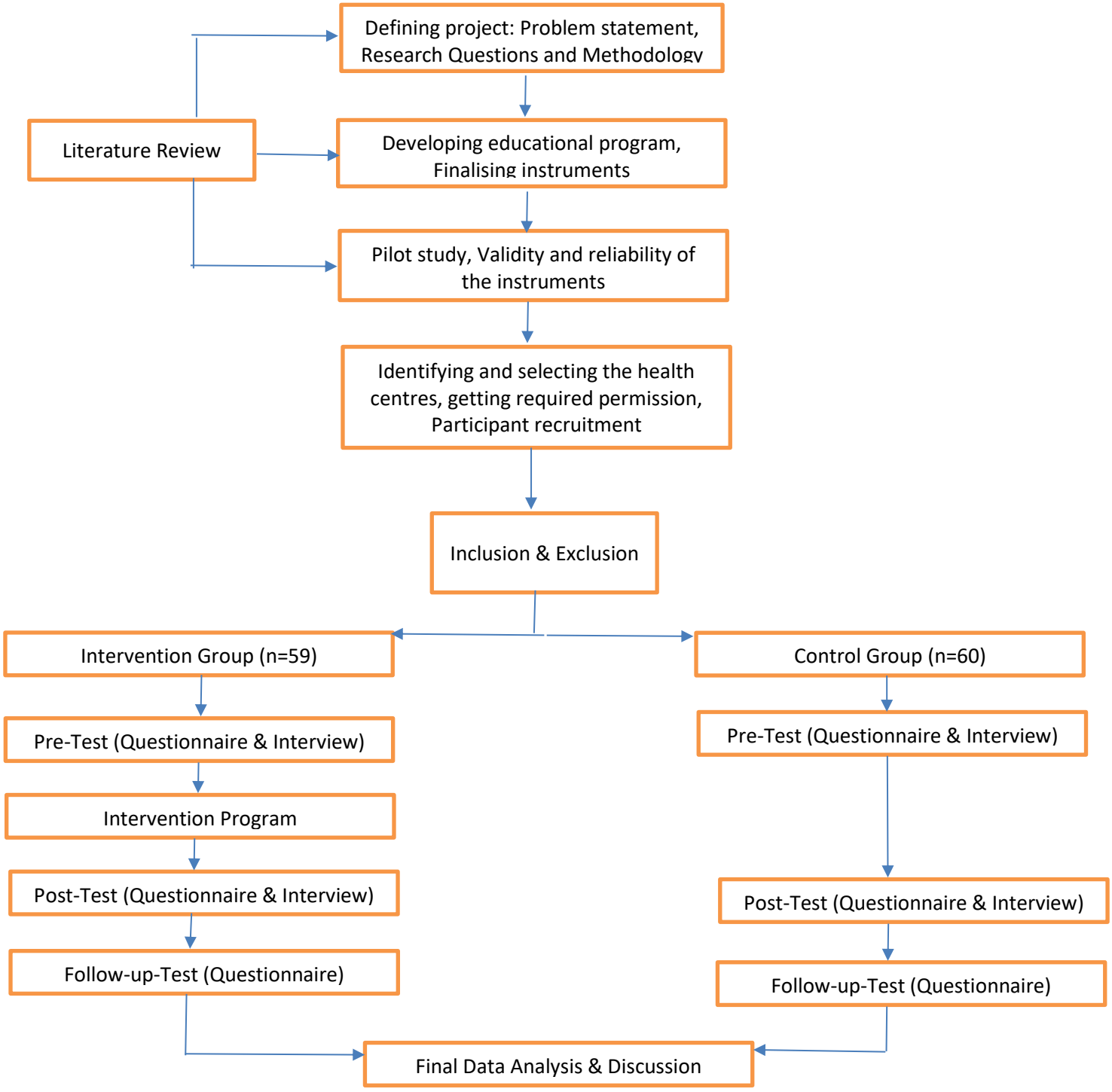


Figure 3-1 Overview of Study Process

3.1 Study location

The study was conducted in Shiraz, the fifth most populous city of Iran and the capital of Fars province (one of the 31 provinces of Iran). Fars is known for its rich Persian culture and history, as shown in Figure 3-2. This study was conducted among the local public health centres located in Shiraz. Shiraz is in South-Central Iran with an area of 240 km². In 2017, the population of Shiraz was 1,651,362 with more than 57% of this population living in urban dwelling ("Population of Cities in Iran," 2020). Iran is a developing country in terms of economic output and Quality of Life.

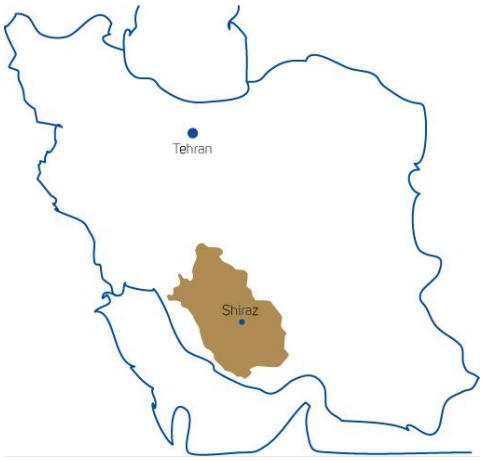


Figure 3-2 Iran- Fars- Shiraz (Fallahi, 2018)

"**Sa-Iran, Everyday better than yesterday**", was the advertising slogan of the first Iranian manufacturer of mobile and electronic industries located in Shiraz which launched the first Iranian mobile phone into the market in 2004. Shiraz is selected as the study location because it is considered as the centre of the mobile and electronic industries of Iran ("Shiraz Electronic Industries Organization," 2016).

3.2 Study Design

Mixed methods research is a procedure for performing research that consists of collecting, evaluating, and combining quantitative (e.g., experiments, surveys) and qualitative (e.g., focus groups, interviews) study. This approach includes one or more quantitative study(s) such as experimental or cross-sectional studies as well as one or more qualitative study(s) such as phenomenology or grounded theory studies. This approach is selected as the study design to provide the opportunity of a better understanding of the research problem compared with doing each method alone. This method can be advantageous in research in which an amalgamation of both quantitative and qualitative designs best reflects the purpose of the study (Burke Johnson & Onwuegbuzie, 2004).

The design of this study was a convergent parallel mixed methods that used both qualitative (phenomenological method) and quantitative (quasi-experimental method) approaches, to obtain complementary data for answering the study research questions. Quasi-experimental methods are research designs that aim to identify the influence of a particular intervention, event, or program by comparing treated units (groups, households, schools, etc.) to control units. Phenomenology is a method related to qualitative studies which concentrates on the unity of a live experience contained by a special group. The primary aim of the method is to come to an account of the character of the special phenomenon (Creswell, 2014).

Convergent parallel design is used to best understand and/or develop more complete details of the research problem by achieving different and complementary data. The convergent parallel design includes some specific criteria such as:

1. Collection and analysis of both quantitative and qualitative data are done at the same time (study includes a single-phase).

2. Priority of both quantitative and qualitative methods is equal where for each method, data collection, and data analysis are done independently.

3. The results of qualitative and quantitative data analysis are combined and compared for the final interpretation.

4. During the final interpretation, the convergence, divergence, and/or relationships between the results of quantitative and qualitative studies are discussed (Creswell, 2014).

The main research question of this study is: “To what extent does providing training on the use of a smartphone and social media apps change the Quality of Life of elderly people?”. Following the convergent parallel design, the data collection was started with a quantitative study, followed by a qualitative assessment of the participants’ experiences in the program, both in a single phase (the qualitative and quantitative data collection was conducted in the same period).

In the quantitative study, the effect of the education program on the participants’ Quality of Life was evaluated through a baseline measurement and was followed by pre-, post-, and follow-up data collection, (i.e., before and after, and one month after the intervention) for both intervention and control group. A pre-, post-, and follow-up design is an experiment where measurements are taken before and after treatment. The design means that a researcher can see the effects of some type of treatment on a group. Pre-, post- and follow-up designs are employed in both experimental and quasi-experimental research and can be used with or without control groups. For example, quasi-

experimental pre-, post-, and follow-up designs may or may not include control groups, whereas experimental pre-, post-, and follow-up designs must include control groups. Due to issues such as the impossibility of random selection of areas and centres, a quasi-experimental design was selected for the quantitative part instead of experimental design (Campbell & Stanley, 2015). However, throughout the study, all efforts were made to control for bias such as increasing the sample size and the random selection of the participants in intervention and control groups.

Qualitative data collection was done before and after the intervention through interviews. Unlike the quantitative section, there was no follow-up interview as the qualitative content analysis focused on themes and codes summarizing the participants' statements at the pre-and post-stage, and not based on statistical analysis.

The quantitative and qualitative data will be analysed separately and then findings are interpreted together to obtain the most comprehensive results and outcomes.

3.3 Study Population

The population of the study consists of all the senior residents registered in local public health centres (in the Persian language: "Marakez Behdasht") located in Shiraz, Fars, Iran. The government's local health centres are the community's first and most extensive contact with the general health care system in Iran's urban and rural areas. The health/medical teams mostly include general practitioners, public health nurses, midwives, and health technicians providing the primary level health care such as routine health services and medical check-up, general public health education and vaccination. They cater for different population groups such as pregnant women, infant and children, mothers and children and elderly people. These centres are open 24 hours a day and elderly people go there if they need any medical service support or if they have an appointment with a doctor or nurse regarding their health.

Of 17 health centres located in Shiraz, five centres that provide primary health care for elderly people regularly, accepted to join the study. The participants were recruited from this population based on the inclusion and exclusion criteria (see Section 3.4). Residents of 60 years and above registered in local public health centres located in Shiraz who meet all the study inclusion criteria was the study unit. Inclusion criteria include social, demographic, and geographic factors. Exclusion criteria are defined as specifications of the potential participants who meet the inclusion criteria but have an additional feature which can distort the process and/or results of the study. The detail of the recruitment process is presented in Section 3.6.2.

3.4 Inclusion and Exclusion criteria

Defining inclusion and exclusion criteria for participants in studies is a standard, essential action to design high-quality research methodologies. Inclusion and exclusion criteria are mostly set by the researcher.

Generally, inclusion criteria include social, demographical, and geographic factors. On the other hand, exclusion criteria are defined as specifications of the potential participants who meet the inclusion criteria but have a further feature that can distort the process and/or results of the study.

3.4.1 Inclusion criteria

- Age: 60 years old and above (Fahimfar, Tajrishi, Gharibzadeh, Shafiee, & Tanha, 2020; Noroozian, 2012).
- Have a smartphone (to make educational tasks possible).

3.4.2 Exclusion criteria

1. Have been diagnosed or treated for psychiatric illnesses (based on the gathered information on participants and their families), due to the specific mental and medical conditions/limitations of individuals with psychiatric illnesses.

2. Have mental problems (based on the gathered information on participants and their families) due to the specific learning conditions/limitations of individuals with mental problems.

3. Completely familiar with this study educational package (based on the gathered information on participants and their families).

Based on inclusion and exclusion, overall 137 volunteers replied to recruitment efforts, of these 119 (57% male) were eligible and continued for the project.

3.5 Pilot Study

A pilot study was done to check the reliability of the study instrument including the Quality of Life Scale (CASP-19) and obtain an overview of the level of the Quality of Life among the Iranian elderly people based on study instruments (Appendix C1). Thirty-seven male and female Iranian seniors aged 60-71 years old who were not participants of this study participated in this pilot and responded to the questionnaire to compute the reliability of study instruments. Cronbach's alpha (α) was used through SPSS to determine the internal consistency reliability of CASP-19, as shown in Table 3-1. It assesses the

extent to which items within a scale are inter-correlated with one another. Cronbach's Alpha is a coefficient, and it can range from 0.00 (no consistency in measurement) to 1.00 (perfect consistency in measurement). When Cronbach's alpha is ≥ 0.70, it means that 70% of the variance in the variable is reliable variance, and the internal consistency reliability is deemed to be acceptable (DeVellis, 2016). For exploring the dimensionality of the scale items, item-total correlations were calculated. Items within each dimension must represent a similar latent variable and correlate more strongly with own domain than others. If item-total correlations are ≥0.40 then it is considered satisfactory (Ware & Gandek, 1998). Spearman's correlation coefficients were interpreted and were used and as follows: ≤0.30: none, 0.31–0.50: weak, 0.51–0.70: fair, 0.71–0.90: good, and >0.90: excellent.

CASP-19 scale presented acceptable to good internal consistency coefficients. Cronbach's alpha of CASP-19 total score was 0.78. Nearly all CASP-19 subscales had good to high internal consistency. The pleasure domain was found to be highly reliable (α = 0.96). Self-realisation and Autonomy subscales had the same result and respectable reliability, with a coefficient alpha of 0.72, and the control domain was 0.69. The result of Cronbach's alpha for the control group Is near/almost 0.70, and because of this reason, the researcher of this study did not decide to change it. The CASP-19 questionnaire has been validated and used in several studies. It has been shown that this questionnaire is highly reliable.
The findings of this pilot study in Table 3-1 showed the instrument was reliable to use.

Table 3-1 Reliability Test of Study's Scale

Scale	Number of items	Cronbach's alpha
CASP-19	19	0.78
Control	4	0.69
Autonomy	5	0.72
Pleasure	5	0.96
Self-realization	5	0.72

3.6 Quantitative Study

The quantitative study includes collecting close-ended data mostly using a different kind of questionnaires. Quantitative data analysis includes analysing the variable collected using study instruments (e.g., questionnaires) to assess the study hypotheses.

For the quantitative study, a quasi-experimental study with pre-test, post-test and one-month follow-up tests (respondents were randomly selected to receive the intervention program) was conducted. Quasi-experimental research is like experimental research. However, one or more factors of experimental research (such as control group, random selection, random assignment, and/or active manipulation) is missed in a quasi-experimental research design. In this study, due to the study limitations, such as the impossibility of random selection of areas and centres, a quasi-experimental design was selected for the quantitative part instead of experimental design (Campbell & Stanley, 2015). However, throughout the study, all efforts were made to control for bias such as increasing the sample size and the random allocation of the participants to intervention and control groups.

Participants in the control group have the same criteria (Table 4-1) as the intervention group except for the main educational program. All participants in both intervention and control groups did the pre-test, post-test, and follow up test. The educational program was given to only the participants in the intervention group. The data (pre-test, post-test, and follow-up test) were analysed with SPSS.

3.6.1 Study hypotheses

The following hypotheses are designed to define the relationship between variables of this study. The present study aims at testing the following specific hypotheses:

H1. There is a significant difference in the mean variable of Quality of Life and its sub-scale, between the intervention and control groups in the post-test.

H2. There is a significant difference in the mean variable of Quality of Life and its sub-scale, between the intervention and control groups in the follow-up test.

H3. There is a significant difference in the mean variable of Quality of Life and its sub-scale, between pre-test and post-test in the intervention group.

H4. There is a significant difference in the mean variable of Quality of Life and its sub-scale, between pre-test and follow-up-test in the intervention group.

H5. There is a no significant difference in the mean variable of Quality of Life and its sub-scale, between post-test and follow-up tests in the intervention group.

These hypotheses will address the first and second research sub-questions.

3.6.2 Sample size

The sample size (n) was calculated based on the following formula (Aday & Cornelius, 2006):

$$n = \frac{2\sigma^2[z_{1-\alpha/2} + z_{1-\beta}]^2}{(\mu_1 - \mu_2)^2}$$

$$n = \frac{(2*(sqr(9.598))*sqr(1.96+1.28)) = 1,934.4}{sqr(70.5-58.1)=153.76} \qquad n=12.65\ (\sim 13)$$

where:

$\sigma = \sqrt{\frac{\sigma_1^2 + \sigma_2^2}{2}}$ here σ_1 is the estimated standard deviation in the first group and σ_2 is the estimated standard deviation in the second group.

$Z_{1-\alpha/2} = 1.96$ which is the standard error associated with 95% confidence intervals. Here, a 95% confidence interval is used as it is the most normal and common confidence in every experimental study. With a 95 %confidence interval, it will have five percent chance of being wrong. (Farajzadegan et al., 2021).

$Z_{1-\beta} = 1.282$ which is the standard error associated with 90% power. Here, a 90% power is used, that means 90% of the time that would get a statistically significant result. In 10% of the case, results would not be statistically significant. In this case the power shows the probability of finding a difference between the 2 means, which is 90%.

μ_1 is the estimated mean in the first group (larger).

μ_2 is the estimated mean in the second group (smaller).

To date, no ICT-related intervention has been conducted among the Iranian elderly people to improve their Quality of Life. Therefore, for calculating the sample size, the results of the most similar study are used which is the work of Hojatollah et al. (2016). In this study, Hojatollah et al. (2016) used these values:

$\mu_1 = 70.5\ and\ \mu_2 = 58.1$

$\sigma_1 = 7.8\ and\ \sigma_2 = 11.11$

Based on the formula, the calculated minimum sample size is 12.65 (~ 13) for each intervention and control group (Cardinal & Aitken, 2013; R. Smith & Sarah, 2019).

To support this study sample size calculation, the results of another study are used which is the work of Mohammad et al (2019). Based on the formula, the calculated sample size is 14 for each intervention and control groups.

$$n = \frac{(2 \times (\text{sqr}(3.75)) \times \text{sqr}(1.96 \div 2.32)) = 515.205}{\text{sqr}(39.46 - 33.46) = 36} \qquad n = 515.205 \div 36 = 14.31125$$

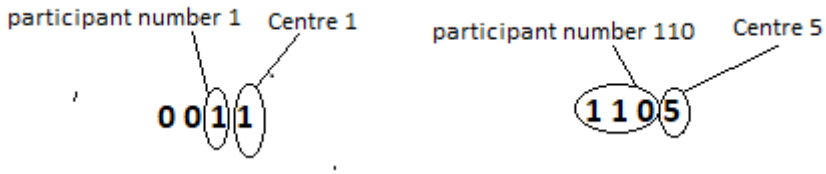
For this study, 90% power (1.28) is used to prevent the low sample size number. The calculated sample size showed the minimum number of participants.

3.6.3 Procedures

Recruitment for the study was started after obtaining the verbal consent of the centres' managers. In each centre, notices stating the study goals and target audience were posted on several bulletin boards. Eligible individuals were required to contact the provided telephone number within three weeks (from the first day of posting the announcement) to indicate their willingness to participate in the study.

All the 119 eligible individuals were divided into intervention and control groups using simple random sampling. Dividing all participants in 2 group, the first 59 codes were randomly selected from the jar as the intervention group. The remaining codes were put in the control group. Random assignment is one of the most critical aspects of this study design. In addition, the researcher requested participants to sign a consent form to not discuss the study with other people outside of the sessions, except when necessary and only with family members, for the duration of the study. This was to avoid influencing participants who were in the control group.

Each participant is identified with a unique number, consisting of participant number and centre number. For example, 1st participant in centre 1 identified with 0011. Last digit (1) is centre 1 and first three digits are participant 1. Another example, 1105, last digit which is 5 is centre 5 and 110 was participant 110.



The training started from Saturday 29th December 2018 and ended Thursday 7th February 2019. The training sessions were conducted in the five public health centres in Shiraz city.

3.6.4 Data collection

In the first phase of data collection, all those who were willing to participate in the study and signed the consent form were asked to answer a few socio-demographic questions, and questions related to their health condition and their level of familiarity with social media apps. By examining the volunteers' responses to these questions and based on the inclusion and exclusion criteria, the eligible individuals were identified for the study. Of the 137 volunteers, 119 (57% male) were eligible for the project.

The educational program was given to only the participants in the intervention group. Before starting and after completing the intervention sessions, all participants in both intervention and control groups did the pre-and post-test, respectively (see section 3.6). Post-test was conducted immediately after completing the six-weeks educational program. After one month of the post-test, we did the follow-up test to check the sustainability of the intervention effects. While the post-test can assess the effects of the interventional/educational program on the participants' Quality of Life, the follow-up test can show the sustainability of these effects. Follow-up assessment was done one month after the post-test through questionnaire to limit the possibility of losing participants.

3.6.5 Quantitative data collection instruments

For the quantitative data collection, a questionnaire containing two sections was developed, the full questionnaire can be found in Appendix A3. The first section contains questions related to socio-demographic characteristics and questions related to smartphone usage.

The socio-demographic characteristics included questions categorising the participants from the viewpoint of age, educational level, gender, marital status, the number of children, and having/not having a smartphone. Information regarding the history of using smartphone (duration of use, the main application(s) of the smartphone, and smartphone usage skills was also collected in this stage.

The second section of the questionnaire was the validated Persian version of the Quality of Life Scale (CASP-19) including four sub-scales (control, autonomy, self-realisation and pleasure) to assess the Quality of Life in individuals in early old age. This questionnaire has been validated in Iran among Iranian elderly people and used several times in the studies related to Quality of Life of Iranian elderly people (Jamil, 2006). A study by Heravi et al. in 2016 found the reliability of the questionnaire was 0.82, which is considered as a good score of reliability (Eskandari, Heravi-Karimooi, Rejeh, Ebadi, & Montazeri, 2015). This questionnaire has been used several times in studies related to Quality of Life of Iranian people. For example, a study conducted to measure the effect of some psychological interventions in decreasing post-traumatic stress disorder symptoms after Bam, Iran earthquake (Fakour et al., 2006). Another study measured how much influence the sense of coherence has on

Quality of Life in cancer patients (Farajzadegan et al., 2021). However, no study has been conducted in Iran to measure Quality of Life by utilising an educational package through smartphone. Therefore, this intervention program and measuring the Quality of Life of participants of this study before and after conducting the educational package is new in Iran.

3.6.6 Data Analysis

Using SPSS 21 software, all study variables were examined to evaluate normality and outlined through descriptive analysis and graphs including histograms and scatter plots. For all variables, the alpha level is the level of statistical significance (p=0.05). So, if the p-value was less than 0.05, there was a statistically significant difference between variables.

Missing data was handled by utilizing data assessment to check the missing values' amount and distribution (See chapter 4, Missing data), using SPSS 21 software (Graham, Cumsille, & Shevock, 2012). Little's MCAR test was applied in order to examine the quantity of the omitted figures (Little, 1988). Little's MCAR test is the most conventional test for lost examples that are missed totally randomly. If the p-value (quantity) for Little's MCAR test is not considerable, then it is assumed to be MCAR and the missingness is regarded as not significant for the analysis. Likewise, deletion (the method for handling missing data) of observations with missing values (omitted quantity) is suitable, on the condition that the number of missing values is not very large.

Data bias was examined to understand if data are missing randomly. This is an essential step and is done before replacing missing data using any imputation method (Garson, 2015). Using Little's Test of Missing Completely at Random (Little's MCAR test) which is one of the most common tests for checking the distribution of missing values, none of the correlations were found to be significant; so, data was assumed to be missing randomly. Table 4-2 shows Little's MCAR test.

To replace the missing data, the Expectation-Maximization method was used due to the very small amount of missing data (only 2.9% of the data was missing). This method automatically replaces the missing data with the average value of the variable. Several references and sources mentioned it as the best method to deal with small random missing data (Dong & Peng, 2013; Gold & Bentler, 2000; Kang, 2013; Nelwamondo, Mohamed, & Marwala, 2007; Van Buuren, 2018). The expectation maximization approach helps to replace values instated of predicting them which allow researchers to analyse a total or complete dataset which should be more powerful than analysing an incomplete dataset.

For descriptive data analysis, mean, standard deviation and frequency (percentage) were calculated. Chi-square test was also performed to check the significant changes among the ordinal/nominal variables. Before running the mean-based tests (t-test and mixed within between ANOVA) the following tests were used:

- Kolmogorov-Smirnov test to assess Normality.
- Levene's test to assess Homogeneity of Variance.
- Box'M to assess Homogeneity of Co-variance.
- Outliers significance.

Independent and pair sample t-test as well as Mixed between-within subjects ANOVA were performed to assess the changes in the mean of the study variables within the 3 stages of time (pre, post-test and one–month follow-up) between intervention and control groups.

Effect sizes were explained using Cohen's (1992) guidelines (small = 0.20 or greater; medium = 0.50 or greater; and large = 0.80 or greater). As there is no option in SPSS for calculating effect size, the effect sizes were calculated manually for independent t-test and paired sample t-test, separately. Both were examined to understand the significance of a difference between two means.

3.7 Qualitative Study

A qualitative study includes open-ended data that researchers usually collect using qualitative data collection methods such as interviews, focus groups and observations. The analysis of the qualitative data (statements, voice, photo and/or behaviour) mostly follows the path of categorizing data and then, representing different experience, ideas and theories gathered from data collection.

The study approach in the qualitative part was a phenomenology method. This method collects individual's real-life experiences mostly from their viewpoint. This method is a philosophy and ideal base for understanding the mental phenomenon and personal cognition. It is also compatible with different fields of psychology including clinical and educational (Smith, 2015).

Based on this method, an active process to reach the detailed statements of real experiences of individual's life was used. It also includes analysing and interpreting data and identifying meaningful statements transforming into formulated definitions (Bryman, 2017). The participants' real experiences regarding the research questions were gathered through semi-structured interviews. Then, during a process which is explained in the following sections, the raw data was transformed into a collection of organized definitions and information.

3.7.1 Procedures

A purposive sampling method (homogeneous sampling) was used. All the items in the sample are selected in homogeneous sampling because of their similarity or same traits. For instance, individuals in a homogeneous sample may be the same age, live in the same location or have the same employment situation. The selected traits (chosen features) are those ones that are beneficial for a researcher. It is a type of sampling that is done with a purpose and is not parallel to maximum variation sampling.

The main objective of purposive sampling is to centralize on specific factors of a certain population (Etikan, Musa, & Alkassim, 2016).

A homogeneous sample is often selected when the study objective addresses a specific factor of the special target group. Homogeneous sampling is classified under purposive sampling method aiming to attain a homogeneous sample with following criteria:

- Have units (such as individuals or cases). In the current study, the units include elderly people participating in the study.

- Share the similar factors or traits (for example a group of individuals with same age, gender or educational level) (Palinkas et al., 2015). In this study, the age range and registry in the health centres were the most important common factors among the participants.

3.7.1.1 Sample size

In qualitative studies, calculating a representative sample size is not a critical issue, because the value of data was assessed based on saturation (Carlsen & Glenton, 2011; Marshall, Cardon, Poddar, & Fontenot, 2013). However, for phenomenological studies, 5-25 participants are recommended to assist a researcher estimate the number of participants (Charmaz, 2006), but eventually, the required number of participants depends on the research saturation.

Saturation happens when adding more participants to the study does not result in additional perspectives or information. So, gathering data could be stopped when no new information comes out from statements (Mason, 2010). The respondents of the qualitative study were also selected from the participants in intervention and control groups in quantitative part. Overall, 20 volunteers (10 from each intervention and control groups) joined the qualitative study. The researcher reached data saturation with 7 participants in the intervention group and with 6 participants in the control group. However, he conducted the interview with all 20 volunteers to make sure that the terms and keywords extracted from the participants' statements are more accurate.

Data was collected via face-to-face interview and research tool was a set of semi-structured questions and analysed using open-coding method. The program was based on the terms and keywords extracted from the participants' statements, as well as the changes in the number and percentage of the keywords among participants in intervention and control groups at two points in time (pre-test and post-test).

3.7.2 Data Collection

For collecting and analysing participants' experiences, ideas and statements regarding the study questions, the Colaizzi approach was utilized (Ayres, Kavanaugh, & Knafl, 2003). Colaizzi's methodology of data analysis is a precise and strong qualitative method that the researchers used to find, understand, explain as they go through them, as well as revealing developing themes and their interconnected relationships.

First, the researcher described the aim of the study as well as basic concept of Quality of Life based on WHO's conception and explain what exactly they expect from the respondents. Data collection was done thorough face to face interview (using semi- structured questions) with the researcher recording field notes and making an audio recording.

The estimated time for the face-to-face interviews was 20 minutes. This data collection method is one of the most appropriate methods for gathering data in the study as interviews can uncover different information from different outlooks.

The qualitative data was processed by extracting and deducing the main statements and keywords. Compared with the structured interview method, the semi-structured interview approach has more flexibility ability to adapt to the respondents' answers which allows both researcher and respondent get into more details. Hence, the questions used in a semi-structured interview are simple and in uncomplicated terms to avoid confusion. All audio recording was transcribed on the same day of interviews.

Overall, 20 participants from the quantitative study announced their readiness for participating in the qualitative study (10 participants in each intervention and control group). So, the pre-test was done with 20 participants. However, only 16 participants participated in the post-test assessments comprising of 9 and 7 participants in intervention and control groups respectively. One participant in the intervention group and two participants in the control group decided to withdraw from the study and another participant in the control group had a health condition that prevented them from continuing.

3.7.3 Qualitative data collection instruments

Data were obtained via interview and recorded. All statements were translated to English and then were translated back to Persian by different people to ensure the accuracy of the statement as well as ensuring that concepts are not altered in the translation process.

The interview questions consisted of four questions. The questions posed to the participants were:

Q1) Can you tell me about how you started using a smartphone and what tasks you used it for?

Q2) How has your use of a smartphone changed over time?

Q3) Focusing on the most popular social media apps in Iran (Telegram, WhatsApp, and Instagram), what you would think about the negative impacts/limitations of using smartphones?

Q4) Focusing on the most popular social media apps in Iran (Telegram, WhatsApp, and Instagram), what you would think about the positive impacts/advantages of using smartphones?

3.7.4 Data analysis of qualitative data

Credibility, dependability, conformability, and transferability are the four criteria propounded by Guba and Lincoln (1985) and were used for assuring data trustworthiness and rigor (Poduthase, 2015). In this study, prolonged engagement as well as using two data collection methods (interview and field note), persistent observation, and member checks were utilised for credibility insurance. All statements were translated to English and then were translated back to Persian by different people to ensure the accuracy of the statement as well as ensuring that concepts are not altered in the translation process. For confidentiality all respondents' personal IDs were removed, the transcripts were coded (open coding). Reliability was achieved utilizing efficient interviewing methods and accurate transcribing (Morse, Barrett, Mayan, Olson, & Spiers, 2002).

At the end of each interview, participant was given an opportunity to give their overall opinion and ask questions (if any). Also, they were given a health package information for elderly people provided by the health centres. For building concepts from a textual data source, it is necessary to open the text as well as exposing the meaning, thoughts, and idea in it. Open coding is one of the processes of analysing textual content. Open coding involves labelling concepts, identifying and developing categories based upon their dimensions and properties (Khandkar, 2009). Open coding aims to develop a wealth of codes with which to define the data. To reach this aim, sensitising questions are presented regarding the data when they are being analysed. This in the end leads to new findings (Strauss & Corbin, 1990).

Open coding, axial coding, and selective coding were all steps of analyzing qualitative data in this study Open coding was the first step of the qualitative analysis of this study. In the first step of open coding, the researcher converted the data from participants to a word file and turned data into small, discrete components of data, and read through qualitative data including transcripts from interviews. Next, data was analytically broken into discrete, bite-sized pieces of data. The second step of open coding was coding each discrete piece of data with a descriptive label. In this step, each piece of data is interpreted and labelled based on the properties of the data. In addition, the researcher ensured that any two pieces of data that relate to the same subject should be labelled with the same codes.

Axial coding was the second step of qualitative analysis. Finding connections and relationships between code was the first step of axial coding. In this section, the researcher identified connections between codes and looked for causal conditions, the context behind observations, and the consequences of phenomena. The last step of axial coding was aggregating and condensing codes into broader categories by determining broader categories that make connections between codes.

Selective coding was the last stage of qualitative analysis. In this phase, the researcher selected one central aspect of data as a core category and put his concentration on it. The purpose of selective coding was to integrate and pull together developing analysis. Therefore, a core category developed as an emergent concept. This stage displayed those categories where more data were essential which denoted more theoretical sampling. This stage is also called the saturation of the theory.

In this study, the transcripts were read several times for emergent themes and statements were rechecked (by comparing the final transcript with the original voice record and field notes) to create the next level of coding. Data were re-coded by researcher and a trained research assistant by grouping statements. Finally, the original transcripts were checked again to ensure that the context warranted the classification. The whole process enabled participants' experiences to be reflected within themes as much as possible by the researcher, steps in Colaizzi's Descriptive Phenomenological method mentioned in Table 3-2. This method is to analyse the qualitative data, and was used in many studies including Meyers et al. (2019) and Wirihana et al. (2018). The interviews data was analysed manually.

Table 3-2 Steps in Colaizzi's Descriptive Phenomenological Method, table adapted from Morrow et al. (2015)

Step	Description
1. Familiarisation	The researcher familiarises him or herself with the data, by reading through all the participant accounts several times.
2. Identifying significant statements	The researcher identifies all statements in the accounts that are of direct relevance to the phenomenon under investigation.
3. Formulating meanings	The researcher identifies meanings relevant to the phenomenon that arise from a careful consideration of the significant statements. The researcher must reflexively "bracket" his or her pre-suppositions to stick closely to the phenomenon as experienced (though Colaizzi recognises that complete bracketing is never possible).
4. Clustering themes	The researcher clusters the identified meanings into themes that are common across all accounts. Again, bracketing of pre-suppositions is crucial, especially to avoid any potential influence of existing theory.
5. Developing an exhaustive description	The researcher writes a full and inclusive description of the phenomenon, incorporating all the themes produced at step 4.
6. Producing the fundamental structure	The researcher condenses the exhaustive description down to a short, dense statement that captures just those aspects deemed to be essential to the structure of the phenomenon.
7. Seeking verification of the fundamental structure	The researcher returns the fundamental structure statement to all participants (or sometimes a subsample in larger studies) to ask whether it captures their experience. He or she may go back and modify earlier steps in the analysis in the light of this feedback.

3.8 Intervention

Studies confirmed that the use of smartphones can increase older people's ability in different mental and social situations of life by enhancing their knowledge, simplifying their communication with friends, getting emotional support, and joining social networks easy (Chan, 2015; Hong et al., 2016; Morris & Aguilera, 2012). Moreover, several studies confirmed that Quality of Life of elderly people in Iran is low due to psychological issues including loneliness, depression, isolation, lack of social support (Farajzadeh & Gheshlagh, 2017; Salehi et al., 2012). Therefore, the researcher designed a smartphone educational package for this study, measured and compared the Quality of Life of participants of this study before and after conducting the training.

An educational package designed to be delivered by one instructor to a small group was developed. The package was focused on people who had basic familiarity with a smartphone but did not make use of news and social media apps. The educational package was adopted from previous studies related to the Internet and Social media apps training for elderly people by (Blažun & Saranto, 2012; Sitti &

Nuntachampoo, 2013; Winstead et al., 2013). Winstead's educational training package consisted of classifying computer parts and turning off and on the computer, how to use email, web-searching, social networking, and YouTube. Blazun et al. (2012) educational package provided guidance on how to browse and search for numerous information important to elderly people through the Internet such as looking for social events, reading newspapers as well as searching for medical information. Sitti and Nuntachompoo's (2013) educational package composed of five subjects such as computer introduction, Windows training, the Internet and web browser as well as e-mail, using social media such as Facebook and searching information. The educational program for this study was modified to suit the specific requirements of the target population, the environment that the participants live in, the local culture, ethnic and religious differences and similarities, the special health situations of participants, and time limitations.

Based on the previous paragraph, those educational packages were designed based on computer desktop. In this study, a smartphone was used instead of a computer. Nowadays smartphone acts as a primary computing device as this technology is more convenient and portable than a computer. Additionally, in Iran, issues such as depression, isolation, loneliness, and financial problem are factors contributing to the suffering of elderly people (Sheykhi, 2019). Therefore, due to their financial capacity, a smartphone was used instead of computer as smartphones are cheaper than desktop computers and easier to use. This intervention program is new in Iran, and no one has designed any educational package related to educational package with smartphone.

The Iranian government filter some social media and communications platforms, such as YouTube, Facebook, YouTube, and Twitter. The government also blocks some streaming services, such as Hulu and Netflix. Therefore, Telegram, Instagram, and WhatsApp were selected as these applications are the most popular social media apps, and are not filtered in Iran. Using of existing applications helped the researcher of this study to save money and time.

In terms of originality and novelty of instruments, a practical educational intervention was developed that included using the most popular social media apps in Iran; Instagram, WhatsApp and Telegram. At each stage (pre-, post-, and one-month follow-up), the CASP-19 questionnaire was administered. In addition, the qualitative content analysis focused on themes and codes summarizing the participants' statements at the pre-and post-intervention stages based on CASP subcategories (control, autonomy, pleasure, and self- realization). The educational program was given to only the participants in the intervention group.

The educational package includes (Appendix D1, D2, D3, and D4):

- How to use web browser in a smartphone
- How to search information and news in a smartphone
- Working with Telegram
- Working with Instagram
- Working with WhatsApp

The training sessions were held in five centres, three times a week (45 minutes for each session) for six weeks. Participants attended the sessions in their own centre. All 59 participants attended the training session every time. The educational package presented with PowerPoint slides on the projector. At the end of each session, participants were asked to work on additional exercises/homework. For example, they were asked to send each other or the researcher a text message or to share a photo or a short video.

Table 3-3 Details of the Training Sessions in 5 centres

Week 1: How to use web browser and how to search information and news in a smartphone

Week/Session	Subjects
Week 1 Session 1	**Introduction** Introduction and Greeting Explaining the educational package overview to the participants **What is the Internet?** The internet overviews World Wide Web
Week 1 Session 2	**How to use web browser in a smartphone.** **How to search information and news in a smartphone?** Working with Google engine
Week 1 Session 3	**How to use web browser in a smartphone.** **How to search information and news on a smartphone?** Working with Google engine

Week 2: Working with WhatsApp

Week/Session	Subjects
Week 2/session 1	**Introduction:** **How to install WhatsApp** **How to create an account for WhatsApp**
Week 2/session 2	**Working with WhatsApp** How to search for a particular user in WhatsApp Send Text, Send Voice, Voice Call
Week 2/session 3	**Working with WhatsApp (Continue)** Send Text, Send Voice, Voice Call First and Second Tick

Week 3: Working with WhatsApp

Week/Session	Subjects
Week 3/session 1	**Working with WhatsApp (continue)** How to download files through WhatsApp Messenger How to change font size in WhatsApp
Week 3/session 2	**Sending Resources** Send File, Send Location, Send Contact Send Video, Send Documents, Send Audio
Week 3/session 3	**Working with WhatsApp (Continue)** How to prevent the transfer of a voice message? How to make a new group Animation Icon

Week 4: Working with Instagram

Week/Session	Subjects
Week 4/session 1	**Introduction:** **How to install Instagram?**
Week 4/session 2	**Five main options of the program** First option: Main part of the program, Second option (search), Third Option (Sharing), Fourth Option (Notification) Fifth Option (Personal Profile)
Week 4/session 3	**Working with Telegram Instagram** How to Send a Message to Your Instagram Friend, Adding Comment Under Pictures and Videos in Instagram Sharing Videos/Pictures with Other Instagram Users Deleting or Revising the Posts, Training the Sending of Personal Message through direct, Like Your Friends Videos and Pictures

Week 5: Working with Telegram

Week/Session	Subjects
Week 5/session 1	**Introduction** **How to install Telegram** **Working with main page of Telegram** Pin to top Clear history, Delete, Leave Channel Search option, Adding Contact
Week 5/session 2	**The difference between group and channel** **Working with Telegram 1** Start to chat with one person Share, Block Edit, Add Shortcut, Call, Search Clear History, Delete Chat Mute Notification
Week 5/session 3	**Working with Telegram 2** Send Text, Send Voice, Send File Animation Icon First and Second Tick, Reply, Call Forward, Edit, Delete

Week 6: Working with Telegram

Week/Session	Subjects
Week 6/session 1	**Editing Photo before Sending It** **Working with Telegram Menu** **Working with main page of Telegram** New Group, New Secret Chat, New Chanel Contacts, Invite friends
Week 6/session 2	**Reviewing how to use the Internet and how to use WhatsApp**
Week 6/session 3	**Reviewing how to use Instagram and Telegram**

3.9 Study variables

The Independent variables of this study were:

- Participation in educational intervention training;
- Age;
- Educational level;
- Gender;

- Marital status;
- Number of children;
- Duration of use of smartphone;
- The reason for using smartphone;
- The level of confidence of using smartphone;
- The average time spend daily using smartphone;

A dependent variable is one that is expected to change with changes to the independent variable(s) (Lodico, 2006). The dependent variables in this study were control, autonomy, pleasure, self-realization, and the level of the Quality of Life (based on the CASP-19 questionnaire).

3.10 Ethical Issues

The participants received detailed information about the study and ethics approval before starting data collection. Personal information (such as demographic data) was collected from participants only after getting the written consent from the participants. All interviews were recorded only with the participant's permission.

Participants were informed that the findings of the research would be published with no personally identifiable information to ensure confidentiality. All transcripts were reviewed by respondents to confirm they represented the respondents' viewpoints.

4 Quantitative Data Analysis

In this chapter, the results of the quantitative part of the study (RQ1 and RQ2) are reported and the analytical methods are described. In addition, the five specific hypotheses of this study will address the first and the second research questions. Within group and between groups, statistical analysis was used to determine the effect of the intervention. Data were collected using CASP-19 survey at three-time intervals, pre, post, and one month following the intervention, as shown in Figure 3-3. After one month of the post test the follow-up test was performed to check the sustainability of the intervention effects. This chapter describes the demographic aspects of the cohort, describes how missing data was treated, and then reports statistical analysis of the data, including t-tests and ANOVA.

4.1 Study Participants

Demographic data were collected about the participants in each group (intervention and control) to ensure that the groups were comparable. An overview of the demographic data collected is shown in Table 4-1 and is discussed below. The

Age, gender, educational level, number of children, marital status, and duration of using smartphone were the socio-demographic characteristics collected. There was no significant difference in the mean age of participants between groups (t=-0.10, p=0.28). The mean age of the participants in intervention and control groups was 66.19±2.73 and 66.67±3.00 respectively. The age range for each group was 60-71 for the control group and 60-70 for the intervention group.

The number of male participants in both groups was higher than the number of female participants. However, the difference is not significant (χ^2=0.01, p=0.92). In the educational data for both groups, majority of the participants has diploma qualifications (49.2% and 46.7% in intervention and control group respectively). No significant difference was found in educational level (χ^2=2.34, p=0.51) between groups. There was no significant difference between the two groups in marital status (χ^2=0.60, p=0.73). Finally, the data shows no significant difference in daily use of a smartphone among participants in the intervention and control groups (χ^2=2.15, p=0.34). It can therefore be confident that the two groups are comparable for the purposes of this study.

Table 4-1 Socio-demographic characteristics of participants

Characteristics	Intervention (%)	Control (%)	Statistical Value*	p-value**
Age (Mean±SD)	66.19	66.67	-0.10	0.28
Educational Level				
Under Diploma	37.30	36.70	2.34	0.51
Diploma	49.20	46.70		
Bachelor	10.20	10.00		
Master and upper	3.40	6.70		
Gender				
Male	57.60	56.70	0.01	0.92
Female	42.40	43.30		
Number of Children				
One child	25.80	28.30	0.14	0.90
2-3 children	24.40	28.30		
More than 3 children	25.80	43.30		
Marital Status				
Married	75.00	72.30	0.60	0.73
Widow/er	15.00	17.60		
Divorced	10.00	10.10		
Hours of Using Smartphone/Daily				
Less than 1 hour	57.60	68.30	2.15	0.34
1-2 hours	23.70	48.10		
More than 2 hours	18.60	10.10		

*Independent t-test for continues variable and Chi-Square Test for categorical variable, **Significant at level $p<0.05$

4.2 Missing Data

One of the common issues in experimental studies is missing data. A potential solution to these missing data is using the Intention-to-Treat (ITT) approach by including all data which is randomized through a specific process (M. Bell, Fiero, & Horton, 2014). Noncompliant data and dropouts could create crucial prognostic differences among treatment groups. Besides, data may be noncompliant or may drop out because of their response of treatment. ITT analysis addresses the practical and interventional studies because it allows noncompliance and protocol aberration.

The sample size is preserved by the ITT approach because, in the case of the exclusion of the nonconforming topics and dropouts from the last assessment, the sample size will be reduced significantly. This will also reduce statistical power. Following ITT in the current study, the first step of missing data treatment was done using data assessment to determine the amount and distribution of missing values using SPSS 21 software (Graham et al., 2012) frequency test. By running a frequency

test for the questionnaire statements, the “Statistics” box shows the number of missing values for each variable. In this study, we identified 2.9% of overall of missing data, and this was due to the withdrawal of participants or failure to answer some questions. A summary of Missing data is shown in Table 4-2.

Data bias was examined to understand if data are missing randomly. This is an essential step and is done before replacing missing data using any imputation method (Garson, 2015). Using Little’s Test of Missing Completely at Random (Little's MCAR test) which is one of the most common tests for checking the distribution of missing values, none of the correlations were found to be significant; so, data was assumed to be missing randomly. Table 4-3 shows Little's MCAR test.

To replace the missing data, the Expectation-Maximization method was used due to the very small amount of missing data (only 2.9% of the data was missing). This method automatically replaces the missing data with the average value of the variable. Several references and sources mentioned it as the best method to deal with small random missing data (Dong & Peng, 2013; Gold & Bentler, 2000; Kang, 2013; Nelwamondo et al., 2007; Van Buuren, 2018).

Table 4-2 Summary of Missing data

	Control (%)	**Autonomy (%)**	**Pleasure (%)**	**Self-realization (%)**	**Overall (%)**
Data					
Complete	97.90	97.30	98.80	97.10	97.10
Incomplete	2.10	2.70	2.20	2.90	2.90

Table 4-3 Little's MCAR test

Scales	**Chi-Square**	**DF**	**P-value**
Control	13.30	13.00	0.22
Autonomy	22.11	21.00	0.39
Pleasure	23.83	26.00	0.98
Self-realization	7.21	5.00	0.21
Overall	15.23	17.00	0.95

**Significant at level $p<0.05$

4.3 Impact of the Intervention

To determine the overall impact on the Quality of Life on participants due to the intervention, an independent t-test was performed to check the differences in mean variable for Quality of Life between the intervention and control groups in the pre-, post- and follow up tests (see Table 4-4). Equality of variances was assumed, therefore the data of the first row was checked. No significant difference was seen between intervention and control groups in the pre-test (t= -0.75, p=0.45). A lower mean variable of all categories and total indices of the Quality of Life indicates lower Quality of Life.

4-4 Independent t-test between intervention and control groups over the study time period

	F	Sig	t	Df	Sig (2-tailed)	Mean difference	95% Cl	
							Lower bound	Upper Bound
pre-test	4.17	0.05	-0.75	117.00	0.45	-0.67	-2.46	1.11
post-test	6.67	0.01	3.68	103.88	0.00	2.91	1.34	4.48
follow-up	13.77	0.00	4.06	96.97	0.00	3.47	1.77	5.16

*Independent t-test, **Significant at level p<0.05

There was a significant difference in both post-test (t= 3.68, p<0.00) as shown in Table 4-4 and follow-up test (t= 4.06, p<0.00) between control and intervention groups, with participants in the intervention group reporting a higher Quality of Life.

The effect size of the independent t-test between groups at the post- test and follow-up stages was calculated using the effect size formula for the Independent t-test (Allen, Bennett, & Heritage, 2014).

$$\text{Cohen's d} = (M_2 - M_1)/SD_{pooled}$$

where:$SD_{pooled} = \sqrt{((SD_{12} + SD_{22})/2)}$

Based on these formulae, the Cohen's (1992) d (effect size) in post and follow up tests were 0.67 and 0.74 (both moderate effect size). The effect size indicates “whether or not the difference between two groups’ averages is large enough to have practical meaning”. The larger this number, the greater the practical impact of the intervention on the population. Therefore, the results have enough potential to have practical meaning.

4.4 Within Group Changes in Quality of Life

To determine the overall effect on Quality of Life of the intervention on participants a paired t-test was performed to check the differences in mean variable for Quality of Life at the post- and follow-up

stages in the intervention and control groups. For the intervention group (see Table 4-5) the results of paired t-test showed a significant mean difference between pre-test and post-test (t= -8.61, p<0.00), post-test and follow-up tests (t= -2.24, p=0.03) as well as pre-test and follow-up test (t= -8.42, p<0.00)..

Table 4-5 The mean difference in Quality of Life for intervention group

	Mean	Std. Deviation	Std. Error Mean	95% CI		T	Df	Sig.(2-tailed)
				Lower Bound	Upper Bound			
Pre-test, post-test	3.11	2.77	0.36	-3.84	-2.39	-8.61	58.00	0.00
Post-test, follow-up-test	0.42	1.45	0.18	-0.80	-0.04	-2.24	58.00	0.02
Pre-test, Follow-up-test	3.54	3.22	0.42	-4.38	-2.70	-8.42	58.00	0.00

*Paired t-test, **Significant at level p<.05

The effect size of paired t-test within groups for the intervention group was calculated using the following formula:

$$d_z = \frac{\mu_1 - \mu_2}{\sigma_{x_1 - x_2}} \approx \frac{\bar{x}_1 - \bar{x}_2}{s_z}$$

Based on this formula, the Cohen's d (effect size) in pre-test and post-test, post-test, and follow-up as well as pre-test and follow-up were 0.82, 0.12 and 0.93, respectively. Effect sizes were explained using Cohen's (1992) guidelines (small = 0.20 or greater; medium = 0.50 or greater; and large = 0.80 or greater). The results of paired t-test for the control group (see Table 4-6) showed no significant mean difference between pre-test and post-test (t= 1.35, p=0.18), post-test and follow-up test (t= 0.38, p=0.70) and pre-test and follow-up test (t= 1.94, p=0.06) for Quality of Life.

4-6 Mean differences in Quality of Life for control group

	Mean	Std. Deviation	Std. Error Mean	95% CI		T	Df	Sig.(2-tailed)
				Lower Bound	Upper Bound			
Pre-test, post-test	-0.46	2.67	0.34	-0.22	1.15	1.35	59.00	0.18
Post-test, follow-up-test	-0.13	2.74	.35	-0.58	0.84	.38	59.00	0.70
Pre-test, Follow-up-test	-0.60	2.39	0.30	-0.02	1.21	1.94	59.00	0.06

*Paired t-test, **Significant at level p<0.05

4.5 Results of the Assumptions

A mixed within-between ANOVA compares the mean differences between groups that have been split on two "factors" (also known as independent variables), where one factor is a "within-subjects" factor (time) and the other factor is a "between-subjects" factor (groups). A mixed ANOVA followed the standard procedure provided by International Business Machines (IBM) in the IBM SPSS manual (Field, 2017).

The following analyses were applied to check the requested assumptions before running the mixed within between ANOVA (Allen et al., 2014; Cardinal & Aitken, 2013):

1. Kolmogorov-Smirnov test to assess Normality;
2. Levene's test to assess Homogeneity of Variance;
3. Box'M to assess Homogeneity of Co-variance;
4. Outliers significance.

Normality (Skewness and Kurtosis) and Homogeneity of Variance (Levene's test) and Homogeneity of Co-variance (using Box'M), and Outliers significance was assessed before doing the main test, as shown in Table 4-8.

Furthermore, Sphericity test was done to check Mauchly's assumption (the variances of the differences between the related groups of the within-subject factor for all groups of the between-subjects factor of variables) (Julie, 2007). Tables 4-7 show the results of normality test for intervention and control groups.

4-7 Results of the normality test for intervention and control groups

	Asymp. Sig. (2-tailed) *		
	Pre-test I-C**	**Post-test I-C****	**Follow-up test I-C****
Control	0.73-0.30	0.49-0.63	0.34-0.67
Autonomy	0.49-0.31	0.61-0.52	0.92-0.38
Pleasure	0.92-0.85	0.82-0.90	0.83-0.98
Self-realization	0.86-0.60	0.65-0.72	0.67-0.75
Quality of Life	0.97-0.56	0.62-0.52	0.46-0.88

*One-Sample Kolmogorov-Smirnov test

**I: intervention group, C: control group

According to the results of the one-simple Kolmogorov-Smirnov test for normality, the p-value for all the study valuables was greater than 0.05. Hence, all the variables were distributed normally in the

intervention and control groups. As well, the outcome of the Levene's and Box'M test approved the Homogeneity of Variance and Homogeneity of Co-variance, respectively. The assumption of homogeneity of variance is that the variance within each of the populations is equal. This is an assumption of analysis of variance (ANOVA). ANOVA works well even when this assumption is violated except in the case where there are unequal numbers of subjects in the various groups. Box's M test (also called Box's Test for Equivalence of Covariance Matrices) is a parametric test used to compare variation in multivariate samples. More specifically, it tests if two or more covariance matrices are equal (homogeneous). The results of these tests are presented in Table 4-8. Because of the sensitivity of Box's test, its level of significance was set at 0.00 (Pallant, 2007).

4-8 Results of the homogeneity of variance and covariance tests

	p value*			
	Pre-test	**Post-test**	**Follow-up test**	**Homogeneity of Co- variance****
Control	0.17	0.88	0.26	0.48
Autonomy	0.63	0.95	0.42	0.00
Pleasure	0.52	0.96	0.37	0.01
Self-realization	0.52	0.71	0.18	0.00
Quality of Life	0.97	0.87	0.70	0.03

*Levene's test; **Box's test (significant level: 0.00)

The test of homogeneity of variance test compares the variance's homogeneity between 2 groups (intervention and control). As well, the homogeneity of covariance has only a single value through time.

The interaction effect, main effects and within/between effects were also considered. Partial eta square was the measurement index for effect size. According to Cohen (Cohen, 1988) 0.01, 0.06 and 0.14 represent small, moderate and large effect size respectively (Bakeman, 2005). The interaction effect was defined as "change in the simple main effect of one variable over levels of the second". If the p-value was smaller than 0.05 the interaction effect was significant. Controlling the main effect of any level on another factor could be done by doing simple mean effect. Furthermore, the changes of a variable in each level in the plots could be reviewed as the alternative way to understand the interaction effect.

According to International Business Machines (IBM) "SPSS offers Bonferroni-adjusted significance tests for pairwise comparisons. When the product of the Least Significant Difference (LSD) p-value and the number of comparisons exceeds 1.00, the Bonferroni-corrected p-value reported by SPSS will be 1.00.

The reason for this is that probabilities cannot exceed 1". So, in the Bonferroni post-hoc analysis some of the p-values were equal to 1.00.

Interaction effect, main effects as well as within and between effects were considered in reporting the results. Partial eta square was used as a value of effect size. According to Cohen et.al (1988), 0.01, 0.06 and 0.14 represent small, moderate and large effect size respectively (Bakeman, 2005).

4.6 Effect of the Intervention Program on the Study Variables using Mixed ANOVA analysis

The comparison of mean variable of Quality of Life and its subscales between intervention and control groups is shown in Table 4-9.

4-9 Comparison of mean variable of QoL and its subscales between intervention (n=59) and Control (n=60) groups

Characteristics	Intervention (Mean±SD)	Control (Mean±SD)	t-value*	p-value**
Control	7.25±1.79	6.83±1.81	1.27	0.21
Autonomy	7.81±1.97	9.35±2.16	-4.05	0.00
Pleasure	5.73±2.85	5.00±3.20	1.30	0.19
Self-realization	5.67±2.10	5.96±2.23	-0.73	0.47
Quality of Life	26.45±4.20	27.15±5.55	-0.75	0.45

*Independent t-test, **Significant at level p<0.05

The mean difference of each question in the CASP-19 in the intervention group is reported in Appendix E4. According to the results, question 3 (autonomy); question 17 (self-realization), and question 2 (control) had the least change between pre- and post-test. Meanwhile, question 13 (pleasure), question 16 (self-realization), question 14 (pleasure) had the most changes, and questions 15 and 19 remained steady.

It is important to note that questions number 1, 2, and 4 (the Control sub-scales) as well as 6, 8, and 9 (the Autonomy sub-scales) are "negative statements", unlike the other sentences that have a positive concept. Therefore, a decrease in their mean variable in the post-test and follow-tests indicates an increase in Quality of Life. Appendix E1, E2, and E3 also showed descriptive statistic (Mean, SD) variable of qualities of life at each time period (pre-test, post-test, and follow up test).

Questions 13 and 10 both from pleasure (-0.10) and 16 from self-realization (-0.08) had the most changes in the period of the post to follow-up test. Questions 11 (pleasure), Questions 7 and 97 (both from self-realization) had no change and also, Questions 1, 2, 3 all from control had the least changes.

Appendix E4 shows the mean difference of each question in the CASP-19 for the intervention group. Finally, Questions 10, 13, and 14 from pleasure had the most changes between pre- and follow-up test. Meanwhile, questions 3, 9 and 2 had the lowest changes in this time period. Appendix E4 shows the mean difference of each question in the CASP-19 for the intervention group. All questions in Appendix-E show a decrease in Quality of Life score between the pre- and post-tests. For instance:

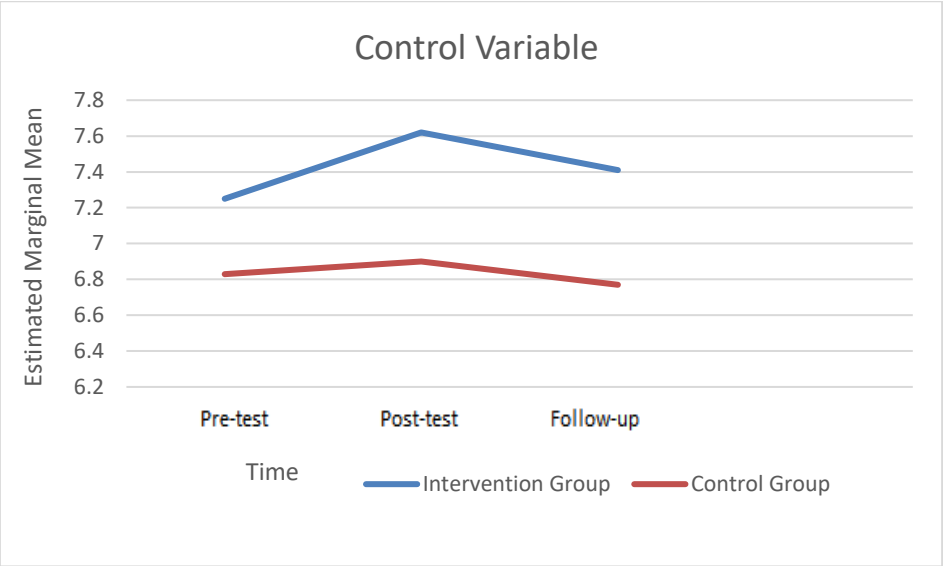
1.47 (C1, Appendix E1) – 1.61 (C1, Appendix E2) = -.14 (control, Appendix E4)

4.7 Effect of the Intervention Program on the Study Variables

Control

The results of the Mixed between-within subjects ANOVA showed a non-significant difference in the mean of the Control variable between two groups (intervention and control) with small effect (F=3.80, p=0.06), and a significant change among 3 stages of time (pre-, post- and follow up-tests) with large effect (F=3.13, p=0.04, η^2=0.27). As well there was no significant difference in the interaction between group and time (F=1.44, p=0.24). Table 4-10 shows the result of ANOVA within – between subject effects.

To show the efficacy of the educational program, the mean score of the Control variable in pre-test, post-test and follow-up test were compared in both the intervention and control groups. The result of post hoc test (Bonferroni) revealed that the difference between pre-test and post-test in the Control score in the intervention group was significant (Δmean=-0.37, p<0.00) with a large effect (η^2=0.11). However, there was no significant difference between the Control mean between post-test and follow-up test (Δmean=-0.22, p=0.24). Meanwhile, there was no significant difference in control between pre-test and post-test (Δmean=-0.07, p=1.00) and between post-test and follow-up test (Δmean=0.13, p=0.86) in control group, as shown in Table 4-11.



	Pre-Test	Post-Test	Follow-up
Intervention Group	7.25	7.62	7.41
Control Group	6.83	6.9	6.77

Figure 4-1 Mean Plot for Intervention and Control Groups over Time (Control variable)

Due to the results of the sphericity test (p=0.76), the sphericity assumption for control was accepted. Therefore, to test the related hypothesis post hoc test (Bonferroni) was applied to compare the mean scores.

The mean plot in the intervention and control groups across the three stages of time is shown in Figure 4-1. For each plot, the lines show the changes of mean scores of each variable in the intervention and control groups. The detailed results of changing the mean variable in intervention and control groups for each of the study variables through time are visualized in these plots in a schematic form.

Moreover, the difference between pre-test and post-test in Control variable in the intervention group was significant, as shown in Figure 4-1. However, there was no significant difference between the Control mean between post-test and follow-up test. Meanwhile, there was no significant difference in control between pre-test and post-test and between post-test and follow-up test in the control group.

4-10 Result of ANOVA within – between subject effects

Variable		Type III Sum of Squares	Df	Mean Square	F-Value	P-Value.	Partial Eta Squared
Control	Time	3.23	2.00	1.61	3.13	0.04*	0.27
	Group	31.70	1.00	31.70	3.81	0.06	0.04
	Time * Group	1.48	2.00	0.74	1.44	0.24	0.11
Autonomy	Time	6.01	2.00	3.00	5.74	0.00*	0.05
	Group	107.28	1.00	107.28	9.15	0.00*	0.07
	Time * Group	8.91	2.00	4.46	8.51	0.00*	0.07
Pleasure	Time	65.91	2.00	32.95	32.81	0.00*	0.22
	Group	275.99	1.00	275.99	14.43	0.00*	0.07
	Time * Group	49.37	2.00	24.69	24.58	0.00*	0.17
Self-realization	Time	5.01	2.00	3.01	4.62	0.03*	0.05
	Group	36.81	1.00	36.81	3.86	0.04*	0.04
	Time * Group	38.95	2.00	19.48	12.11	0.00*	0.09
Quality of Life	Time	156.42	2.00	78.21	23.09	0.00*	0.16
	Group	322.33	1.00	322.33	5.56	0.02*	0.05
	Time * Group	300.69	2.00	150.35	44.39	0.00*	0.27

Autonomy

The results of the Mixed between-within subjects ANOVA on the Autonomy scores showed a significant difference in mean of the Autonomy between two groups (intervention and control) with small effect ($F=3.13$, $p=0.00$, $\eta^2=0.27$), and among 3 stages of time (pre-, post- and follow up-tests) with medium effect ($F=5.74$, $p=0.00$, $\eta^2=0.05$). As well there was a significant difference in the interaction between group and time ($F=8.51$, $p<0.00$, $\eta^2=0.07$). Table 4-10 shows the result of ANOVA within – between subject effects. Therefore, to test the related hypothesis post hoc test (Bonferroni) was applied to compare the mean scores among the stages of time and between groups. Due to the results of the sphericity test ($p=0.73$), the sphericity assumption for control was accepted. Therefore, to test the related hypothesis post hoc test (Bonferroni) was applied to compare the mean scores.

4-11 The difference of mean scores between tests in intervention and Control Groups

Variable	intervention position	(I) time	(J) time	Mean Difference (I-J)	S.E	p. value	95% CI		Partial η^2
							Lower Bound	Upper Bound	
Control	Intervention	Pre-test	Post-test	0.37	0.10	0.00	-0.63	-0.15	0.11
		Pre-test	Follow-up	0.15	0.16	1.00	-0.54	0.23	
		Post-test	Follow-up	0.22	0.12	0.24	-0.08	0.52	
	Control	Pre-test	Post-test	0.07	0.10	1.00	-0.32	0.19	0.00
		Pre-test	Follow-up	-0.06	0.16	1.00	-0.32	0.45	
		Post-test	Follow-up	-0.13	0.12	0.86	-0.17	0.43	
Autonomy	Intervention	Pre-test	Post-test	0.54	0.14	0.00	-0.87	-0.21	0.13
		Pre-test	Follow-up	0.66	0.16	0.00	-1.05	-0.27	
		Post-test	Follow-up	0.12	0.09	0.67	-0.35	0.12	
	Control	Pre-test	Post-test	-0.05	0.13	1.00	-0.28	0.38	0.02

		Pre-test	Follow-up	-0.07	0.16	1.00	-0.32	0.45	
		Post-test	Follow-up	0.02	0.09	1.00	-0.25	0.22	
Pleasure	Intervention	Pre-test	Post-test	1.52	0.18	0.00	-1.96	-1.07	0.42
		Pre-test	Follow-up	1.83	0.21	0.00	-2.35	-1.31	
		Post-test	Follow-up	0.30	0.15	0.15	-0.68	0.07	
	Control	Pre-test	Post-test	0.17	0.18	1.00	-0.60	0.27	0.02
		Pre-test	Follow-up	0.10	0.21	1.00	-0.61	0.41	
		Post-test	Follow-up	-0.07	0.15	1.00	-0.31	0.44	
Self-realization	Intervention	Pre-test	Post-test	0.68	0.23	0.01	-1.24	-0.12	0.14
		Pre-test	Follow-up	0.89	0.22	0.00	-1.43	-0.36	
		Post-test	Follow-up	0.22	0.25	1.00	-0.82	0.38	
	Control	Pre-test	Post-test	-0.65	0.23	0.06	0.09	1.20	0.02
		Pre-test	Follow-up	-0.57	0.22	0.03	0.03	1.09	
		Post-test	Follow-up	0.08	0.25	1.00	-0.68	0.52	
Quality of Life	Intervention	Pre-test	Post-test	3.12	0.35	0.00	-3.98	-2.26	0.46
		Pre-test	Follow-up	3.54	0.37	0.00	-4.44	-2.65	
		Post-test	Follow-up	0.42	0.29	0.43	-1.12	0.27	
	Control	Pre-test	Post-test	-0.47	0.35	0.56	-0.39	1.32	0.00
		Pre-test	Follow-up	-0.60	0.37	0.31	-0.28	1.49	
		Post-test	Follow-up	-0.13	0.28	1.00	-0.56	0.82	

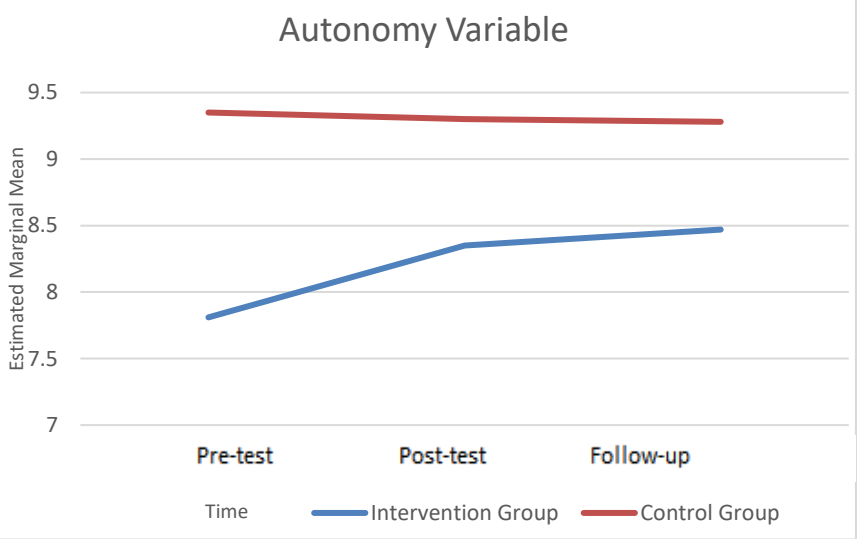
** The mean difference is significant at the p< 0.05 level.

Adjustment for multiple comparisons: Bonferroni.

To show the efficacy of the educational program, the mean score of Autonomy in the pre-test, post-test, and follow-up tests were compared in both the intervention and control groups. The result of the post hoc test (Bonferroni) revealed that a difference between pre-test and post-test in Autonomy variable in the intervention group was significant (Δmean=-0.54, p<0.00) with a large effect (η^2=0.13). However, there was no significant difference between the Autonomy mean between post-test and follow-up test (Δmean=-0.12, p=0.67). Meanwhile, there was no significant difference in Autonomy between pre-test and post-test (Δmean=-0.05, p=1.00) and between post-test and follow-up test (Δmean=0.01, p=1.00) in the control group. The difference in mean scores between tests in intervention and Control Groups reported in Table 4-11. The consistency of mean Quality of Life over time in the control group indicates that changes in the Quality of Life in the intervention group at the same time efficiency can be due to the implementation of the educational program.

The result of the Bonferroni test also revealed that the difference of the Autonomy variable between control and intervention groups in the pre-test (Δmean=-1.55, p<0.00), post-test (Δmean=-0.95, p=0.01, η^2=0.05) and follow up test (Δmean=-0.81, p=0.03, η^2=0.04) was significant it can be concluded that the intervention program was effective on Autonomy in the intervention group. The holistic mean difference between intervention and Control Groups in Pre-test, post-test, and follow-up test reported in Table 4-11. In addition, the changes in autonomy mean scores in intervention and control groups over time is reported in Table 4-11.

Although the autonomy means scores remained steady across three-time points among participants in the control group, the increase in mean of this variable in the intervention group during the study period is quite obvious. As can be seen from the Figure 4-2, there is a gradual increase between pre-test and post-test time. The intervention group was able to sustain this between post-test and follow-up test.



	Pre-Test	Post Test	Follow-up
Intervention Group	7.81	8.35	8.47
Control Group	9.35	9.30	9.28

Figure 4-2 Mean Plot for in Intervention and Control Groups over Time (Autonomy variable)

Pleasure

The results of the Mixed between-within subjects ANOVA on the Pleasure variable showed a significant difference in mean of the Pleasure between two groups (intervention and control) with small effect (F=14.43, p<0.00, η^2=0.07), and among 3 stages of time (pre-, post- and follow up-tests) with large effect (F=32.81, p<0.00, η^2=0.22).

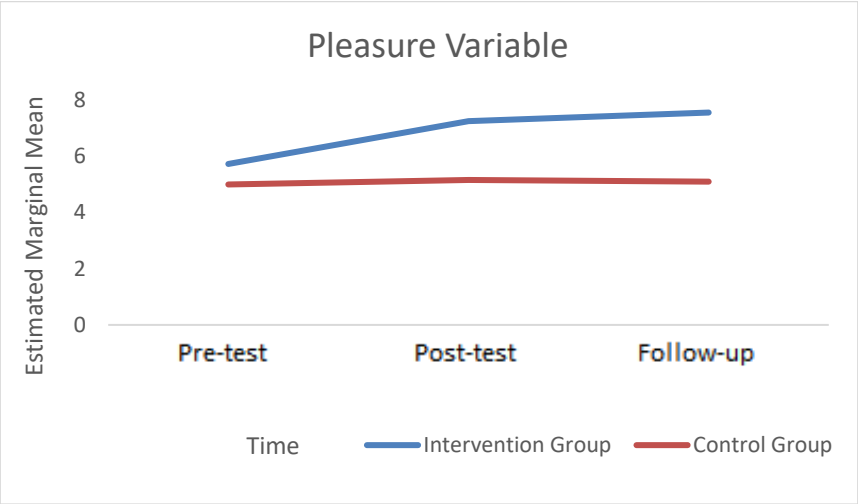
As well there was a significant difference in the interaction between group and time (F=24.58, p<0.00, η^2=0.17). Therefore, to test the related hypothesis post hoc test (Bonferroni) was applied to compare

the mean scores among the stages of time and between groups. Due to the results of the sphericity test (p=0.87), the sphericity assumption for control was accepted. Therefore, to test the related hypothesis post hoc test (Bonferroni) was applied to compare the mean scores.

To show the efficacy of the educational program, the mean score of Pleasure in pre-test, post-test, and follow-up test were compared in both the intervention and control groups. The result of the post hoc test (Bonferroni) revealed that a difference between pre-test and post-test in the Pleasure variable in the intervention group was significant (Δmean=-1.52, p<0.00) with a large effect (η^2=0.42). However, there was not a significant difference between the Pleasure mean between post-test and follow-up test (Δmean=-0.30, p=0.15). Meanwhile, there was no significant difference in Pleasure between pre-test and post-test (Δmean=-0.17, p=1.00) and between post-test and follow-up test (Δmean=0.07, p=1.00) in the control group (Table 4-11).

The result of the Bonferroni test also revealed that the difference in the Pleasure score between control and intervention groups in pre-test (Δmean=0.73, p=0.19) was not significant. However, the difference of the score between control and intervention groups in post-test (Δmean=2.09, p<0.00, η^2=0.15) and follow up test (Δmean=2.46, p<0.00, η^2=0.21) was significant. Therefore, it could be concluded that the intervention program was effective on Pleasure in the intervention group (Table 4-11).

The plot of the mean score for Pleasure across the three-time stages for the control and intervention groups is shown in Figure 4-3. It can be seen from the table that a difference between pre-test and post-test in the Pleasure variable in the intervention group was significant. However, there was no significant difference between the Pleasure mean between the post-test and follow-up test. Similarly, there was no significant difference in Pleasure between pre-test and post-test and between post-test and follow-up tests in the control group. Although the pleasure means scores remained steady across the 3 time points among participants in the control group, the increase in mean of this variable in the intervention group during the study period is quite obvious. As it can be seen from the Figure 4-3, there is a gradual increase between pre-test and post-test time. The intervention group was able to sustain this between post-test and follow-up test.



	Pre-Test	Post-Test	Follow up
Intervention Group	5.73	7.25	7.56
Control Group	5.00	5.16	5.10

Figure 4-3 Mean Plot for in Intervention and Control Groups over Time (Pleasure variable)

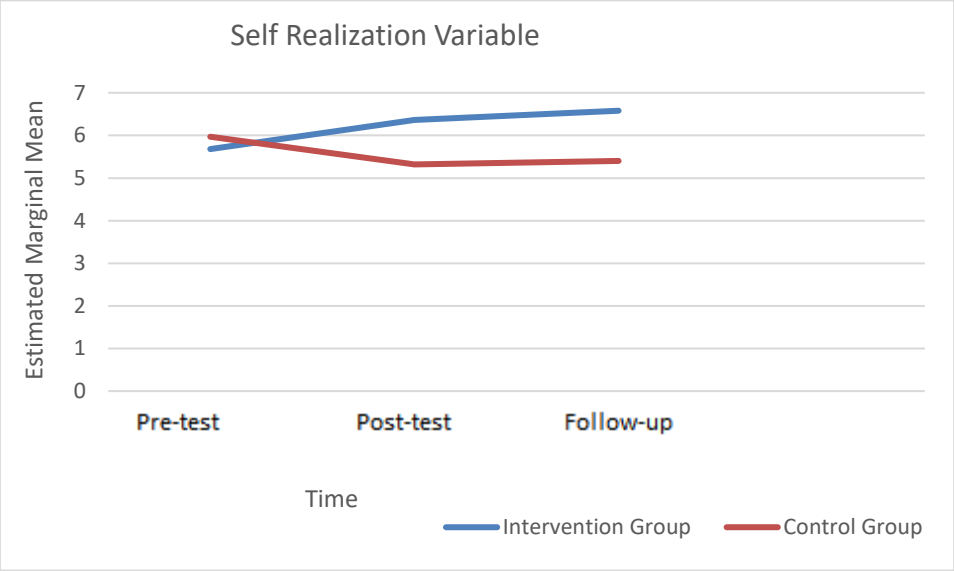
Self-realization

The results of the Mixed between-within subjects ANOVA on the Self-realization variable showed a significant difference in mean of the Self-realization between two groups (intervention and control) ($F=3.38$, $p=0.04$, $\eta^2 =0.04$), and among 3 stages of time (pre-, post- and follow up-tests) both with small effect ($F=4.62$, $p=0.03$, $\eta^2=0.05$).

As well there was a significant difference in the interaction between group and time ($F=12.11$, $p<0.00$, $\eta^2=0.09$), as reported in Appendix E2 Therefore, to test the related hypothesis post hoc test (Bonferroni) was applied to compare the mean scores among the stages of time and between groups. Due to the results of the sphericity test ($p=0.62$), the sphericity assumption for control was accepted. Therefore, to test the related hypothesis post hoc test (Bonferroni) was applied to compare the mean scores.

To show the efficacy of the educational program, the mean score of Self-realization in pre-test, post-test, and follow-up test were compared in both the intervention and control groups. The result of the post hoc test (Bonferroni) revealed that a difference between pre-test and post-test in Self-realization variable in the intervention group was significant ($\Delta mean=-0.68$, $p=0.01$) with a large effect ($\eta^2=0.14$). However, there was not a significant difference between the Self-realization mean between post-test and follow-up test ($\Delta mean=-0.22$, $p=1.00$). Meanwhile, there was no significant difference in Self-

realization between pre-test and post-test (Δmean=0.65, p=0.06) and between post-test and follow-up test (Δmean=0.08, p=1.00) in control group, as shown in Table 4-11.



	Pre-Test	Post Test	Follow-up
Intervention Group	5.68	6.36	6.58
Control Group	5.97	5.32	5.40

Figure 4-4 Mean Plot for in Intervention and Control Groups over Time (Self-realization)

The Bonferroni test also revealed that the difference of the Self-realization variable between control and intervention groups in the pre-test (Δmean=-0.29, p=0.46) was not significant. However, the difference in the score between control and intervention groups in the post-test (Δmean=1.04, p=0.03, η^2=0.07) and follow-up test (Δmean=1.18, p=0.03, η^2=0.07) was significant. Therefore, it can be concluded that the intervention program was effective on Self-realization in the intervention group, as shown in Table 4-11.

The mean plot in intervention and control groups across the 3 stages of time for Self-realization is reported in Figure 4-4. The difference between pre-test and post-test in the Self-realization variable in the intervention group was significant. However, there was no significant difference between the Self-realization mean between the post-test and the follow-up test in the intervention group There is no significant difference in Self-realization between pre-test and post-test and between post-test and follow-up test in the control group.

Quality of Life

The results of the Mixed between-within subjects ANOVA test on the Quality of Life variable showed a significant difference in mean of Quality of Life between two groups (intervention and control) with

small effect (F=5.56, p=0.02, η^2 =0.05), and among 3 stages of time (pre-, post- and follow up-tests) with large effect (F=23.09, p<0.00, η^2=0.16).

As well there was a significant difference in the interaction between group and time (F=44.39, p<0.00, η^2 =0.17), as illustrated in Table 4-10. Therefore, to test the related hypothesis a post hoc test (Bonferroni) was applied to compare the mean scores among the stages of time and between groups. Due to the results of the sphericity test (p=0.92), the sphericity assumption for control was accepted. Therefore, to test the related hypothesis a post hoc test (Bonferroni) was applied to compare the mean scores.

To show the efficacy of the educational program, the mean score of Quality of Life in pre-test, post-test, and follow-up test were compared in both the intervention and control groups. The result of a post hoc test (Bonferroni) revealed that a difference between pre-test and post-test in the Quality of Life score in the intervention group was significant with a very large effect (Δmean=-3.11, p<0.00). However, there was not a significant difference in the Quality of Life mean between post-test and follow-up test (Δmean=-0.42, p=0.42). Meanwhile, there was no significant difference in Quality of Life between pre-test and post-test (Δmean=0.47, p=0.56) and between post-test and follow-up test (Δmean=0.13, p=1.00) in the control group, as shown in Table 4-11.

The result of the Bonferroni test also revealed that the difference in the Quality of Life variable between control and intervention groups in the pre-test (Δmean=0.67, p=0.45) was not significant. However, the difference in the score between control and intervention groups in the post-test (Δmean=-2.91, p<0.00, η^2=0.10) and follow-up test (Δmean=3.46, p<0.00, η^2=0.12) was significant. Therefore, it can be concluded that the intervention program was effective in improving Quality of Life in the intervention group, as shown in Table 4-11.

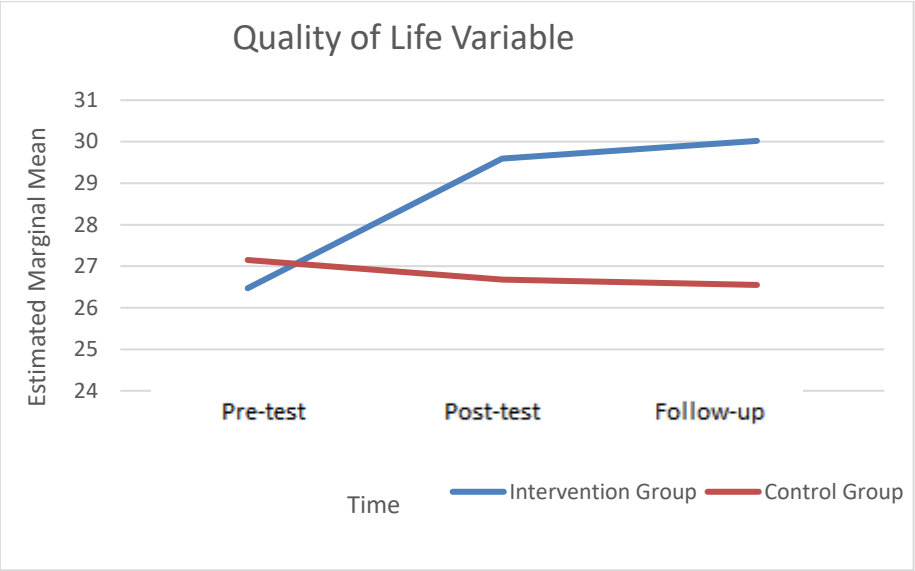
4-12 Holistic mean difference within and between two Groups in Pre, post, and follow-up test

Variable	Time	intervention position (I)	intervention position (J)	Mean Difference (I-J)	S.E	p. value	95% CI		Partial η^2
							Lower Bound	Upper Bound	
Control	Pre-test	intervention	Control	0.42	0.33	0.20	-0.23	1.07	0.01
	Post-test	intervention	Control	0.72	0.30	0.01	0.13	1.32	0.06
	Follow-up	intervention	Control	0.64	0.43	0.06	-0.02	1.30	0.03
Autonomy	Pre-test	intervention	Control	-1.54	0.38	0.00	-2.28	-0.78	0.12
	Post-test	intervention	Control	-0.94	0.38	0.01	-1.69	-0.19	0.05
	Follow-up	intervention	Control	-0.81	0.38	0.03	-1.56	-0.06	0.04
Pleasure	Pre-test	intervention	Control	0.72	0.56	0.19	-0.37	1.83	0.01
	Post-test	intervention	Control	2.09	0.46	0.00	1.17	3.00	0.15
	Follow-up	intervention	Control	2.46	0.43	0.00	1.60	3.32	0.21
Self-realization	Pre-test	intervention	Control	-0.29	0.39	0.47	-1.07	0.49	0.01
	Post-test	intervention	Control	1.04	0.34	0.00	0.36	1.72	0.07
	Follow-up	intervention	Control	1.18	0.39	0.00	0.40	1.95	0.07
Quality of Life	Pre-test	intervention	Control	-0.67	0.90	0.45	-2.46	1.10	0.05
	Post-test	intervention	Control	2.91	0.79	0.00	1.34	4.48	0.10
	Follow-up	intervention	Control	3.47	0.86	0.00	1.77	5.17	0.12

** The mean difference is significant at the p< 0.05 level.

Adjustment for multiple comparisons: Bonferroni.

The overall changes in the mean score of Quality of Life among the study's participants in the intervention and control groups is presented in Figure 4-5. As it can be seen in the graph, the difference between pre-test and post-test in Quality of Life variable in the intervention group was significant with a very large effect. However, there was no significant difference between the Quality of Life mean between post-test and follow-up test in the intervention group. Meanwhile, there was no significant difference in Quality of Life between pre-test and post-test and between post-test and follow-up test in the control group.



	Pre-Test	Post Test	Follow-up
Intervention Group	26.47	29.59	30.02
Control Group	27.15	26.68	26.55

Figure 4-5 Mean Plot for in Intervention and Control Groups over Time (Quality of Life)

Therefore, based on the above discussion about each variable as well as the result shown in Tables 4-10, 4-11, and 4-12, the first hypothesis (H1) "There is a significant difference in the mean score of Quality of Life and its sub-scale, between the intervention and control groups in the post-test." was accepted. The second hypothesis (H2) "There is a significant difference in the mean score of Quality of Life and its sub-scale, between the intervention and control groups in the follow-up test" was also accepted. In addition, "H3: there is a significant difference in the mean variable of Quality of Life and its sub-scale, between pre-test and post-test in the intervention group" was accepted. As well, other study hypotheses: "H4: there is a significant difference in the mean variable of Quality of Life and its sub-scale, between pre-test and follow-up-test in the intervention group" and "H5: there is a no significant difference in the mean variable of Quality of Life and its sub-scale, between post-test and follow-up tests in the intervention group" were also accepted.

4.8 Summary

This chapter discusses the results of the quantitative analysis on the data collected from the participants in both intervention and control groups. Overall, the results of the comprehensive data analysis show the positive effects of the intervention (educational program) on Quality of Life among the participants in the intervention group across the CASP-19 questionnaire sub-scales (control,

autonomy, pleasure, self-realization) and the overall mean score of Quality of Life. Therefore, based on these results. all hypotheses of this study are accepted, and the first research question “Do participants viewpoints of smartphone and apps change through training?” and the second research question “Do the Quality of Life changes persist?” of this study are addressed.

Meanwhile, the results of the data analysis showed no significant changes in the level of Quality of Life among the participants in the control group during the study. So, it can be concluded that the significant changes in the level of the Quality of Life in the intervention group was because of the educational program. The next chapter discusses the results of the qualitative data analysis in detail.

5 Qualitative Data Analysis

This chapter presents the qualitative results of this study and addresses the first research question (RQ1)

Do participants viewpoints of smartphone and apps change through training?

Data were collected through semi-structured interviews and analysed as described in Chapter 3. Qualitative data were collected to understand the impact of the intervention program on Quality of Life factors among the participants. The qualitative content analysis focused on themes and codes summarizing the participants' statements at the pre- and post-intervention stages using two coding approaches:

- Coding statements based on personal, familial, and social considerations.
- Coding statements based on CASP subcategories (control, autonomy, pleasure, and self-realization).

Of the participants in the quantitative study who were selected based on this study inclusion and exclusion criteria, overall, 20 participants (10 from each group) volunteered, to join the qualitative study.

The participants were interviewed at the pre-test (within 5 days before the pre-test) and post-test stage (within 5 days after the post-test), using the same questions. The socio-demographic characteristics of the participants in the intervention and control groups are presented in Table 5-1.

The interview consisted of four questions which were:

Question #1: Can you tell me about how you started using a smartphone and what tasks you use it for?

Question #2: How has your use of a smartphone changed over time?

Question #3: Focusing on the most popular social media applications in Iran (Telegram, WhatsApp, and Instagram), what you would think are the negative impacts/limitations of using smartphones?

Question #4: Focusing on the most popular social media applications in Iran (Telegram, WhatsApp, and Instagram), what you would think are the positive impacts/advantages of using smartphones?

Table 5-1 Socio-demographic characteristics of the participants in intervention and control groups

	Intervention (%)	Control (%)
Age (Mean±SD)	66.37±2.01	66.89±2.36
Educational Level		
Under Diploma	37.30	36.70
Diploma	49.20	46.70
Bachelor	10.20	10.00
Master and upper	3.40	6.70
Gender		
Male	57.60	56.70
Female	42.40	43.30
Number of Children		
One child	25.80	28.30
2-3 children	24.40	28.30
More than 3 children	49.80	43.30
Marital Status		
Married	75.00	72.30
Widow/er	15.00	17.60
Divorced	10.00	10.10

The coding frame includes theme, code, and number/percentages of the occurrence in order to understand the range and magnitude of responses and themes. The analysis process is described earlier in Section 3.7.4.

5.1 Pre-test Responses

In the pre-test interview, overall, the interviewees in both intervention and control groups answered all 4 questions. This stage of the data collection was done before starting the educational sessions (for the participants in the intervention group). Therefore, in this stage, all the participants were in the same situation with regards to receiving or not receiving the intervention. As the first 2 questions were completely related, they were asked in one step. The questions included:

Question1: Can you tell me about how you started using a smartphone and what tasks you used it for?

Question 2: How has your use of a smartphone changed over time?

Answering these questions, participants mostly mentioned that one of their family members (mostly children) has chosen/bought their smartphone for them.

"My old phone had broken. So, I asked my son to choose a new one. Honestly, I don't know anything about buying these new things. He also installed some programs on my new phone. But I have rarely used them. It was about one and half years ago". (Male participant, 69, intervention group)

"Last year my daughter wanted to change her phone to a new one. Mine was not working well; so, she gave me, or in better words sold me, her old phone and bought a new one. Since then, I have been using her phone. I mostly used it for calling my family members. Sometimes my son sends me my grandchildren photos or videos." (Female participant, 68, control group)

"I bought this phone 6 month ago when my little grandson broke my old one. Regularly, I use it for calling someone. I also have an account in Telegram. My children sometimes send me a message. I know how to reply to them but nothing more! " (male participant, 69, intervention group)

As the focus of the study was on smartphone communication applications, the participants were also asked about what they know about social media apps. Participants' responses to these questions indicated that some of them were unaware of mobile apps. Some participants also considered the use of these applications as a serious risk to traditional and religious beliefs of families, given their traditional beliefs.

"I just know these days, wherever you go, young people just play with their phones. No matter what we say, they don't put it aside for a minute." (Male participant, 68, intervention group).

"It seems to me that people are no longer interested in traditional and family celebrations." (Male participant, 70, control group)

"In the old days when there were no smartphones, people were more likely to see each other". (Female participant, 71, control group)

On the other hand, some of the interviewees believed that this technology could be useful and even fun if used correctly. Along with these two options, some participants believed that the tool might be helpful and harmful, but because they did not know how to do it, they were not sure.

*"*Nowadays, a smartphone is so popular and in the hand of everyone*. My son and his grandchildren live abroad. If I want to call them with my cell phone, it costs a lot. Through these programs, I talk to them and see their picture. Of course, I don't know myself and my youngest daughter must help me get in touch."* (Female participant, 72, intervention group)

"I think it's a good opportunity and I would love to learn. But I'm not a very patient person. Furthermore, my son has an excuse every time and most of the time is not home" (male participant, 72, control group)

Overall, most of the participants had an acquaintance with some of the applications, but their viewpoints were very different, as shown in Table 5-2. Based on the participants' statements in the interviews, family values, religious beliefs, as well as the number and gender of young people living at home, seemed to influence older people's view of mobile apps (specifically social apps).

Table 5-2 Number of occurrences of each code, related to questions 1 and 2, in intervention (n=10) and control (n=10) groups in pre-test

#	Codes	Intervention n (%)	Control n (%)
1	**So popular**	10 (100)	10 (100)
2	**Sending photo and texts**	7 (70)	6 (60)
3	**Source of news**	6 (60)	5 (50)
4	**Get youth so busy**	4 (40)	4 (40)
5	**Imitate traditional relationships**	7 (70)	8 (80)
6	**Good for abroad relations**	4 (40)	5 (50)
9	**Seems fun**	3 (30)	4 (40)

Social media apps that participants identified included the Telegram app, the most well-known social media apps in Iran. Instagram and WhatsApp came in second and third, respectively. However, only 5% of the participants mentioned other apps. Some participants did not remember the name of the applications, instead, they could describe its environment and performance. Figure 5-1 shows the summary of the participants' answers in intervention and control groups.

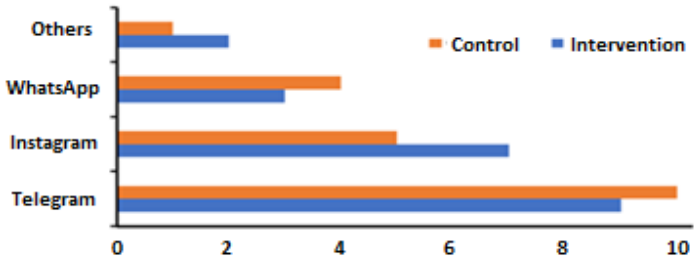


Figure 5-1 The Social media apps mentioned by the participants in intervention and control groups

Question 3: Focusing on the most popular social media applications in Iran (Telegram, WhatsApp, and Instagram), what you would think about the negative impacts/limitations of using smartphones

Question 4: Focusing on the most popular social media applications in Iran (Telegram, WhatsApp, and Instagram), what you would think about the positive impacts/advantages of using smartphones?

The participants' responses to the core questions were analysed twice based on the socio-demographic and cultural factors as well as CASP subcategories (control, autonomy, pleasure, and self- realization). The transcripts of the statements were coded twice to cover both socio-demographic/cultural factors and Quality of Life subscales.

5.1.1 Socio-demographic and cultural factors

Three main themes were defined for socio-demographic and cultural factors to analyse interview questions three and four, including:

- ✓ **Theme A:** Personal consideration
- ✓ **Theme B:** Family consideration
- ✓ **Theme C:** Social (community) consideration

Based on the codes which were extracted from the participants viewpoint, the researcher of this study realized that personal, family and social (community) consideration are themes of codes. Some codes were repeated in different themes based on participants answers to different questions. The participants' statements related to these terms were analysed manually and are represented below:

Regarding personal consideration, most of the participants indicated that they are too old to use new technologies such as smartphone. They mostly pointed to different age limitations as an excuse for not using apps.

"I am old for these new things, let the young ones use them." (Male participant, 68, intervention group)

"I'd rather read my hardcopy books; these phones just make me confused." (Male participant,71, control group).

"My eyes are weak for working with these programs. I can't read the posts." (Female participant,69, control group).

"I tried Telegram once or twice. But the trembling of my hands didn't allow me to write texts. So, I put it aside." (Male participant, 65, intervention group).

"It is not easy to learn it for someone in my age. I'd rather call others, it's easier." (Female participant, 65, intervention group)

However, as the discussions continued, many participants expressed their interest to use smartphone apps despite their limitations. They believed that using smartphone apps may increase their self-confidence.

"It might be good…. I mean, acting like the younger members in the family." (Male participant, 67, intervention group).

"Now that I think of it, it looks good. I can see photos and videos of my grandson every day without my son's help. So, he cannot boast that I don't have time …(laughed!)" (Female participant, 66, intervention group).

"My husband uses Telegram, but I think he doesn't want me to. You know…. Our family is too traditional." (Female participant, 65, control group)

On the other hand, some participants mentioned that no one in their family has time to teach them how to use the apps in detail. So, they have almost stopped trying to learn.

"I think I am a slow learner. It is complicated to learn. Who would want to spend time teaching me? The new generation is not patient at all…" (male participant, 67, control group).

The number of repetitions of each code before the educational period between the intervention (n=10) and control (n=10) groups (final limitation codes based on socio-demographic and cultural factors) is reported in Table 5-3 and Figure 5-2.

Table 5-3 Number of occurrences of each code at the pre-test stage between intervention(n=10) and control (n=10) groups (The final limitation codes based on socio-demographic and cultural factors)

Themes	Codes	Intervention (n)	Intervention (%)	Control (n)	Control (%)	Intervention-Control difference
Personal Limitation	Complicated to learn	6	60	4	40	-20
	Physical issues	5	50	7	70	+20
	Slow learning	5	50	6	60	+10
	Cultural issues	8	80	6	60	-20
Family Limitation	Reaction of Family	5	50	5	50	0
	No one to learn from	6	60	4	40	-20
	Time limitation	10	100	10	100	0
	Cultural issues	8	80	6	60	-20
Social Limitation	Cultural issues	8	80	6	60	-20
	Reaction of community and friends	5	50	5	50	0

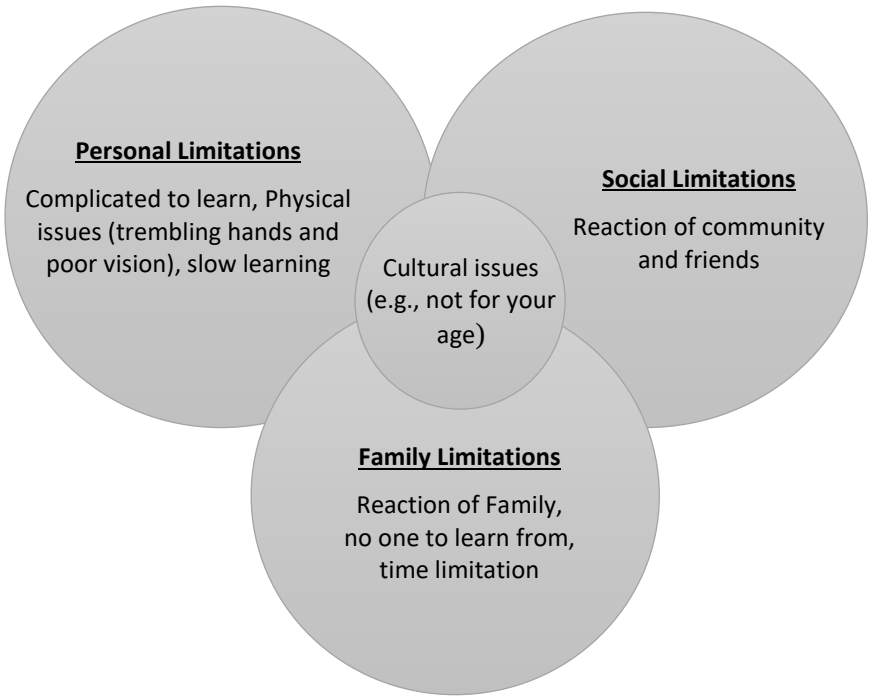


Figure 5-2 The final limitation themes and codes for using smart phone apps from the participants' viewpoints (n=10) before the interventional sessions

Along with personal limitations and benefits, participants also addressed issues related to family and community reaction. This part of the discussion involved a complex set of limitations and benefits. Below are examples of interviewees' responses to this

"My son says: Mom, it is too late for you to have an Instagram. This is for the younger ones," (Female participant, 68, control group)

"I think the use of these programs in our society is not very acceptable to older people. The environment of these programs is more suitable for young people." (Male participant, 70, intervention group)

And the positive viewpoints:

"My daughter always says it's better to learn these. She is studying abroad and believes that using these programs, she can get in touch with us much easier and faster. I think it's time for me to learn [the Social media apps] …" (Male participant, 70, intervention group)

"I have a 12-year-old granddaughter living in another city. She always says if you learn this [Telegram app], we can send each other photos every day!! This is so good because I miss her so much…" (Male participant, 69, intervention group)

"*Now I can talk to my grandchildren every day. I also can see them through video calls. They send me their pictures and I reply to them with stickers (emojis)."*

"Learning along with others of my age was so good that I realized people don't have a bad impression of a woman at my age having an account in Instagram. I was very worried about this before…"

The number of repetitions of each code before the educational period between the intervention (n=10) and control (n=10) groups (final advantages codes based on socio-demographic and cultural factors) is represented in Table 5-4 and Figure 5-3.

Table 5-4 Number of occurrences of each code at the pre-test stage between intervention(n=10) and control (n=10) groups (the final advantages codes based on socio-demographic and cultural factors)

Themes	Codes	Intervention (n)	Intervention (%)	Control (n)	Control (%)	Intervention-Control difference
Personal Advantages	New experience	1	10	4	40	+30
	Seems fun	8	80	9	90	+10
	More up to date	4	40	0	0	-40
	Feeling more useful	4	40	5	50	+10
Family advantages	Better integration	8	80	7	70	-10
	Easy to communicate with family	9	90	10	100	+10
Social advantages	Easy to communicate with peers	7	70	6	60	-10
	Have fun with friends	6	60	5	50	-10

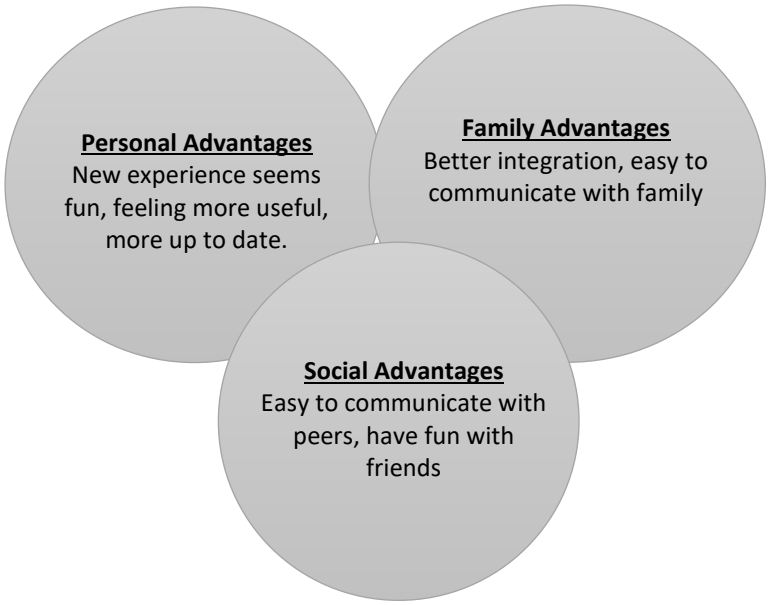


Figure 5-3 The final advantage codes for using smart phone apps from the participants' viewpoints (n=10) before the interventional sessions

5.1.2 Analysing statements based on CASP-19 questionnaire domains (control, autonomy, pleasure, and self-realization)

The participants' statements in the pre-test were reviewed once again, this time considering the Quality of Life domains based on the CASP-19 questionnaire including control, autonomy, pleasure, and self-realization. Five keywords (age limitation, complicated to learn, physical issues, slow learning, better control of life activities) were identified as the closest ones to the control concept. Along with previous examples related to these terms, the following statements from the participants also represent more perspective of their viewpoints:

"Every time I need to use my Telegram [account], I should ask someone to help me, because I am a little bit confused about it [working with Telegram App] … …" (Male participant,67, control group)

"I used my son's account to send a message to my daughter living in another city. But I sent the message to one of his friends by mistake!" (Male participant,72, intervention group)

"My son was not happy about it. He is not happy about using his phone by me at all, and I think he is right. I think if I learn to use it [WhatsApp], I have more control over sending messages…" (Female participant, 65, control group)

Age limitation, time limitation, expensive, and cultural issues were the keywords related to autonomy. Furthermore, three keywords were identified related to pleasure (Seems fun and easy to

communicate). Regarding autonomy, the statements below could represent the appropriate examples to clear the viewpoints of the participants in pre-test interviews:

"When I asked my son to install Telegram on my [smart]phone, he said my phone was old [version] and not fast enough [its speed is low]. The price of newer phones has also gone up. I also don't know how to work with them very well. So, I just gave up…" (Female participant,66, intervention group).

"I love to learn. But many things must be considered in our age. You can't do anything you want…" (Male participant, 69, intervention group).

"I always see young people are too busy with their phones and not taking any responsibility. Who gets to do my responsibilities if I got busy with one, like my children?" (Male participant,70, in the control group).

Four keywords were identified related to pleasure (Seems fun, good hobby, easy to communicate, and finding new friends). Good hobby and finding new friends are two keywords that were identified in the post-test interviews. Most of the participants in both groups (intervention=80% and control=90%), directly and/or indirectly, mentioned the fun aspect of social apps. However, some participants (intervention=20% and control=10%) believed that it is not always a good hobby because all kinds of information, video, and photos are easily accessible on social networks.

"My children read me some of the posts sent to them [in social network apps]. Sometimes funny or educational ones. I think it is fun and interesting…" (Male participant,67, intervention group).

"Some of my peers from family and friends use it [social network app(s)]. I don't feel good when we get together. Either they read new stuff (posts) or they send it to each other" (Male participant,66, intervention group).

"In mornings, my children go to college and work. So, I'm home alone. Often, I get bored of being alone. If I learn to [using of social network app(s)], I can fill my time…" (Female participant,65, control group).

*"…, I feel like I'm living in another world. Everyone talks about what they read or see [in social network apps] and I just watch them." (*Male participant,71, control group).

Finally, new experience, being more up-to-date and new opportunities were the keywords related to self-realization. Participants mostly had positive viewpoints regarding the impacts of social network apps on self-realization.

"The world has changed a lot since our youth. When we were teenagers, if someone told us you could send photos and videos to someone [living] on the other side of the world immediately, we thought she/he was ridiculous or crazy. But now these things have become as normal as they always have existed. I think it's a new experience and opportunity for our age too…" (Male participant, 65, intervention group).

"I came to the conclusion that good or bad, this [using of social network app(s)] is a strong favourite of the younger generation. If we want to have a good relationship with our kids, we shouldn't fall behind…" (Male participant, 66, control group).

"You can't fight anything new. I like to learn. Why

not? It looks like all the people are getting information and news from here [social networks and Social media apps] …" (Female participant, 68, control group).

Table 5-5 Number of occurrences of each code at the pre-test stage between the intervention(n=10) and control (n=10) groups (based on CASP-19 sup-scales).

Themes	Codes	Intervention (n)	Intervention (%)	Control (n)	Control (%)	Intervention-Control difference
Control	Age limitation	10	100	10	100	0
	Complicated to learn	6	60	4	40	-20
	Physical issues	5	50	7	70	+20
	Slow learning	5	50	6	60	+10
	Better control on life activities	7	70	6	60	-10
Autonomy	Time limitation	4	40	5	50	+10
	Expensive	7	70	6	60	-10
	Cultural issues	8	80	6	60	-20
Pleasure	Easy to communicate	9	90	10	100	+10
	Good hobby	9	90	9	90	0
	Seems fun	8	80	9	90	+10
Self-realization	New opportunity	3	30	4	40	+10
	New experience	1	10	4	40	+30
	More up to date	4	40	0	0	-40

The number of repetitions of each code before the educational period between the intervention (n=10) and control (n=10) groups (based on CASP-19) is represented in Table 5-5 and Figure 5-4.

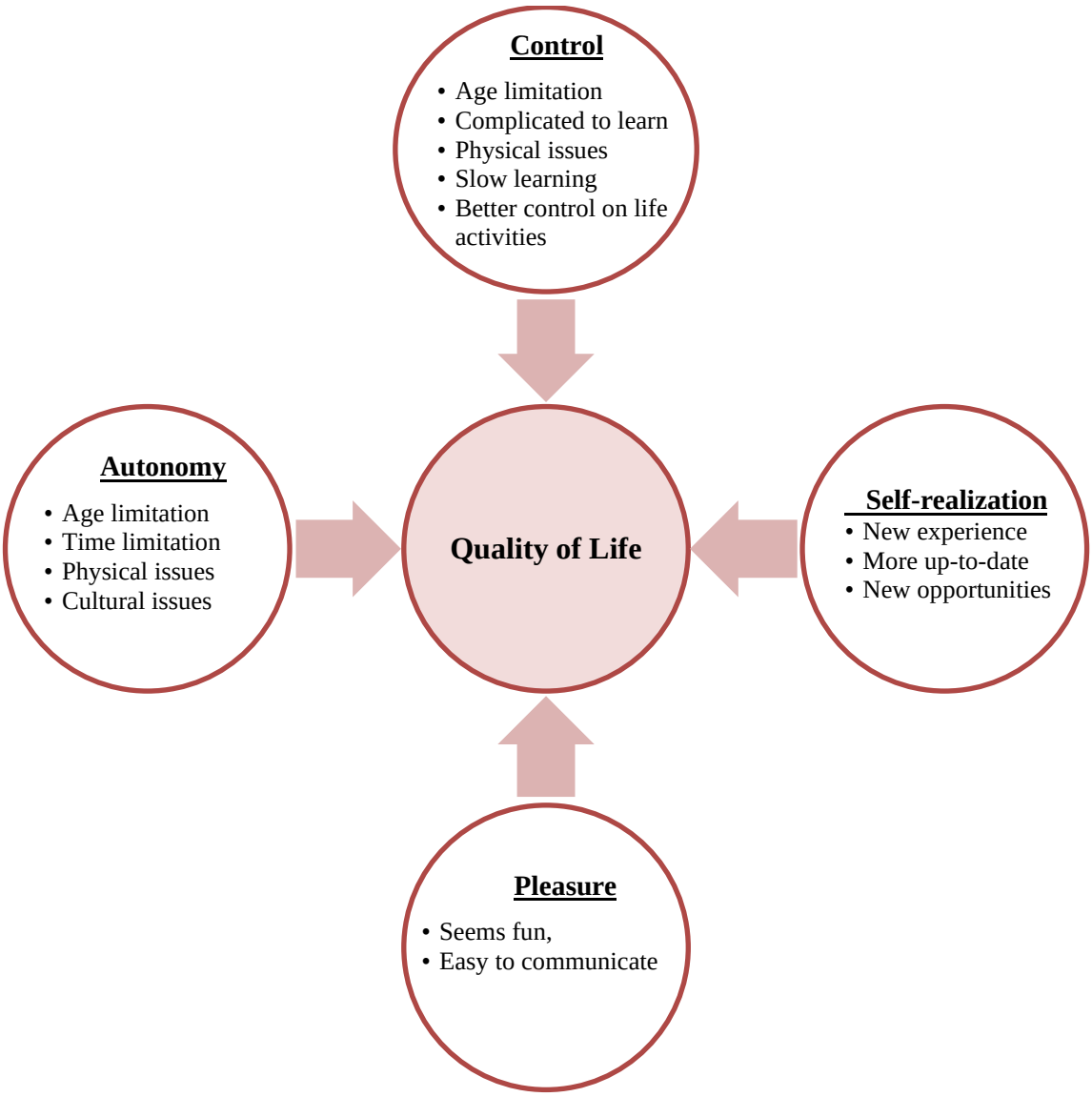


Figure 5-4 The final limitation and advantage codes for using smart phone apps from the participants viewpoints (n=20) before the interventional sessions (based on CASP-19 sup-scales)

5.2 Post-test Interview Analysis

After finishing the intervention sessions, the same interviewees participating in the pre-test interviews were invited to join the post-test interviews. Of 20 participants in the intervention and control groups in the pre-test interviews, nine and seven participants in the intervention and control groups, respectively, participated in the post-test interviews. One participant in the intervention group withdrew from the post-test interview stage for health reasons. For the control group, one participant withdrew from the study due to health issues and two were not available.

Similar terms and keywords were extracted in the post-test to allow comparisons between the statements provided by the participants in pre- and post-test. However, the participants' statements in post-post were also searched for new terms and keywords.

Table 5-6 represents the number of repetitions of each code after the educational period between the intervention (n=n9) and control (n=7) groups (final limitation codes based on socio-demographic and cultural factors).

Table 5-6 Number of occurrences of each code at the post-test stage between intervention(n=nine) and control (n=seven) groups (The final limitation codes based on socio-demographic and cultural factors)

Themes	Codes	Intervention (n)	Intervention (%)	Control (n)	Control (%)	Intervention-Control difference
Personal Limitation	Complicated to learn	2	22	5	71	+49
	Physical issues	4	44	3	43	+1
	Slow learning	1	11	2	29	+18
	Cultural issues	3	33	5	71	+38
Family Limitation	Reaction of Family	6	67	5	71	+4
	No one to learn from	0	0	4	57	+57
	Time limitation	3	33	2	29	-4
	Cultural issues	3	33	5	71	+38
Social Limitation	Cultural issues	8	80	6	60	+38
	Reaction of community and friends	6	67	5	71	+4

Table 5-7 represents the number of repetitions of each code after the educational period between the intervention (n=9) and control (n=7) groups (final advantages codes based on socio-demographic and cultural factors).

Table 5-7 Number of occurrences of each code at the post-test stage between intervention(n=nine) and control (n=seven) groups (the final advantages codes based on socio-demographic and cultural factors)

Themes	Codes	Intervention (n)	Intervention (%)	Control (n)	Control (%)	Intervention-Control difference
Personal Advantages	New experience	9	100	3	43	-57
	Seems fun	8	89	5	71	-18
	More up to date	9	100	3	43	-57
	Feeling more useful	9	100	5	71	-29
Family advantages	Better integration	7	78	5	71	-7
	Easy to communicate with family	9	100	7	100	0
Social advantages	Easy to communicate with peers	9	100	5	71	-29
	Have fun with friends	9	100	5	71	-29

The below table (Table 5-8) represents the number of repetitions of each code after the educational period between the intervention (n=9) and control (n=7) groups (codes based on CASP-19).

Table 5-8 Number of occurrences of each code at the post-test stage between intervention(n=9) and control (n=7) groups (based on CASP-19)

Themes	Codes	Intervention (n)	Intervention (%)	Control (n)	Control (%)	Intervention-Control difference
Control	Age limitation	3	33	7	100	+67
	Complicated to learn	2	22	5	71	+49
	Physical issues	4	44	3	43	-1
	Slow learning	1	11	2	29	+18
	Better control on life activities	8	89	6	86	-3
Autonomy	Age limitation	3	33	7	100	-67
	Time limitation	3	33	2	29	-4
	Expensive	4	44	3	43	-1
	Cultural issues	3	33	5	71	+38
Pleasure	Easy to communicate	9	100	7	100	0
	Seems fun	8	89	6	86	-3
	Less bored	7	78	0	0	-78
	Informing about news	8	89	0	0	-89
Self-realization	New opportunity	8	89	4	40	-49
	New experience	9	100	3	43	-57
	More up to date	9	100	3	43	-57

5.2.1 Participants views regarding the use of smartphone apps based on Themes A, B, and C in post-test (intervention group)

This section was related to personal consideration, Family consideration, and social consideration (Themes A, B, and C) of using smartphone apps from viewpoint of the participants in post-test (intervention group).

Personal consideration of using smartphone apps among the participants in the intervention group had a visible change in the post-test interviews compared with the viewpoints among the interviews in the pre-test. The participants were asked to point any changes they noticed in their viewpoints regarding to personal consideration. Most participants mentioned overall improvement during the post-test interviews. Some of the participants' statements are:

"It was not too hard, even for someone as slow learner like me. At least it wasn't as hard as I thought …" (Male participant,67, intervention group)

"One of my biggest problems [regarding using the smartphone Social media apps] was vision problems. Now I know how to enlarge texts to make them easier to read. I even change colours to

read better. And you know what is the best part? I can do this without the help of my children …" (Female participant, 69, intervention group).

However, some participants mentioned that some of their personal consideration still exist. Because their problem was not such that the training course is able to solve it:

"Well, my hands still shake. Still, typing texts takes a lot of time. However, I have learned ways to be more comfortable. I know that instead of typing I can record my voice. Of course, I still need to practice. Sometimes I do wrong…" (Male participant, 71, intervention group).

Along with personal views, participants were also asked to talk about any change in family and community issues. Participants reported enhancement compared to the pre-test discussions and statements, especially in the statements related to family considerations. Below are examples of interviewees' responses to this.

"Now I can talk to my grandchildren every day. I also can see them through video calls. They send me their pictures and I reply to them with stickers (emojis). However, sometimes I send a sticker by mistake, and they make jokes and laugh. I used to talk to them through Telegram sometimes, but I needed my sons help. Now I contact them whenever I miss them…" (Female participant, 68, intervention group).

"I thought it is better to leave them [Social media apps] to younger ones. I still think that it is more attractive to young people. But now I join some groups in telegram and sometimes they send some posts that are even good for me…" (Male participant, 69, intervention group).

"I am still not confident about viewpoints of my relevant about using Instagram, but I have an account anyway, just following the pages close to my interests such as cooking and confectionery. I still don't like to share any picture…" (Male participant, 69, intervention group).

"I showed to my husband some religious groups that I can join. He is still not so OK with me having an account. He even emphasized it when I wanted to join the educational sessions. At this age, your beliefs cannot be changed…" (Female participant, 65, intervention group).

5.2.2 Analysing statements based on CASP-19 questionnaire domains among intervention groups

The participants' statements in the post-test were reviewed once again, this time considering the Quality of Life domains based on the CASP-19 questionnaire including control, autonomy, pleasure and self-realization. The same keywords, compared to pre-test (age limitation, complicated to learn,

physical issues, slow learning, better control to life activities) were searched related to the control concept. Along with previous examples related to these terms, the following statements from the participants represent their viewpoints:

"In our age, it feels good to do something independently, without the need for younger people. Especially when there is something, they [younger people] think they are the only ones knowing that. …" (Male participant, 69, intervention group).

"Many of the previous restrictions still exist. But once you know you need something all the time, you can do very well…" (Female participant,65, intervention group).

Age limitation, time limitation, expensive, and cultural issues were the keywords related to autonomy. Furthermore, four keywords were identified related to pleasure (Seems fun, good hobby, finding new friends, and Easy to communicate). Regarding autonomy, the statements below represent examples of the participants' viewpoints in pre-test interviews:

"Learning along with others of my age was so good that I realized people don't have a bad impression of a woman at my age having an account in Instagram. I was very worried about this before…" (Female participant, 68, intervention group).

"The first few days took a lot of time, but now I don't have that problem. I set my time and get everything done…" (Male participant, 70, intervention group).

Four keywords were identified related to pleasure (Seems fun, good hobby, easy to communicate, and finding new friends). Most of the participants in the intervention group mentioned the pleasure advantages of using social media apps. In fact, a change in using the keywords related to pleasure was highlighted in the post-test interviews among participants in the intervention group.

"A friend of mine invited me to a group where all members were at my own age. We were posting together, and I became friends with two people living in my city. For me, it's a fun and useful hobby…" (Male participant, 67, intervention group).

"I have learned a lot of new stuff. I have also subscribed in some of the pages with my favourite topics and read them daily. Some, even for me with many years of life experience, look new and fun…" (Male participant, 66, intervention group).

"Now, when everyone is talking about new things they've seen or read [from social media apps], I also have something to say and don't need to be just a listener…" (Female participant, 68, intervention group).

Finally, new experience, being more up-to-date and new opportunities were the keywords related to self-realization. Participants mostly had positive viewpoints regarding the impacts of social network apps on self-realization.

*"These days you can't get all the news and information through television or newspapers. It looks like a lot of news come out of these [the Social media apps] …" (*Male participant, 65, intervention group).

"Compared to previous, I handle the content faster and easier. Well, some of the stuff here is nowhere to be found that quickly… " (Female participant, 65, intervention group).

Table 5-9 Comparing the final codes and the number of occurrences in intervention group before (n=10) and after (n=9) the educational period (CASP-19)

#	Codes	Before (n)	Before (%)	After (n)	After (%)	Change (%)
1	Age limitation	10	100	3	33	-67
2	Complicated to learn	6	60	2	22	-38
3	Physical issues	5	50	4	44	-6
4	Slow learning	5	50	1	11	-39
5	Cultural issues	8	80	3	33	-47
6	Time limitation	4	40	3	33	-7
7	Expansive	4	40	3	33	-7
8	Better control	5	50	6	67	+17
9	New opportunity	3	30	8	89	+59
10	Easy to communicate	9	90	9	100	+10
11	Seems fun	8	80	8	89	+9
12	New experience	1	10	9	100	+90
13	More up to date	4	40	9	100	+60
14	Informing about news	0	0	8	89	+89
15	Less bored	0	0	7	78	+78

Table 5-9 shows the final codes and the number of occurrences in the intervention group before (n=10) and after (n=9) the educational period (based on final limitation and advantage, and CASP-19 codes)

5.3 Analysing the post-test data for core questions (control group)

Only seven out of 10 participants in the control group joined the interviews in post-test. Two participants in the control group decided to withdraw from the study and another participant in the control group had a health condition. Reviewing the participants' statements in the post-test showed no considerable difference in the keywords extracting, compared to the pre-test keyword. Age limitations still were the most important issues mentioned by the participants. The comparison of the final codes and the number of occurrences in the control group before (n=10) and after (n=7) the educational period (based on final limitation and advantage, and CASP-19 codes) is represented in Table 5-10.

Table 5-10 Compares the final codes and their occurrences in control group before (n=10) and after (n=7) the educational period

#	**Codes**	**Before (n)**	**Before (%)**	**After (n)**	**After (%)**	**change (%)**
1	Age limitation	10	100	7	100	0
2	Complicated to learn	6	60	5	71	11
3	Physical issues	5	50	3	43	-7
4	Slow learning	5	50	2	29	-21
5	Cultural issues	8	80	5	71	-9
6	Time limitation	4	40	2	29	-11
7	No one to learn from	6	60	4	57	-3
8	Expansive	4	40	1	14	-26
9	Better integration	6	60	5	71	11
10	Better control	5	50	4	57	7
11	feeling more useful	6	60	5	71	11
12	Reaction of Family	5	50	5	71	21
13	Easy to communicate	9	90	7	100	-10
14	Seems fun	8	80	6	86	-6
15	New experience	1	10	3	43	33
16	More up to date	4	40	3	43	3

Results were consistent given the absence of any intervention in the control group, statements in the post-test showed no considerable difference in the keywords extracting, compared to the pre-test keyword. Table 5-6 compares the final codes and their repetitions in the control group before (n=10) and after (n=7) the educational period.

5.4 Summary

Overall, based on the terms and keywords extracted from the participants' statements, as well as the changes in the number and percentage of the keywords among participants in intervention and control groups at two points of time (pre-test and post-test), the positive effects of the interventional program were supported. Therefore, the outcome of this result addressed the first research question.

These outcomes and conclusion are in line with the findings of analysing quantitative data which with help of a defined level of significance between and within groups as well as the amount of effect size, showed that the intervention program significantly improves the level of Quality of Life among the participants in the intervention group.

On the other hand, although at the pre-test time point the number and percentage of the keywords among participants in intervention and control groups were almost similar (similar to the result of the quantitative data analysing in pre-test), the difference between the participants' statements in intervention and control groups was visible in the post-test. Similar results were found in quantitative data analysis.

A discussion of the quantitative and qualitative results is presented in Chapter 6 in which the results of both result sets are discussed separately and integrated as a mixed-method study. As well, the results of comparable studies are discussed and compared to the results of the current study.

6 Discussion

6.1 Introduction

In this chapter, the results of the qualitative (chapter five) and quantitative (chapter four) studies are discussed first separately and then jointly as the mixed-method study. The results of recent relevant studies are also discussed and compared to the results of the current study.
The main research question of this study is:

To what extent does providing training on the use of a smartphone and social media apps change the Quality of Life of elderly people?

Sub-questions:

1. Do participants viewpoint of smartphone and apps change through training?
2. Do the Quality-of-Life changes persist?
3. Is the effect of technology on Quality of Life different between developed and developing countries?
4. Is the effect on Quality of Life of a smartphone different from the effect of a desktop computer?

6.2 Quantitative Results discussion

In this section, the results of the quantitative part of the study which focused on RQ1 and RQ2 are reported. Following the selection of the CASP-19 instrument and initial study design, hypotheses were generated from the two research questions.

H1. There is a significant difference in the mean variable of Quality of Life and its sub-scales, between the intervention and control groups in the post-test.

H2. There is a significant difference in the mean variable of Quality of Life and its sub-scales, between the intervention and control groups in the follow-up test.

H3. There is a significant difference in the mean variable of Quality of Life and its sub-scales, between pre-test and post-test in the intervention group.

H4. There is a significant difference in the mean variable of Quality of Life and its sub-scales, between pre-test and follow-up-test in the intervention group.

H5. There is a no significant difference in the mean variable of Quality of Life and its sub-scales, between post-test and follow-up tests in the intervention group.

The results of the quantitative analysis on the data collected from the participants in both intervention and control groups showed the intervention group had increased Quality of Life scores in the areas of CASP-19 questionnaire sub-scales (control, autonomy, pleasure, self-realization) and the overall mean score of Quality of Life at the post-intervention and follow up stages of the study. All the CASP-19 questionnaire sub-scales (control, autonomy, pleasure, self-realization) and the overall mean score of Quality of Life showed an improvement in their post-test mean scores, however, the effect size of these changes was different for each variable. The control sub-scale had the lowest effect size ($\eta 2$ =0.11), followed by autonomy (η^2=0.13) and self-realization (η^2=0.14). The highest size of the effect was for Quality of Life (η^2 =0.46) and pleasure (η^2=0.42) variables. The results of the Mixed between-within subjects ANOVA showed a non-significant difference in the mean of the Control variable between two groups (intervention and control) with small effect (F=3.80, p=0.06), and a significant change among 3 stages of time (pre-, post- and follow up-tests) with large effect (F=3.13, p=0.04, η^2=0.27). As well there was no significant difference in the interaction between group and time (F=1.44, p=0.24).

All the CASP-19 sub-scales had a statistically significant mean difference between pre-test and post-test($p<0.00$), and pre-test and follow-up test ($p<0.00$) as did the combined Quality of Life score. This explains the big effect size for these variables and the relevantly small effect size for the control sub-scale.

The results of the Mixed between-within subjects ANOVA showed a non-significant difference in the mean of the Control variable between two groups (intervention and control) with small effect (F=3.80, p=0.06), and a significant change among 3 stages of time (pre-, post- and follow up-tests) with large effect (F=3.13, p=0.04, η^2=0.27). As well there was no significant difference in the interaction between group and time (F=1.44, p=0.24). Table 4-10 shows the result of ANOVA within – between subject effects.

None of the study variables' mean scores showed a significant difference between post- and follow-up tests for the intervention group meaning that the intervention effect was sustained. Based on these results, the third, fourth, and fifth hypotheses were accepted.

To determine the overall effect on the Quality of Life of the intervention on participants a paired t-test was performed to compare the differences in mean score for Quality of Life at the post- and follow-up stages in the intervention and control groups. For the intervention group (see Table 4-5) the results of

paired t-test showed a significant mean difference between pre-test and post-test (t= -8.61, p<0.00), post-test and follow-up tests (t= -2.24, p=0.03) as well as pre-test and follow-up test (t= -8.42, p<0.00).

The results of paired t-test showed a significant mean difference between pre- and post-test (t= -8.61, p<0.00) in the intervention group, as shown in Table 4-5. In addition, the results of paired t-test showed a significant mean difference between post-and follow-up-test (t= -2.24, p=0.02) in the intervention group, see Table 4-5. The results of paired t-test also showed a significant mean difference between the pre-test and the follow-up test (t= -8.42, p<0.00) in the intervention group, (see Table 4-5).

Control sub-scale scores showed a non-significant difference in mean of the Control sub-scale between the intervention and control groups during the 3 stages of time (pre, post-test and one–month follow-up) (F=3.80, p=0.06). There was a significant difference in the mean of the autonomy between two groups (intervention and control), also with large effect (F=3.13, p=0.00, η^2=0.27). The mean scores of pleasures showed a significant difference between the two groups (intervention and control) with small effect (F=14.43, p<0.00, η^2=0.07).

The results of the data analysis showed no significant changes in the level of Quality of Life among the participants in the control group in the duration of the study. So, it can be concluded that the significant changes in the level of the Quality of Life in the intervention group was due to the educational program. Meanwhile, the Quality of Life scores showed a significant difference between the two groups (intervention and control) with small effect (F=5.56, p=0.02, η^2=0.05).

Based on the results shown in Tables 4-10, 4-11, and 4-12, the results of the comprehensive data analysis showed the positive impacts of the intervention (educational program) on Quality of Life among the participants in the intervention group across the CASP-19 questionnaire sub-scales (control, autonomy, pleasure, self-realization) and also the overall mean score of Quality of Life. However, the results of the control group showed no significant mean difference between pre-test and post-test, post-test and follow-up test, and pre-test and follow-up test. Therefore, hypotheses number one and two were accepted as well.

Based on the above discussion and addressing the hypotheses of this study, the first research question “Do participants viewpoints of smartphone and apps change through training?” and second research question “Do the Quality of Life changes persist?” of this study were addressed. Overall, the results of quantitative data showed positive impacts of the interventional/educational program on Quality of Life among the participants in the intervention group in particular in the areas of CASP-19 questionnaire sub-scales (control, autonomy, pleasure, self-realization) and also the overall mean score of Quality of Life. The intervention group was able to sustain this between post-test and follow-

up test. Meanwhile, the results of the data analysis showed no significant changes in the level of Quality of Life among the participants in the control group in the duration of the study.

6.3 Qualitative Results Discussion

Qualitative data were collected through semi-structured interviews to understand the impact of the intervention program on Quality of Life factors among the participants. The qualitative content analysis focused on themes and codes summarizing the participants' statements at the pre- and post-intervention stages

Our four interview questions were:

- Question #1: Can you tell me about how you started using a smartphone and what tasks you use it for?
- Question #2: How has your use of a smartphone changed over time?
- Question #3: Focusing on the most popular social media applications in Iran (Telegram, WhatsApp, and Instagram), what you would think are the negative impacts/limitations of using smartphones?
- Question #4: Focusing on the most popular social media applications in Iran (Telegram, WhatsApp, and Instagram), what you would think are the positive impacts/advantages of using smartphones?

Based on the results of this study, majority of participants in the qualitative study indicated that a family member (typically one of their children) has chosen/bought their smartphone for them This was an expected answer due to the age of the participants, the semi-traditional culture of Iranian families, and because most of the Iranian youth are quite familiar with smartphone technology and the criteria of selecting a good smartphone for any purpose.

Participants were also asked about what they knew about social media apps. Participants' responses to these questions indicated that some of them were unaware of mobile apps. Some participants also considered the use of these applications as a serious risk to traditional and religious beliefs of families, especially young people, given their traditional beliefs. These answers could also be justified by the Iranian culture. The source of news and information of many of the Iranian elderly people is television programmes. Due to the traditional religious context of Iranian society, there is a hidden resistance to the introduction of new technologies among traditional groups, especially elderly people. This resistance is mainly due to concerns about the influence of foreign cultures.

Most of the participants (Chapter 5, Table 5-4) in both intervention and control group believed that

this technology could be useful and even fun if used correctly (e.g., “My daughter always says it's better to learn these [the Social media apps]. She is studying abroad and believes that using these programs, she can get in touch with us much easier and faster. I think it's time for me to learn”). Along with these two options, some participants believed that the tool might be helpful and harmful, but because they did not know how to do it, they were not sure. Participants mentioned directly and indirectly (Chapter 5, Section 5.2.1), the family background (traditional or modern), religious beliefs, as well as the number and gender of young people living at home, influenced their view of mobile apps (specifically social apps).

Most of the respondents (95%) pointed to the Telegram app as the app that they already knew or have heard about. This was also expected because the Telegram app is the most well-known social media apps in Iran. Instagram and WhatsApp came in second and third, respectively (Newman et al., 2019; Nikkhah, Heravi, et al., 2018). Both of these apps are also so familiar in Iran especially among youth (Newman et al., 2019) (Nikkhah, Heravi, et al., 2018). In Iran, both Telegram and Instagram applications are used for business (for example online marketing and selling), advertising and entertainment activities. While WhatsApp is a popular alternative for Telegram application for group chats.

All the participants indicated that (Chapter 5, Table 5-3) they think it is too late to utilize new technologies such as smartphone apps given their. They pointed to different physical limitations as a reason for not using apps. However, as the discussions continued, many participants expressed their interest to use smartphone apps despite their limitations. They believed that using smartphone apps may increase their self-confidence.

Despite all the fundamental changes in people's attitudes regarding smartphone technology, there is still a difference in approach to this technology in many areas of Iran. While it is unthinkable for the majority of Iranian youth to live without the relatively new technology of smartphones, the use of this technology for seniors still faces resistance due to their traditional beliefs and the usual limitations of aging. These deterrent beliefs are in many cases reinforced by the younger people. This may explain why some participants mentioned that no one in their family has time to teach them how to use the apps in detail which has led them to stop trying to learn.

Analysis of the participants’ statements in the pre-test, five keywords (age limitation, complicated to learn, physical issues, slow learning, better control to life activities) were identified as the closest ones to the control concept; age limitation, time limitation, expensive instrument, and cultural issues were also the keywords found as the related keywords to autonomy. Moreover, four keywords were identified related to pleasure (Seems fun, good hobby, easy to communicate, and finding new friends).

The majority of the participants (about 80%) in both groups, directly and/or indirectly, mentioned the fun aspect of social apps. However, some participants (less than 20%) believed that it is not always a good hobby because all kinds of information, video, and photos are easily accessible on social networks. Finally, new experiences, being more up-to-date and new opportunities were the keywords related to self-realization. Participants mostly had positive views regarding the impact of social networking apps on self-realization.

Similar terms and keywords were extracted from the participants' statements at the post-test stage to provide comparisons between pre- and post-test results. Along with the keywords and terms from pre-test, new terms and keywords also were searched from participants' statements in the post-test. For example, the terms "Informing about news" and "Less bored" were not detected in the pre-test statements, while these terms were used respectively by 89% and 78% of intervention group participants in the post-test (chapter 5, Table 5-9).

There are some derived codes from the post-test interview same with pre-test and the reason was because of the researcher of this study asked only 4 interview questions in pre and post and participants answers were these codes. However, there were two new codes in post-test interview.

The intervention group participants mentioned some enhancement in their personal and social considerations, as well as the main factors related to their Quality of Life (based on CASP-19 categorization) including control, autonomy, pleasure, and self-realization during the post-test interviews. However, some participants mentioned that some of their personal consideration such as age-related physical limitations still exist. Because these kinds of problems were not something that the training course would be able to solve it. So, it was logical that, given the type of intervention, no change was made in the participants' physical conditions and limitations. However, appropriate training for participants' specific circumstances (e.g., using bold or coloured fonts when typing) somewhat reduced physical constraints.

At the next step of data analysis, the participants' statements in the post-test were analysed again, this time considering the CASP-19 questionnaire domains (control, autonomy, pleasure, and self-realization). Same as the pre-test, age limitation, complicated to learn, physical issues, slow learning, and better control of life activities were the keywords related to the control subscale. Moreover, age limitation, time limitation, expensive instrument, and cultural issues were the keywords related to autonomy (chapter 5, Table 5-8).

Seems fun (89%), less bored (78%), informing about news (89%), and easy to communicate (100%) are the keywords were detected related to pleasure. The majority of the participants in the intervention

group mentioned the pleasure advantages of using social media apps (see chapter 5, Table 5-8). In fact, change in using the keywords related to pleasure was highlighted in the post-test interviews among participants in the intervention group. Learning easy ways to use these apps seems to improve participants' perceptions of their difficulties and complexities (chapter 5, Table 5-8).

As a result, the entertainment aspect was further enhanced from the participants' viewpoint. Finally, new experiences, being more up-to-date, and new opportunities were the keywords related to self-realization. Participants mostly had positive viewpoints regarding the impacts of social network apps on self-realization.

On the other hand, the situation was quite different among the participants in the control group. Analysing data from the participants in the control group in the post-test (chapter 5, Table 5-6) did not show any notable difference in the keywords extracted, compared to the pre-test results. In the post-test, participants still mentioned age limitations as the most important issues limiting their desire and ability regarding using the smartphone apps. This results in consistency was logical and predictable due to the absence of any education and the relatively short interval between pre-test and post-test interviews among the participants in the control group (chapter 5, Table 5-10).

Moreover, comparing the results between intervention and control groups after the educational sessions, the differences between the groups also were observable. For example, "age limitation" was mentioned 100% and 33% times, respectively in pre- and post-test by participants in the intervention group. Meanwhile, the same term was mentioned by 100% of the participants in the control group, in both pre- and post-test (chapter 5, Table 5-9).

In another example, the term "more up to date" was mentioned 40% and 100%, respectively in pre- and post-test by the participants in the intervention group. However, this term was mentioned by 40% and 43%, respectively in pre- and post-test by the participants in the control group (chapter 5, Table 5-9). Therefore, we can conclude that based on the result form this section, the first research question "Do participants viewpoints of smartphone and apps change through training?" of this study was addressed.

6.4 Combined Results

The qualitative and quantitative studies were focused on the overall study questions. The qualitative results were mainly based on the terms and keywords extracted from the participants' statements, while the quantitative results were based on the changes in the mean scores of the study variables (regarding the p-value) in the study duration. In both studies, the positive effects of the interventional program were supported based on the following findings.

To address the first and second research questions of this study, the results of the quantitative study showed that there was a significant change in the mean score of the control variable (as the first Quality of Life sub-scale based on CASP-19) among participants in the intervention group between pre-test and post-test (mean difference pre- to post-test= -0.37, p-value <0.00; η^2 =0.11). On the other hand, the participants' statements which could be considered as the closest statements to the questions of control subscale showed an improvement in this variable. For example, in "age limitation" keyword: mentioned 100% and 33% times, respectively before and after the intervention program; and in "complicated to learn" keyword: mentioned 60% and 22%, respectively before and after the intervention program.

Moreover, a significant change was seen in the mean score of the autonomy sub-scale among participants in the intervention group between pre-test and post-test (mean difference pre- to post-test= -0.54, p-value <0.00; η^2=0.13). Meanwhile, the participants' statements which could be considered as closest statements to the questions of autonomy subscale showed an improvement in this variable. As the example, 40% and 33% the participants mentioned "Expensive [a new model of smartphone]", respectively before and after the intervention program; and the keyword "Time limitation" mentioned 80% and 33% times, respectively before and after the intervention program by the participants in the intervention group. The reason that we considered the price of new smartphone under the "autonomy" sub-section was that some of the participants did not have full financial independence (for example, due to lack of insurance and pension). Or, despite the financial independence of the father of the family, he had to spend a large part of his income to on his children (which is very common in Iranian culture) and as a result does not have complete independence regarding his income.

There was a significant change in the mean score of the pleasure sub-scale among participants in the intervention group between pre-test and post-test (mean difference pre- to post-test= -1.52, p-value <0.00; η^2=0.42).

The very large effect size in pleasure quantitative data analysis (η^2=0.42) showed the magnitude of the mean difference between pre- and post-test was very high. As explained above, the same conclusion can be drawn regarding the changes in the keyword results in the qualitative study. There was also a significant change in the mean score of self-realization among participants in the intervention group between pre-test and post-test (mean difference pre- to post-test= -0.67, p-value= 0.01; η^2 =0.14). The participants' statements which could be considered as close statements to the questions of self-realization subscale showed an improvement in this variable. E.g.: "more up-to-date" was mentioned 40% and 100%, respectively before and after the intervention program. As well, "New opportunities"

was mentioned 10% and 100%, respectively before and after the intervention program.

Finally, results of the analysing quantitative data showed a significant change in the mean score of Quality of Life among the participants in the intervention group between pre-test and post-test (mean difference pre- to post-test= -3.12, p-value= 0.01; η^2 =0.42). Same as the pleasure variable, the effect size index was very large and so, the magnitude of the mean difference between pre- and post-test was very high. An overview of the results of the qualitative study also leads us to a similar conclusion.

At pre-test time, the number and percentage of the keywords among participants in intervention and control groups were similar (similar to the result of the quantitative data analysis in pre-test), the difference between the participants' statements in intervention and control groups was visible in the post-test.

Therefore, overall, the findings of this mixed methods research showed the positive effects of the educational program (using the smartphone social media apps) on the elderly people participants in the study. The results of both qualitative and quantitative studies showed an improvement in the Quality of Life after finishing the training sessions among the participants in the intervention group and addressed the first and second research questions of this study.

The effect size shows which variable after education is significant. The significant difference between the pre and post shows that the study and particularly the educational package affect variables, however, the changes are different in different variables. For example, one variable can be a higher or lower effect. Based on the result of this study, it can be concluded that the educational package effects pleasure and QoL more than other variables. Based on effect size, it seems that the effect of the educational program on pleasure and QOL was higher than other variables. However, the main factor in the statistics is the p-value.

As most of the control variable questions were based on physical issues such as age limitation, therefore education showed a lower effect size than other variables. On the other side, most of the pleasure variable questions are related to entertainment and fun. In addition, smartphones can be used for fun and pleasure exactly has the meaning of fun. Therefore, the effect of using smartphone applications including WhatsApp and Instagram is more pleasurable and fun. If the education was mostly related to overcoming physical limitations then the control variable might show a higher effect size. In addition, the nature of the educational program of this study is closer to pleasure and self-realization than autonomy and control variables

The summary of the results of qualitative and quantitative studies for the intervention and control Group provided in tables 6-1 and 6-2.

Table 6-1 A Summary of the results of qualitative and quantitative studies (Intervention Group)

Results of the qualitative study	**Summary of analysis**	**Results of the quantitative study**	**Summary of analysis**
There was a significant change in the mean score of Control among participants in the intervention group between pre-test and post-test	Mean Difference= -0.37 p value=0.00; η2 =0.18	The participants statements which could be considered as a close statement to the questions of control* subscale showed an improvement in this variable.	e.g.: "age limitation" (mentioned 100% and 33% times, respectively before and after the intervention program); "complicated to learn" (mentioned 60% and 22%, respectively before and after the intervention program).
There was a significant change in the mean score of Autonomy among participants in the intervention group between pre-test and post-test	Mean Difference= -0.54 p value=0.00; η^2 =0.13	The participants statements which could be considered as a close statement to the questions of the Autonomy* subscale showed an improvement in this variable.	e.g.: "Expensive [a new model of smartphone]" (mentioned 40% and 33%, respectively before and after the intervention program); "Time limitation" (mentioned 80% and 33% times, respectively before and after the intervention program).
There was a significant change in the mean score of Pleasure among participants in the intervention group between pre-test and post-test	Mean Difference= -1.52 p value=0.00; η^2=0.42	The participants statements which could be considered as a close statement to the questions of the Pleasure* subscale showed an improvement in this variable.	e.g.: "New experience" (mentioned 10% and 100% times, respectively before and after the intervention program); "seems fun" (mentioned 80% and 89% times, respectively before and after the intervention program).
There was a significant change in the mean score of Self-Realization among participants in the intervention group between pre-test and post-test	Mean Difference= -0.67 p value=0.01; η^2 =0.14	The participants statements which could be considered as a close statement to the questions of the Self-Realization* subscale showed an improvement in this variable.	e.g.: "more up-to-date" (mentioned 40% and 100%, respectively before and after the intervention program); "New opportunities" (mentioned 10% and 100%, respectively before and after the intervention program).
There was a significant change in the mean score of Quality of life among participants in the intervention group between pre-test and post-test	Mean Difference= -3.12 p value<0.00; η^2=0.46	The participants statements showed an improvement in Quality of Life variable.	

Table 6-2 A summary of the results of qualitative and quantitative studies (Control Group)

Results of the qualitative study	**Summary of analysing results**	**Results of the quantitative study**	**Summary of analysing results**
There was no significant change in the mean score of Control among participants in the control group between pre-test and post-test	Mean Difference= -0.07 p value<1.00; η^2 =0.00 η2 =0.15	The participants statements which could be considered as a close statement to the questions of the control* subscale showed no improvement in this variable.	e.g.: "age limitation" (mentioned 100% and 100% times, respectively before and after the intervention program); "complicated to learn" (mentioned 40% and 71%, respectively before and after the intervention program).
There was no significant change in the mean score of Autonomy among participants in the control group between pre-test and post-test	Mean Difference= -0.05 p value<1.00; η^2=0.02	The participants statements which could be considered as a close statement to the questions of the Autonomy* subscale showed no improvement in this variable.	e.g.: "Expensive [a new model of smartphone]" (mentioned 40% and 14%, respectively before and after the intervention program); "Time limitation" (mentioned 40% and 29% times, respectively before and after the intervention program).
There was no significant change in the mean score of Pleasure among participants in the control group between pre-test and post-test	Mean Difference= -p.17 p value<1.00 η^2 =0.02	The participants statements which could be considered as a close statement to the questions of the Pleasure* subscale showed no improvement in this variable.	e.g.: "New experience" (mentioned 10% and 43% times, respectively before and after the intervention program); "seems fun" (mentioned 80% and 86% times, respectively before and after the intervention program).
There was no significant change in the mean score of Self-Realization among participants in the control group between pre-test and post-test	Mean Difference= -0.65 p value=0.06 η^2 =0.02	The participants statements which could be considered as a close statement to the questions of the Self-Realization* subscale showed no improvement in this variable.	e.g.: "more up-to-date" (mentioned 40% and 43%, respectively before and after the intervention program).
There was no significant change in the mean score of Quality of life among participants in the control group between pre-test and post-test	Mean Difference= 0.47 p value<0.56 η^2 =0.56	The participants statements showed no improvement in Quality-of-life variable.	

6.5 Comparison with previous studies

To address the third research question "Is the effect of technology on Quality of Life different between developed and developing countries?" of this study, findings are contrasted with recent studies in different developed and developing countries to determine the extent to which a country's developmental stage impacts the generalisability of findings. Overall, our study showed using the Internet/social app via smartphone had a positive effect on the participant's Quality of Life. These findings are in agreement with the results of studies in developed counties including Winstead et al. (2013) in US. The outcomes of these recent studies suggest that regardless of location, the use of social media and applications had positive effects on elderly people's health and Quality of Life.

In terms of the effect of technology on Quality of Life in developed counties, in the last decade, the outcomes of the studies by Winstead et al. (2013), Hutto and Bell (2014), Bell et al. (2013), all in the USA, Blažun et. al. (2012) in Finland, Erickson et al. (2011) in Canada, Aarts et al. (2015) in the Netherlands, Tsai and Tsai (2011) from Taiwan, and Erickson and Genevieve (2011) in Canada reveals more support for the current study findings.

All of these studies have shown the positive effects of different aspects of ICT on elderly people's health and Quality of Life. In the Winstead et al. (2013) study for instance, not only both of the studies approved of the positive effects of ICT training on the elderly people's Quality of Life, but even in detail, they got the same results. Both studies showed that their ICT training positively affects the participants' social relationships (Winstead et al., 2013).

In the qualitative outcomes of the current study, the participants mentioned the positive effect of using social media apps on their self-realization and self-efficiency. These findings are supported by the studies by Erickson et al. (2011). Additionally, Aarts, Peek, and Wouters (2015) found no connection between using social networks and loneliness and mental health among the elderly people who participated in their study. Both the current study and the study in Taiwan by Tsai and Tsai (2011) highlight the importance of learning and using the technology due to its positive impacts on loneliness/social relationship. Some issues and limitations related to the effect of technology in developed countries are reported by Blažun et al .(2012) in Finland, Slegers et al. (2008) in the Netherlands, which will be discussed in the next paragraphs.,

The "age limitation" factor, that participants in the current study reported are supported by the study by Blažun et al. (2012) in Finland, where both reached the same conclusion in which "age-related problems" are the significant barrier in learning and using ICT technology including social media apps. This study also pointed to the importance of learning and using the technology due to its positive

impacts on loneliness/social relationship and most importantly the participants' Quality of Life (Blažun; & Saranto, 2012).

As stated before in this chapter, despite all the fundamental changes in people's attitudes regarding smartphone technology, there are still different viewpoints regarding this technology. In another counterexample, regarding the results of the current study, use of social media showed no effects (positive or negative) among the elderly people regarding their daily function, and emotional well-being was investigated in an experimental study by Slegers et al. (2008) in the Netherlands

6.6 Answer RQ3

Research question 3 (Is the effect of technology on Quality of Life different between developed and developing countries?) is essential in this study and it was designed to show the reason for conducting this study in Iran as one of the developing countries in the world. The comparison of the effect of technology on the Quality of Life between developed and developing countries is discussed to answer the third research question of this study.
In terms of the effect of technology on the Quality of Life in developing countries, the outcomes of the current study are in agreement with the results of studies in developing countries including Maqbool et al. (2021) in Pakistan, Nugraha and Sebastian (2020) in Indonesia, Kurniawan & Widagdo (2019) in Indonesia, Mealor and Van Belle Mealor and Van Belle (2014) in South Africa, Rylands, and Van Belle Rylands and Van Belle (2017) in Cape Town, South Africa, Mohadisdudis and Ali (2014) in Malaysia, Momeni et al. (2018) in Iran, and Bahramnezhad et al. (2017) in Iran.

A study in Pakistan examined the role of social media usage in elderly people's life. Data were collected from 308 participants, results indicated that social media usage significantly contributes to the Quality of Life and social support among elderly people (p value=0.00) (Maqbool & Ullah, 2021). Using mobile multimedia content including music and videos showed a statistically significant positive influence on the overall well-being and Quality of Life of elderly people in South Africa (p=0.01) (Mealor & Van Belle, 2014). A study in South Africa revealed that elderly people used Facebook principally to get socially involved with their family and friends which improves well-being (Rylands & Van Belle, 2017).

Reviewing the literature relating to studies conducted in Iran, revealed some more evidence supporting the findings of the current study. In Iran, a cross-sectional study by Bahramnezhad et al. (2017) and a qualitative study by Momeni et al. (2018) showed a direct significant relationship between social network use and Quality of Life among the elderly people who participated in a study that concurs with the main findings of the current study (Bahramnezhad et al., 2017).

Some issues and limitations related to the effect of technology in developing countries were reported

which are in line with the outcomes of the current study. For example, the “complicated to learn” factor, that participants in the current study reported are supported by Nugraha and Sebastian (2020) in Indonesia, Kurniawan & Widagdo (2019) in Indonesia. A result of a study in Indonesia showed that elderly people may not fully take benefit of technology because they are not technologically savvy. The researchers of this study recommended designing user-friendly interfaces and applications and encourage elderly people to use them (Kurniawan & Widagdo, 2019). Another study confirmed that elderly people in Indonesia are often left behind in adapting and using technology due to a technological leap (Nugraha & Sebastian, 2020).

The “expensive” factor, that participants in the current study reported are supported by Mohadisdudis and Ali (2014) in Malaysia, Momeni et al. (2018) in Iran, and Bahramnezhad et al. (2017) in Iran. A study was conducted to specify the barriers to smartphone usage among elderly people in Malaysia. Results of this study revealed that elderly people have problems in using smartphones due to: vision impairments, financial limitations, and lack of interest and knowledge in using technological devices and their advanced functionalities (Mohadisdudis & Ali, 2014).

Two previous studies in Iran showed high prices of the new smartphones/tablets/personal computer was one of the limitations of using online social networks among elderly people in Iran (Bahramnezhad et al., 2017; Momeni et al., 2018). Moreover, these studies indicated that elderly people need to learn some of the basic concepts to help them to access useful web pages and applications. Therefore, having specific knowledge is important for the use of social media. So, the need for educational courses for elderly people to receive basic knowledge to use computers, the Internet, and subsequently social networks is necessary. Iranian elderly people should be encouraged to use social networks to improve their adaptation to modern life and improve their Quality of Life.

In many developing countries specifically countries which are defined as low-income economies, only 5–15% of people who require technology including assistive technology and devices have access to them, and hearing aid production meets only ten percent of global need and three percent of the need in these countries (Organization, 2018; Tangcharoensathien & Woranan, 2018). The lack of access to technology including assistive devices in countries which are defined as low-income economies is due to a diversity of factors such as high costs, lack of awareness, limited availability, lack of governance. lack of suitably trained personnel, and inadequate financing (Tangcharoensathien & Woranan, 2018; Thapaliya, 2016).

In Bangladesh, there is no inclusive system of registering either disability or the use of technology (Borg & Östergren, 2015), and the facilities and infrastructure for people with disabilities who could benefit

from using technology including assistive technologies are weak (Shahen, 2020). Only about one percent of the assistive technology services in the country are provided by the Government of Bangladesh; the rest are provided by the community, voluntary organisations, and NGOs (Borg & Östergren, 2015).

In contrast, in India, access to technology particularly assistive technology services, have increased. Even though all the Indian Government commitments, policies and acts, anecdotal evidence advise that the unmet need for assistive technology services in India may be similar to that in Bangladesh. The lack of accurate data on prevalence of disability and assistive technology users poses a challenge to formulating policies and programmes for persons with disabilities in India (Pryor, Nguyen, Islam, Jalal, & Marella, 2018).

In Nepal, there is widespread and multifaceted discrimination against persons with disabilities affecting their access to technology such as assistive technology services. A study reported that only one in eight people who has disability issues had access to assistive technology (Eide, 2016). The implementation of the initiatives defined is still weak, nevertheless, with increased access to budget at the local level, the government's commitment to the rights of people with disability issues, and increased awareness amongst assistive technology users, access to Assistive technology services is improving. However, there is still a long way to go for ensuring assistive technology services are available to everybody who needs them in Nepal (Karki, Rushton, Bhattarai, & De Witte, 2021). Therefore, according to the above discussion lack of accessibility, reachability and affordability, and eligibility are the main barriers for accessing technology specifically assistive technology services for people with disability issues in India, Bangladesh, and Nepal.

Not all the findings of previous studies are in line with the outcomes of the current study. For example, according to the findings of a study by Khalaila et al. (2018), although using the Internet and social media/apps can improve the level of Quality of Life among older adults both directly and indirectly (mostly due to decreasing loneliness and improving independence), these influences could be dependent on other factors. These effects could be directly affected by the time that elderly people spend with their families (Khalaila & Vitman-Schorr, 2018).

Keeping all the above discussions in mind, the most significant gap of this study tried to address the absence of studies about the effect of using social media apps on the elderly people's Quality of Life in developing countries including Iran. Even in recent years the studies on this topic have increased significantly, there are very few data and information on the population of Iranian elderly people. In

fact, most of the related studies have been done in developed countries which highlights the importance of delivering basic and essential skills regarding using the Internet and online social networks. Many of these studies, as we discussed, have confirmed the positive effects of using online technology on Quality of Life for elderly people, in both developing and developed countries.

6.7 Answer RQ4

Before answering the last research question, it is essential to mention that the reason for the inclusion of research question 4 was because of most of educational package was designed with desktop computer by (Blažun & Saranto, 2012; Sitti & Nuntachampoo, 2013; Winstead et al., 2013). However, in this study, a smartphone was used instead of computer. Nowadays smartphone acts as a primary computing device as this technology is more convenient and portable than computer. Therefore, the comparison between effect of desktop computer and smartphone on Quality of life is discussed to answer the last research question of this study.

To address the last research question of this study, "Is the effect on Quality of Life of a smartphone different from the effect of a desktop computer?" many studies reported positive effect on Quality of Life of a smartphone and a desktop computer.

In terms of the effect on Quality of Life of a desktop computer, the use of computers as well as the Internet amongst elderly people has meaningfully increased. For example, the American Life Project and Pew Internet found only 22% of adults aged 65 and above used the Internet in 2004, as of 2011, the percentage increased to 53% (Zickuhr & Madden, 2012).

A study was conducted on the influence of computer training courses on reducing the loneliness of elderly people in Slovenia and Finland (Blažun & Saranto, 2012). They saw a significant reduction in loneliness after intervention/ enhanced social inclusion level ($p = 0.01$).

Another research was performed to examine possible positive effects that the use of computers and the Internet might have on elderly people in Israel (Shapira et al., 2007). The results of this study revealed that participants who began using a computer and the Internet felt more satisfied with life, less lonely and depressed, and more pleased with their current Quality of Life.

In the Netherlands a study was conducted to examine how ICTs may be used by elderly people for overcoming social barriers in the United State (Winstead et al., 2013). The research team focused on

training elderly people for using computers and the Internet and assessing the impact on their Quality of Life over time. Use of the Internet associated with lower levels of social isolation as well as loneliness (their ICT training positively affects the participants' social relationships) was shown in Winstead et al (2013) .

A study was performed to examine whether the training provided to elderly people age 60+ would increase the use of ICT, including the Internet and email as well as influencing participants' mental health and social support (Woodward et al., 2011). The experimental group from this study stated more self-efficacy in executing computer-related tasks and used more information communication technologies, reported significantly higher Quality of Life and perceived greater social support from friends than the control group ($p < 0.00$).

In terms of the effect on the Quality of Life of a smartphone, several studies showed that the application of smartphones can raise the ability of elderly people in different mental, physical, and social situations of life by enhancing their knowledge, getting emotional support, simplifying their communication with friends, and make joining social networks easy (Chan, 2015; Hong et al., 2016; Morris & Aguilera, 2012; Seo, 2019).

Many studies confirmed that smartphone is a beneficial ICT platform that has a special place among different age groups of the community. Statistics revealed the growing popularity of using the Internet and smartphone among elderly people (Marques et al., 2016; Szabo et al., 2018).

According to the results of the previous studies, information and communication technology (ICT) including smartphones may help elderly people maintain a better relationship with their families and community (Bahramnezhad et al., 2017; Quintana, Cervantes, & Sáez, 2018; Shapira et al., 2007; Slegers et al., 2008; Szabo et al., 2018)

Using a variety of smartphone applications helps elderly people to get the daily news, expand their social relationships, reduce feelings of loneliness, (Plaza et al., 2011), and play games and have fun (Kwan, 2013).

Therefore, based on the above results, we can conclude that using a smartphone and a desktop computer has some positive effects on elderly people quality of life such as reducing loneliness and depression (Blažun & Saranto, 2012; Khalaila & Vitman-Schorr, 2018; Plaza et al., 2011; Shapira et al., 2007; Winstead et al., 2013), helping them to maintain a better relationship with their families and community, and having greater social support from friends (Bahramnezhad et al., 2017; Kwan, 2013;

Quintana, Cervantes, & Sáez, 2018; Shapira et al., 2007; Slegers et al., 2008; Szabo et al., 2018; Woodward et al., 2011). In addition, these results are in line with our study results as well.

To compare the effect on Quality of Life between a smartphone and a desktop computer, some studies confirmed that the weight and size of desktop-based equipment limited elderly people convenience (Tsai & Tsai, 2011; Tsai, Tsai, Wang, Chang, & Chu, 2010; Yamamoto-Mitani, Aneshensel, & Levy-Storms, 2002). Yet, smartphone technology has become an attractive modality to deliver health related interventions due to their increasingly powerful technical capabilities and widespread adoption. Unlike laptops and desktop computers, smartphones are hand-held devices, everyone can use this technology anywhere and everywhere (Tak, Benefield, & Mahoney, 2010; Tsai, Cheng, Shieh, & Chang, 2020). Such technology is able, accordingly, to address safety issues, provide communication and entertainment, and support daily life activities. Compared to desktop computers, smartphones might optimize the opportunities for interactions between nursing homes citizens and their families as well (Tsai et al., 2020).

However, some studies reported some issues and concerns related to the effect on the Quality of Life of a smartphone and a desktop. For instance, earlier studies have revealed desktop computers to be associated with insufficient sleep duration and quality (Hale & Guan, 2015; Kenney & Gortmaker, 2017). Using of portable devices including smartphones have also been related to adverse adolescent sleep results. As the importance of poor sleep hygiene among youths, the use of social media devices including desktop computers and smartphones either throughout the night or day has also been revealed in some studies to be associated with poor health related Quality of Life such as loneliness amongst teenagers (Foerster & Röösli, 2017; Mireku, Barker, Mutz, & Dumontheil, 2019; Schweizer, Berchtold, Barrense-Dias, Akre, & Suris, 2017).

Some other studies confirmed that the use of a computer desktop and a smartphone might affect people's health issues. Researchers confirmed that using a smartphone and a desktop computer at night, might reduce physical wellbeing among youths via symptoms including tinnitus, stomach ache, backache, headaches, or high body mass index (BMI) (Hutter et al., 2010; Lajunen et al., 2007; Mireku et al., 2019). Recent literature reveals that increased desktop computer and smartphone use are related to the increased likelihood of peer victimization and social isolation among people (Mireku et al., 2019; Pagani, Lévesque-Seck, & Fitzpatrick, 2016). Therefore, these results addressed the last research question of this study.

6.8 Summary

In this chapter, first, we discussed the quantitative and qualitative results and then combined and compared them to address the first and second research questions of this study. Comparison with previous studies was the last part of this chapter to address the third and fourth research questions of this study.

7 Conclusion

The impacts of online technologies including smartphones and social media apps on lifestyle, Quality of Life, and well-being among elderly people have recently become a major issue of attention and increasing research consideration. Therefore, the most significant gap of this study tried to address the absence of studies about the effect of using social media apps on the elderly people's Quality of Life in developing countries including Iran.

A mixed-methods approach study was designed to determine the effects of using smartphone social media apps (including Telegram, WhatsApp, and Instagram) in an interventional educational package to determine if increased education improved the Quality of Life of the elderly citizens in Shiraz-Iran. The population of the study was all the senior residents registered in local public health centres located in Shiraz, Fars, Iran in 2018-2019.

Qualitative and quantitative studies were focused on the overall study questions. The qualitative results were based on the terms and keywords extracted from the participants' statements, while the quantitative results were based on the changes in the mean scores of the CASP-19 scale and subscales (p-value) in the intervention population measured before the study, after the intervention and again one month later. In both studies the intervention programme was shown to have a positive impact as detailed below.

In the quasi-experimental quantitative study, the intervention group in the CASP-19 questionnaire sub-scales (control, autonomy, pleasure, self-realization) mean values increased and the overall mean score of Quality of Life increased between the pre-test and the post-test and between the pre-test and the follow-up test. The control sub-scale had the lowest effect size (η^2 =0.11), followed by autonomy (η^2=0.13) and self-realization (η^2=0.14). The highest size of the effect was for pleasure (η^2=0.42) and Quality of Life (η^2=0.46) variables.

The control group showed no significant changes in the control, autonomy, pleasure, self-realization, and the level of the Quality of Life variables for the duration of the study. So, it can be concluded that the significant changes in the level of the Quality of Life in the intervention group was due to the educational program.

An overview of the results of the qualitative study also leads us to a similar conclusion. In the qualitative study, overall, 20 participants from the quantitative study participated in the qualitative study (10 participants in each intervention and control group). Data were collected via face-to-face semi-structured interview and analysed using the open-coding method. Based on the terms and

keywords extracted from the participants' statements, as well as the changes in the number and percentage of the keywords among participants in intervention and control groups at two points in time (pre-test and post-test), the positive effects of the interventional program was shown.

The CASP-19 questionnaire is presented as a potential alternative definition of Quality of Life that is less concentrated on the physical health of elderly people. It also incorporates concepts including purpose in life and self-determination that are gradually seen as fundamental to wellbeing (Nikkhah, Heravi-Karimooi, et al., 2017). This questionnaire is related to the mental qualities and abilities of elderly people to Quality of Life which is directly related to the objectives of this study.

The result of this study supports the previous paragraph as based on the quantitative chapter's result, the educational package's effect was more on autonomy, self-realization, pleasure, and Quality of Life, and the control sub-scale had the smallest effect size. The reason was that some of questions under control variable are close to physical than mental issues. Similarly, in the qualitative chapter (Chapter 5), the intervention group participants mentioned the main factors related to their Quality of Life (based on CASP-19 categorization) during the post-test interviews. However, for the control theme, some participants mentioned that some of their issues such as age-related physical limitations still exist (e.g., "Well, my hands still shake. Still, typing texts takes a lot of time. However, I have learned ways to be more comfortable. I know that instead of typing I can record my voice. Of course, I still need to practice. Sometimes I do wrong…").

Unfortunately, these kinds of problems were not something that the training course would be able to solve. So, it was logical that, given the type of intervention, no change was made in the participants' physical conditions and limitations. However, appropriate training for participants' specific circumstances (e.g., using bold or coloured fonts when typing) somewhat reduced physical constraints.

The goal of this research was to determine to what extent does providing training on the use of a smartphone and social media apps change the Quality of Life of elderly people. To address the first and second research questions of this study, overall, the findings of this mixed methods research showed the positive effects of the educational package using smartphone on the elderly participants in the study. The results of both qualitative and quantitative studies showed an improvement in the Quality of Life after finishing the training sessions among the participants in the intervention group. Integrating the qualitative and quantitative results, the findings of both studies were in the same line, supporting each other. These findings are in agreement with the results of studies in developed counties including Winstead et al (Winstead et al., 2013) in Alabama, US, and Quintana et al. (2018) in Spain. The outcomes of these recent studies suggest that regardless of location, the use of social media

and applications had positive effects on elderly people's health and Quality of Life.

A study by Mealor and Van Belle (2014) in South Africa investigated the impact of different aspects of using mobile phones on quality of life of the elderly which participated in the study. Using CASP-19 as the study instrument, the results of this study showed a significant relationship between the complex of the constituent mobile phone usage variables and the participants quality of life. More specifically, using of social/multimedia had a direct significant contribution with the participants quality of life. The researchers pointed that the elderly participants had able to maintain and expand their social/personal connections using the social media and avoid isolation regardless their specific age limitations (Mealor & Van Belle, 2014). The findings of our qualitative study are supported by these statements.

In another example, Quintana et al. (2018) investigated the relationship between the Internet usage and the participants psychological well-being among 2314 senior participants in Spin. The results showed a significant positive relationship between Internet/Email usage and psychological health among the participants. Although the purpose of this study was not pointed the participants quality of life, the researches of this study believe that given to the importance of psychological health in individual's quality of life, Internet usage could positively affect the level of the quality of life (Quintana, Cervantes, Sáez, et al., 2018). This conclusion is also in agreement with the findings of the current study. Therefore, according to the above discussion, the first research question "Do participants viewpoints of smartphone and apps change through training?" and second research question "Do the Quality-of-Life changes persist?" of this study were addressed.

To address the third research question "Is the effect of technology on Quality of Life different between developed and developing countries?" of this study, findings are contrasted with recent studies in different developed and developing countries to determine the extent to which a country's developmental stage impacts the generalisability of findings. Overall, our study showed using the Internet/social app via smartphone had a positive effect on the participant's Quality of Life. These findings are in agreement with the results of studies in developed counties including the studies by Winstead et al. (2013), Hutto and Bell (2014), Bell et al. (2013), all in the USA, Blažun et. al. (2012) in Finland, Erickson et al. (2011) in Canada, Aarts et al.(2015) in the Netherlands, Tsai and Tsai (2011) from Taiwan, and Erickson and Genevieve (2011) in Canada. In terms of the effect of technology on the Quality of Life in developing countries, the outcomes (or at least some parts of the outcomes) of the current study are in agreement with the results of studies in developing counties. including Maqbool et al. (2021) in Pakistan, Nugraha and Sebastian (2020) in Indonesia, Kurniawan & Widagdo (2019) in Indonesia, Mealor and Van Belle (2014) in South Africa, Rylands, and Van Belle (2017) in Cape Town, South Africa, Mohadisdudis and Ali (2014) in Malaysia, Momeni et al. (2018) in Iran, and

Bahramnezhad et al. (2017) in Iran.

Finally, to address the last research question of this study, “Is the effect on Quality of Life of a smartphone different from the effect of a desktop computer?” many studies reported positive effect on Quality of Life of a smartphone and a desktop computer. This study analysed and compared the effect on the Quality of Life between a smartphone and a desktop computer, and the finding of several studies confirmed that using a smartphone and a desktop computer had positive effects on people's Quality of Life, which are in the line with the outcomes (or at least some parts of the outcomes) of the current study. Previous studies confirmed that using a smartphone and a desktop computer has some positive effects on elderly people quality of life such as reducing loneliness and depression (Blažun & Saranto, 2012; Khalaila & Vitman-Schorr, 2018; Plaza et al., 2011; Shapira et al., 2007; Winstead et al., 2013), helping them to maintain a better relationship with their families and community, and having greater social support from friends (Bahramnezhad et al., 2017; Kwan, 2013; Quintana, Cervantes, & Sáez, 2018; Shapira et al., 2007; Slegers et al., 2008; Szabo et al., 2018; Woodward et al., 2011). In addition, these results are in line with our study results as well.

7.1 Limitations

The current study faced some limitations mostly with reference to study design and data collection procedures which are mentioned below:

- Due to issues such as the impossibility of random selection of areas and centres, a quasi-experimental design was selected for the quantitative part instead of experimental design (Campbell & Stanley, 2015). However, throughout the study, all efforts were made to control the study bias such as increasing the sample size and the random selection of the participants in intervention and control groups.
- In semi-experimental designs, contamination bias could be considered as one of the study limitations. In this study some actions were used to treat the contamination bias.
    - Larger sample size: in this study, the minimum sample size was calculated as 13 per group. A larger sample of participants was recruited for the study however and the larger sample size is a method of dealing with contamination bias (Rhoads, 2011).
    - Large effect size: large effect size reduces the effect of contamination bias. As it can be seen in chapter 4, most of the effect size were large or moderate (Magill, Knight, McCrone, Ismail, & Landau, 2019; Rhoads, 2011).
    - Finally, the randomization itself (selecting the participants for intervention and control groups totally by random), is also considered as one of the methods of dealing with contamination bias (Campbell & Stanley, 2015).

- Participants were asked to not discuss the study details, except when necessary and only with family members, for the duration of the study. This was to avoid influencing participants who were in the control group.
- Due to issues such as the age of the participants in the study as well as the field situation, a follow-up assessment was done one month after the post-test to limit the possibility of losing participants. It may be appropriate in the future to consider a period longer than one month to do a follow-up test for checking sustainability of the intervention effects.
- Initially several health centre managers were reluctant to cooperate in the study. This problem was managed by holding several face-to-face and telephone meetings with the officials of the centres in order to fully cover the sample required for the study. However, the centres expressed a desire to remain anonymous.

7.2 Contribution

This study addresses the absence of studies about the effect of using the Internet and Social media apps on elderly people's Quality of Life in developing countries and specifically Iranian elderly people. Despite an increase in the number of studies that have been conducted in developing countries (Maqbool & Ullah, 2021; Momeni et al., 2018; Nugraha & Sebastian, 2020), there are very little data and information on the population of Iranian elderly people. Most related studies have been done in developed countries and highlight the importance of delivering basic skills regarding using the Internet and online social networks. Many of these studies, as we discussed, have confirmed the positive effects of using online technology on the Quality of Life for elderly people, in both developing and developed countries.

Due to the importance of improving the Quality of Life of older adults in the community, the findings of this study and the educational training are intended to help families and practitioners in the aging field to pay more attention to teaching modern social media apps technology to promote healthier elderly people and stronger communities.

In addition, according to the previous studies policymakers spend billions of dollars annually treating elderly peoples mental conditions (Dang, Ananthasubramaniam, & Mezuk, 2022; Knapp & Wong, 2020). The percentage of elderly people who were told by a doctor that they have anxiety, depression, or other mental health conditions is shown in Figure 7-1.

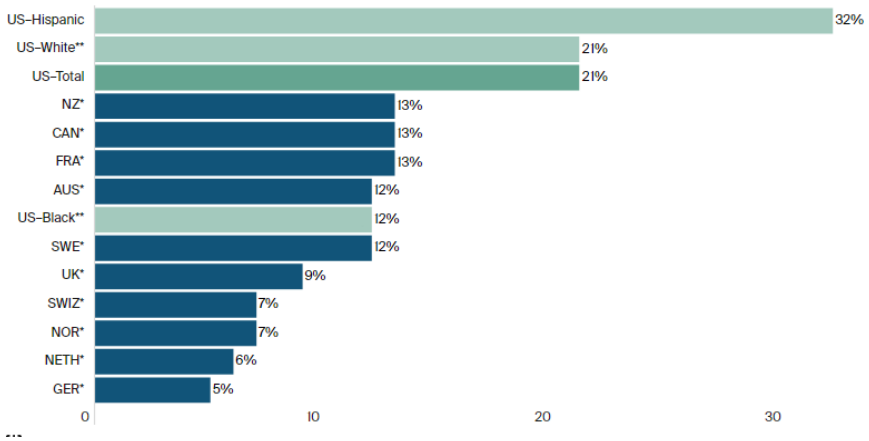


Figure 7-1 Percentage of elderly people who were told by a doctor that they have anxiety, depression, or other mental health conditions (Cottagiri et al., 2022)

The intervention program was shown to have a positive impact on the Quality of life of participants of this study, and the significant changes in the level of Quality of Life in the intervention group were due to the educational program. Therefore, it is highly appropriated if policymakers consider these types of packages and train elderly people with low budgets to reduce their mental condition.

Moreover, developers can design appropriate upskilling intervention on smartphones applications for elderly people who have physical issues. For example, for the control theme, some participants mentioned that some of their issues such as age-related physical limitations still exist. These issues include their shaking hands and eyes condition. Therefore, application developers can develop appropriate applications with bigger screen size for elderly people who have eyes problems and to develop applications that work with elderly people sound rather their typing.

The result of the rapid increase in aging adults is of great significance in both science and technology. People are living longer, not only with physical impairments but also with mental health issues. Motivational factors such as technology for staying connected are becoming more essential to helping older adults' function independently (e.g., age in place) and embrace a healthy sense of well-being.

7.3 Future work

The following are the suggested future directions for research:

- With social media becoming more widespread and being used for everything from news to personal updates to staying connected when other avenues of contact are not available, it is critical that we understand the power behind it. The use of social media leads to higher social satisfaction and tighter bonds with family and friends would be beneficial to several groups,

including the aging in place community, supporters of health and well-being, as well as for older adults themselves. These concepts are all worthy of further investigation.

- Future research could explore the use of other social media applications such as Facebook and Twitter on influencing the overall Quality of Life of elderly people in other countries. These popular applications have been banned since 2009 in Iran. As discussed in Chapter Two, Facebook and Twitter as social networks can help construct and maintain social relationships and have been recognised as influencing seniors' health. (Collins et al., 2019).
- It could be interesting to conduct a similar study in different countries and see the effect (if any) of national cultures and the type/purpose of usage of an educational package and conducting training among elderly people; an expansion of this research, with a larger sample size, and more variables would shed greater insight on this important topic.
- Future work could focus attention on other variables such as cognitive function, level of happiness, life satisfaction and privacy to measure the overall elderly people Quality of Life.
- Based on what we have found in the data thus far, as well as findings in current research, we believe that age may be a predictor of the size of individuals' social networks. Additional studies are needed to further investigate this link.

8 References

Aarts, S., & Peek, S. (2015). Can smart home technology deliver on the promise of independent living? A critical re-flection based on the perspectives of older adults. *Understanding technology acceptance by older adults who are aging in place: a dynamic perspective*, 37.

Aarts, S., & Peek, S. (2015). The relation between social network site usage and loneliness and mental health in community-dwelling older adults. *International Journal of Geriatric Psychiatry, 30*(9), 942-949.

Aarts, S., Peek, S., & Wouters, E. (2015). The relation between social network site usage and loneliness and mental health in community-dwelling older adults. *International Journal of Geriatric Psychiatry, 30*(9), 942-949.

Aday, L. A., & Cornelius, L. J. (2006). *Designing and conducting health surveys: a comprehensive guide*: John Wiley & Sons.

Aeschliman, C., Ross, B., Chase, A.-M., & Pechenkina, E. (2018). Effective use of educational technology: Upskilling academics to deliver learning that successfully blends pedagogies.

Afshar, P. F., Asgari, P., Shiri, M., & Bahramnezhad, F. (2016). A review of the Iran's elderly status according to the census records. *Galen Medical Journal, 5*(1), 1-6.

Afsharnia, E., Pakgohar, M., Khosravi, S., & Haghani, H. J. T. A. M. (2018). Examining the effect of the computer-based educational package on quality of life and severity of hypogonadism symptoms in males. *21*(2), 85-92.

Aghajani, A., Nazari, A. M., & Zahrakar, K. (2018). Study of Psychological Distresses in Married Children Caring for Their Aging Parents: A Qualitative Study. *Iranian Journal of Ageing, 13*(3), 346-361.

Alhassan, M. D. A., Ibrahim Osman. (2021). The effects of digital inclusion and ICT access on the quality of life: A global perspective. *Technology in Society, 64*, 101511.

Alizadeh, S., Riazi, H., Majd, H. A., & Ozgoli, G. (2021). The effect of sexual health education on sexual activity, sexual quality of life, and sexual violence in pregnancy: a prospective randomized controlled trial. *BMC pregnancy childbirth, 21*(1), 1-11.

Allen, P., Bennett, K., & Heritage, B. (2014). *SPSS statistics version 22: A practical guide*: Cengage Learning Australia.

Anderson, M., & Perrin, A. (2017). Tech adoption climbs among older adults. *Pew research center*, 1-22.

Arnaert, A., & Delesie, L. (2007). Effectiveness of video-telephone nursing care for the homebound elderly. *CJNR (Canadian Journal of Nursing Research), 39*(1), 20-36.

Atri, S. B., Pakpour, V., Khalili, A. F., Jafarabadi, M. A., & Kharajo, Z. N. (2020). Social Capital and Its Predictive Role in Quality of Life among the Elderly Referring to Health Centers in Tabriz, Iran: A Community-Based Study. *Journal of Caring Sciences, 9*(4), 212.

Awick, E., Wójcicki, T., Olson, E., & Fanning, J. (2015). Differential exercise effects on quality of life and health-related quality of life in older adults: a randomized controlled trial. *Quality of Life Research, 24*(2), 455-462.

Ayres, L., Kavanaugh, K., & Knafl, K. A. (2003). Within-case and across-case approaches to qualitative data analysis. *Qualitative health research, 13*(6), 871-883.

Baccarella, C. V., Wagner, T. F., Kietzmann, J. H., & McCarthy, I. P. (2018). Social media? It's serious! Understanding the dark side of social media. *European Management Journal, 36*(4), 431-438.

Bahram, M., Pourvaghar, M., & Sadeh, M. (2014). Effect of 12 weeks of Chosen Pilates Exercise on the Quality of life of Healthy Nonathletic People. *Toloo-e-Behdasht, 13*, 93-103.

Bahramnezhad, F., Chalik, R., Bastani, F., Taherpour, M., & Navab, E. (2017). The social network among the elderly and its relationship with quality of life. *Electronic physician, 9*(5), 4306.

Bakeman, R. (2005). Recommended effect size statistics for repeated measures designs. *Behavior research methods, 37*(3), 379-384.

Ballantyne, A., Trenwith, L., Zubrinich, S., & Corlis, M. (2010). 'I feel less lonely': what older people say about participating in a social networking website. *Quality in Ageing and Older Adults, 11*(3), 25-35.

Baraković, S., Baraković Husić, J., van Hoof, J., Krejcar, O., Maresova, P., Akhtar, Z., . . . health, p. (2020). Quality of life framework for personalised ageing: A systematic review of ICT solutions. *International journal of environmental research, 17*(8), 2940.

Barrera, T. L., & Norton, P. J. (2009). Quality of life impairment in generalized anxiety disorder, social phobia, and panic disorder. *Journal of anxiety disorders, 23*(8), 1086-1090.

Basakha, M. (2019). Acceptance of Information and Communication Technology by the elderly people living in Tehran. *Iranian Journal of Ageing*.

Bell, Fausset, C., Farmer, S., Nguyen, J., Harley, L., & Fain, W. B. (2013). *Examining social media use among older adults.* Paper presented at the Proceedings of the 24th ACM conference on hypertext and social media.

Bell, M., Fiero, M., & Horton, N. (2014). Handling missing data in RCTs; a review of the top medical journals. *BMC Medical Research Methodology, 14*(1), 118.

Bhamani, M. A., Karim, M. S., & Khan, M. M. (2013). Depression in the elderly in Karachi, Pakistan: a cross sectional study. *BMC psychiatry, 13*(1), 181.

Blažun, H., & Saranto. (2012). Impact of computer training courses on reduction of loneliness of older people in Finland and Slovenia. *Computers in human behavior, 28*(4), 1202-1212.

Blažun;, & Saranto. (2012). Impact of computer training courses on reduction of loneliness of older people in Finland and Slovenia. *Computers in human behavior, 28*(4), 1202-1212.

Borg, J., & Östergren, P.-O. (2015). Users' perspectives on the provision of assistive technologies in Bangladesh: awareness, providers, costs and barriers. *Disability and Rehabilitation: Assistive Technology, 10*(4), 301-308.

Borhaninezhad, V., Kazazi, L., Haghi, M., & Chehrehnegar, N. (2016). Quality of Life and Its Related Factors among Elderly with Diabetes (Per-sian). *Iranian Journal of Ageing, 11*(4), 162-173.

Borrat-Besson, C., Ryser, V.-A., & Gonçalves, J. (2015). *An evaluation of the CASP-12 scale used in the Survey of Ageing and Retirement in Europe (SHARE) to measure Quality of Life among people aged 50+*. Retrieved from

Bowling, A., Hankins, M., & Windle, G. (2013). A Short Measure of Quality of Life in Older Age: The performance of the brief Older People's Quality of Life questionnaire (OPQOL-brief). *Archives of gerontology, 56*(1), 181-187.

Brandtzæg, P. B. (2012). Social networking sites: Their users and social implications—A longitudinal study. *Journal of Computer-Mediated Communication, 17*(4), 467-488.

Brewster, G., Hirschman, K., Riegel, B., Hanlon, A., & Huang, L. (2019). Association of Health Related Quality of Life Domains with Daytime Sepiness Aong Ederly Ripients of Lng-Term Services and Support. *Geriatric Nursing*.

Bryman, A. (2017). Quantitative and qualitative research: further reflections on their integration. In *Mixing methods: Qualitative and quantitative research* (pp. 57-78): Routledge.

Burholt, V., & Nash, P. (2011). Short form 36 (SF-36) health Survey Questionnaire: Normative Data for Wales. *Journal of Public Health, 33*(4), 587-603.

Burke Johnson, R., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher, 33*(7), 14-26.

Campbell, D. T., & Stanley, J. C. (2015). *Experimental and quasi-experimental designs for research*: Ravenio Books.

Campos, W., Martinez, A., Sanchez, W., Estrada, H., Castro-Sánchez, N. A., & Mujica, D. (2016). A systematic review of proposals for the social integration of elderly people using ambient intelligence and social networking sites. *Cognitive Computation, 8*(3), 529-542.

Cao, X., & Yu, L. (2019). Exploring the influence of excessive social media use at work: A three-dimension usage perspective. *International Journal of Information Management, 46*, 83-92.

Cardinal, R. N., & Aitken, M. R. (2013). *ANOVA for the behavioral sciences researcher*: Psychology Press.

Cardona, L. A. (2010). *Understanding quality of life in older adults*: University of North Texas.

Carlsen, B., & Glenton, C. J. B. m. r. m. (2011). What about N? A methodological study of sample-size reporting in focus group studies. *11*(1), 1-10.
Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science, 312*(5782), 1913-1915.
Cavallero, P., & Morino, A. (2007). The Social Relations of the Elderly. *Archives of Gerontology and Geriatrics, 44*, 97-100.
Černovas, A., Alekna, V., Tamulaitienė, M., & Stukas, R. (2018). Reliability and Validity of the Lithuanian Version of CASP-19: A Quality of Life Questionnaire for the Elderly. *Medicina, 54*(6), 103.
Chan, M. (2015). Multimodal connectedness and quality of life: Examining the influences of technology adoption and interpersonal communication on well-being across the life span. *Journal of Computer-Mediated Communication, 20*(1), 3-18.
Chang, J., McAllister, C., & McCaslin, R. (2015). Correlates of, and barriers to, Internet use among older adults. *Journal of gerontological social work, 58*(1), 66-85.
Charmaz, K. (2006). *Constructing Grounded Theory: A Practical Guide Through Gualitative Analysis*: Sage.
Charness, N. (2019). The Role of Social Media Networks for Aging Adults: Panacea, Plague, or Been There, Done That? *Innovation in Aging, 3*(Suppl), S210.
Cohen. (1988). Statistical Power Analysis for the Behavioral Sciences–Second Edition. 12 Lawrence Erlbaum Associates Inc. *Hillsdale, New Jersey, 13*.
Cohen, J. (1992). Quantitative methods in psychology: A power primer. *Psychol. Bull., 112*, 1155-1159.
Collins, E. I., Cox, A. L., & Wootton, R. (2019). Out of Work, Out of Mind?: Smartphone Use and Work-Life Boundaries. In *Multigenerational Online Behavior and Media Use: Concepts, Methodologies, Tools, and Applications* (pp. 963-974): IGI Global.
Comijs, H. C., van Zelst, W. H., Schoevers, R. A., & Voshaar, R. C. O. (2014). Defining anxious depression in later life: a scaring heterogeneity in results. *The American Journal of Geriatric Psychiatry, 22*(11), 1375-1378.
Conn, D. K., & Steingart, A. B. (1997). Diagnosis and management of late life depression: a guide for the primary care physician. *The International Journal of Psychiatry in Medicine, 27*(3), 269-281.
Cottagiri, S. A., Villeneuve, P. J., Raina, P., Griffith, L. E., Rainham, D., Dales, R., . . . Crouse, D. L. (2022). Increased urban greenness associated with improved mental health among middle-aged and older adults of the Canadian Longitudinal Study on Aging (CLSA). *Environmental Research, 206*, 112587.
Cotten. (2017). Examining the Roles of Technology in Aging and Quality of Life

Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 72(5), 823-826.
Cotten, S., Ford, G., Ford, S., & Hale, T. (2014). Internet use and depression among retired older adults in the United States: A longitudinal analysis. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 69*(5), 763-771.
Creswell, J. W. (2014). *A concise introduction to mixed methods research*: Sage Publications.
Da Silva, S. A., Scazufca, M., & Menezes, P. R. (2013). Population impact of depression on functional disability in elderly: results from “São Paulo Ageing & Health Study”(SPAH). *European archives of psychiatry and clinical neuroscience, 263*(2), 153-158.
Dang, L., Ananthasubramaniam, A., & Mezuk, B. (2022). Spotlight on the Challenges of Depression following Retirement and Opportunities for Interventions. *Clinical interventions in aging, 17*, 1037.
De Leo, D., Diekstra, R. F., Lonnqvist, J., Lonnqvist, J., Cleiren, M. H., Frisoni, G. B., . . . Rozzini, R. (1998). LEIPAD, an internationally applicable instrument to assess quality of life in the elderly. *Behavioral Medicine, 24*(1), 17-27.
Deters, F. G., & Mehl, M. R. (2013). Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social psychological and personality science, 4*(5), 579-586.
DeVellis, R. F. (2016). *Scale development: Theory and applications* (Vol. 26): Sage publications.

Dong, Y., & Peng, C.-Y. J. (2013). Principled missing data methods for researchers. *SpringerPlus, 2*(1), 222.

Doosti-Irani, A., Nedjat, S., Nedjat, S., Cheraghi, P., & Cheraghi, Z. (2018). Quality of life in Iranian elderly population using the SF-36 questionnaire: systematic review and meta-analysis. *Eastern Mediterranean Health Journal, 24*(11).

Doyal, L., & Gough, I. (1984). A theory of human needs. *Critical Social Policy, 4*(10), 6-38.

Doyal, L., & Gough, I. (1991). *A theory of human need*: Macmillan International Higher Education.

Dunlop, D. D., Manheim, L. M., Song, J., Lyons, J. S., & Chang, R. W. (2005). Incidence of disability among preretirement adults: the impact of depression. *American journal of public health, 95*(11), 2003-2008.

Eide, A. (2016). Living Conditions Among People with Disability in Nepal. *Sintef Rapport*.

Eliasi, L. G., Rasi, H. A., & Tavakoli, A. (2017). Factors Affecting Quality of Life Among Elderly Population in Iran. *Diabetes, 3*, 0.014.

Erickson, & Genevieve. (2011). Internet use and psychological wellness during late adulthood. *Canadian Journal on Aging/La Revue canadienne du vieillissement, 30*(2), 197-209.

Erickson, L. B. (2011). *Social media, social capital, and seniors: The impact of Facebook on bonding and bridging social capital of individuals over 65.* Paper presented at the AMCIS.

Eshaghi, S.-R., Ramezani, M. A., Shahsanaee, A., & Pooya, A. (2006). Validity and reliability of the Short Form-36 Items questionnaire as a measure of quality of life in elderly Iranian population. *Am J Appl Sci, 3*(3), 1763-1766.

Eskandari, S., Heravi-Karimooi, M., Rejeh, N., Ebadi, A., & Montazeri, A. (2015). Translation and validation study of the Iranian version of minnesota living with heart failure questionnaire. *Payesh (Health Monitor), 14*(4), 475-484.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1-4.

Fahimfar, N., Tajrishi, F. Z., Gharibzadeh, S., Shafiee, G., & Tanha, K. (2020). Prevalence of Osteosarcopenia and its Association with Cardiovascular Risk Factors in Iranian Older People: Bushehr Elderly Health (BEH) Program. *Calcified Tissue International, 106*(4), 364-370.

Fakour, Y., Mahmoudi-Gharaei, J., Mohammadi, M., Karimi, M., Azar, M., & Momtaz-Bakhsh, M. (2006). The effect of psychosocial supportive interventions on PTSD symptoms after Bam earthquake. *Tehran University Medical Journal TUMS Publications, 64*(9), 55-64.

Fallahi. (2018). How to Spend 48 Hours in Shiraz. Retrieved from https://life.toiran.com/?p=841.

Farajzadegan, Z., Tavakoli Moghadam, N., Naderolasli, M., Aahmadloo, H., Boroumand, M. A., & Motamed, N. (2021). Correlation between sense of coherence (SOC) and quality of life (QOL) in cancer patients; A systematic review. *Iranian Journal of Health Psychology, 4*(2), 77-86.

Farajzadeh, M., & Gheshlagh, R. (2017). Health Related Quality of Life in Iranian Elderly Citizens: a Systematic Review and Meta-analysis. *International Lournal of Community Based Nursing and Midwifery, 5*(2), 100.

Farzianpour, F., Farokhi, B., Shojaei, S., Shafii, M., & Manafi, F. (2014). Status of the elderly healthcare costs. *American Journal of Agricultural and Biological Sciences, 9*(2), 194.

Farzianpour, F., Foroushani, A. R., Badakhshan, A., & Gholipour, M. (2016). The relationship between quality of life with demographic variables of elderly in Golestan Province-Iran. *Health, 7*(05), 507.

Feizi, A., & Heidari, Z. (2020). Persian version of the brief Older People's Quality of Life questionnaire (OPQOL-brief): the evaluation of the psychometric properties. *Health and quality of life outcomes, 18*(1), 1-11.

Field, A. (2017). *Discovering statistics using IBM SPSS statistics: North American edition*: Sage.

Foerster, M., & Röösli, M. (2017). A latent class analysis on adolescents media use and associations with health related quality of life. *Computers in human behavior, 71*, 266-274.

Garson, G. D. (2015). Missing Values Analysis and Data Imputation. Asheboro. In: Statistical Associates Publishing.

Ghasemi, H., Harirchi, M., Masnavi, A., Rahgozar, M., & Akbarian, M. (2011). Comparing quality of life between seniors living in families and institutionalized in nursing homes. *Social Welfare Quarterly, 10*(39), 177-200.

Gholamzadeh, S., Sharifi, S., & Zarshenas, L. (2018). The role of Preoperative Knowledge and Self-efficacy in Predicting Postoperative Anxiety, Depression, and Vision-related quality of life in dlderly patients with Macular Degeneration Undergoing Retinal Surgery in Shiraz, Iran, 2016. *Shiraz E-Medical Journal, 19*(9).

Gökşin, İ., & Aşiret, G. (2021). The effect of progressive muscle relaxation on the adaptation of elderly women to depression and old age: a randomised clinical trial. *Psychogeriatrics, 21*(3), 333-341.

Gold, M. S., & Bentler, P. M. (2000). Treatments of missing data: A Monte Carlo comparison of RBHDI, iterative stochastic regression imputation, and expectation-maximization. *Structural equation modeling, 7*(3), 319-355.

Gothe, N., Ehlers, D., Salerno, E., & Fanning, J. (2020). Physical activity, sleep and quality of life in older adults: influence of physical, mental and social well-being. *Behavioral Sleep Medicine, 18*(6), 797-808.

Graham, J. W., Cumsille, P. E., & Shevock, A. E. (2012). Methods for handling missing data. *Handbook of Psychology, Second Edition, 2*.

Grassi, L., Caruso, R., Da Ronch, C., Härter, M., Schulz, H., & Volkert, J. (2020). Quality of life, level of functioning, and its relationship with mental and physical disorders in the elderly: Results from the MentDis_ICF65. *Health Quality of Life Outcomes, 18*(1), 1-12.

Gustafson, D. H., McTavish, F., Mahoney, J. E., Johnson, R. A., Lee, J. D., Quanbeck, A., . . . Clemson, L. (2015). The effect of an information and communication technology (ICT) on older adults' quality of life: study protocol for a randomized control trial. *Trials, 16*(1), 191.

Haan, S. C. (2019). Facebook's Alternative Facts. *Va. L. Rev. Online, 105*, 18.

Hale, L., & Guan, S. (2015). Screen time and sleep among school-aged children and adolescents: a systematic literature review. *Sleep medicine reviews, 21*, 50-58.

Hamedanchi, A., Momtaz, Y., & Khankeh, H. (2020). The growth trend of never-married elderly population in Iran in the third millennium. *Journal of Family Medicine and Primary Care, 9*(6), 2837.

Hayward, R. D., Owen, A. D., Koenig, H. G., Steffens, D. C., & Payne, M. E. (2012). Religion and the presence and severity of depression in older adults. *The American Journal of Geriatric Psychiatry, 20*(2), 188-192.

Hedayati, H. R., Hadi, N., Mostafavi, L., Akbarzadeh, A., & Montazeri, A. (2014). Quality of life among nursing home residents compared with the elderly at home. *Shiraz E-Medical Journal, 15*(4).

Heidari, M., & Shahbazi, S. (2012). Effect of self-care training program on quality of life of elders. *Iran Journal of Nursing, 25*(75), 1-8.

Heravi, M., Rejeh, N., Garshasbi, A., & Montazeri, A. (2018). Psychometric properties of the Persian version of the quality of life in early old age (CASP-19). *Iranian journal of psychiatry and behavioral sciences, 12*(2).

Higgs, P., Hyde, M., Wiggins, R., & Blane, D. (2003). Researching quality of life in early old age: the importance of the sociological dimension. *Social Policy & Administration, 37*(3), 239-252.

Hojatollah, M., Maddah, S. M. B., & Mahammadi, F. (2016). The effectiveness of self-care training on Quality of Life among alderlies with diabetes *Iranian Journal of Rehabilitation Research in Nursing, 2*(4).

Honarvar, B., Gheibi, Z., Asadollahi, A., Bahadori, F., Khaksar, E., Faradonbeh, M. R., . . . health, p. (2020). The impact of abuse on the quality of life of the elderly: A population-based survey in Iran. *53*(2), 89.

Honarvar, B., Khaksar, E., Jafari, F., Zahedroozegar, M. H., Amiri, S. J. D., & Extra, G. C. D. (2020). Quality of Life in Elders with Suspected Alzheimer Disease: An Urban Health Centers-Based Study from Iran. *10*(3), 143-153.

Hong, S., Trimi, S., & Kim, D. (2016). Smartphone use and internet literacy of senior citizens. *Journal of Assistive Technologies, 10*, 27-38.

Hope, A., Schwaba, T., & Piper, A. M. (2014). *Understanding digital and material social communications for older adults.* Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems.

Hutter, H.-P., Moshammer, H., Wallner, P., Cartellieri, M., Denk-Linnert, D.-M., Katzinger, M., . . . Kundi, M. (2010). Tinnitus and mobile phone use. *Occupational and environmental medicine, 67*(12), 804-808.

Hutto, C. (2015). *Social media gerontology: Understanding social media usage among older adults.* Paper presented at the Web Intelligence.

Hutto, C., & Bell, C. (2014). *Social media gerontology: Understanding social media usage among a unique and expanding community of users.* Paper presented at the 2014 47th Hawaii International Conference on System Sciences.

Hyde, M. (2003). A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19). *Aging & mental health, 7*(3), 186-194.

Hyde, M., Wiggins, R. D., Higgs, P., & Blane, D. B. (2003). A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19). *Aging & mental health, 7*(3), 186-194.

Ilha, S., Santos, S. S. C., Backes, D. S., Barros, E. J. L., Pelzer, M. T., & Costenaro, R. G. S. (2017). Complex educational and care (geron) technology for elderly individuals/families experiencing Alzheimer's disease. *Revista brasileira de enfermagem, 70*(4), 726-732.

Jadidi, A., Farahaninia, M., Janmohammadi, S., & Haghani, H. (2015). Quality of life for elderly residents in nursing home. *Iran J Geriatric Nurs, 2*(1), 9-18.

James, B. D., Boyle, P. A., Bennett, J. S., & Bennett, D. A. (2012). The impact of health and financial literacy on decision making in community-based older adults. *Gerontology, 58*(6), 531-539.

Jamil, M. B. (2006). Validity and Reliability Study of Rosenberg Self-esteem Scale in Seremban School Children. *Malaysian Journal of Psychiatry, 15*(2).

Jiang, J., Tang, Z., Futatsuka, M., & Zhang, K. (2004). Exploring the influence of depressive symptoms on physical disability: a cohort study of elderly in Beijing, China. *Quality of Life Research, 13*(7), 1337-1346.

John, P. D. S., Montgomery, P. R., & Tyas, S. L. (2013). Social position and frailty. *Canadian Journal on Aging/La Revue canadienne du vieillissement, 32*(3), 250-259.

Julie, P. (2007). SPSS survival manual—A step by step guide to data analysis using SPSS for windows (3rd ed.). *Maidenhead: Open University Press*.

Jung, E. H., Walden, J., Johnson, A. C., & Sundar, S. S. (2017). Social networking in the aging context: Why older adults use or avoid Facebook. *Telematics and Informatics, 34*(7), 1071-1080.

Kang, H. (2013). The prevention and handling of the missing data. *Korean journal of anesthesiology, 64*(5), 402.

Kariuki, J. W. (2019). Quality of Life among the elderly in nursing homes. *Theseus*(15).

Karki, J., Rushton, S., Bhattarai, S., & De Witte, L. (2021). Access to assistive technology for persons with disabilities: a critical review from Nepal, India and Bangladesh. *Disability and Rehabilitation: Assistive Technology*, 1-9.

Kaware, S. S., & Sain, S. K. (2015). ICT application in education: an overview. *International Journal of Multidisciplinary Approach & Studies, 2*(1), 25-32.

Kenney, E. L., & Gortmaker, S. L. (2017). United States adolescents' television, computer, videogame, smartphone, and tablet use: associations with sugary drinks, sleep, physical activity, and obesity. *The Journal of pediatrics, 182*, 144-149.

Khaki, S., Khesali, Z., Farajzadeh, M., Dalvand, S., Moslemi, B., & Ghanei Gheshlagh, R. (2017). The relationship of depression and death anxiety to the quality of life among the elderly population. *Hayat Journal, 23*(2), 152-161.

Khalaila, R., & Vitman-Schorr, A. (2018). Internet use, social networks, loneliness, and quality of life among adults aged 50 and older: mediating and moderating effects. *Quality of Life Research, 27*(2), 479-489.

Khandkar, S. (2009). Open coding. *University of Calgary, 23*, 2009. Retrieved from http://pages.cpsc.ucalgary.ca/~saul/wiki/uploads/CPSC681/open-coding.pdf.

Khazaei Jalil, S., Azmoon, A., Abdohhali, M., Ghomi, N., & Shamsizadeh, M. (2015). Quality of life among Elderly Living at Nursing Home in Shahroud city. *Iranian Journal of Geriatric Nursing, 2*(1), 39-49.

Khoshraftar Roudi, E., Behnam Voshani, H., Emami Zeydi, A., Askari Hoseini, Z., Movahedifar, M., & Emami Moghadam, Z. (2016). Comparison of the effects of healthy lifestyle education program implemented by peers and community health nurses on the Quality of Life of elderly patients with hypertension. *Evidence Based Care, 5*(4), 51-60.

Kiat, B. W., & Chen, W. (2015). Mobile instant messaging for the elderly. *Procedia Computer Science, 67*, 28-37.

Kleine, D. (2010). ICT4WHAT?—Using the choice framework to operationalise the capability approach to development. *Journal of International Development, 22*(5), 674-692.

Knapp, M., & Wong, G. (2020). Economics and mental health: the current scenario. *World Psychiatry, 19*(1), 3-14.

Kurniawan, E., & Widagdo, T. (2019). *Mobile application menu design for elderly in indonesia with cognitive consideration.* Paper presented at the Journal of Physics: Conference Series.

Kwan, A. (2013). mHealth Solutions for Improving Mental Health and Illnesses in the Aging Process. *White Paper Series on mHealth and Aging, mHealth Alliance, UN Foundation*.

Lajunen, H.-R., Keski-Rahkonen, A., Pulkkinen, L., Rose, R. J., Rissanen, A., & Kaprio, J. (2007). Are computer and cell phone use associated with body mass index and overweight? A population study among twin adolescents. *BMC public health, 7*(1), 1-8.

Laslett, P. (1991). *A fresh map of life: The emergence of the third age*: Harvard University Press.

Lawrence, V., Murray, J., Banerjee, S., Turner, S., Sangha, K., Byng, R., . . . Macdonald, A. (2006). Concepts and causation of depression: A cross-cultural study of the beliefs of older adults. *The gerontologist, 46*(1), 23-32.

Leist, A. K. (2013). Social media use of older adults: a mini-review. *Gerontology, 59*(4), 378-384.

Liebig, P. S., & Rajan, S. I. (2003). An aging India: perspectives, prospects, and policies. *Journal of aging & social policy, 15*(2-3), 1-9.

Lin, C.-Y., Imani, V., Broström, A., Nilsen, P., Fung, X. C., Griffiths, M. D., & Pakpour, A. H. (2019). Smartphone application-based addiction among Iranian adolescents: A psychometric study. *International Journal of Mental Health and Addiction, 17*(4), 765-780.

Lincoln, Y. S., & Guba, E. (1985). Qualitative inquiry. *Thousand Oaks*.

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American statistical Association, 83*(404), 1198-1202.

Llorente-Barroso, C., Kolotouchkina, O., & Mañas-Viniegra, L. (2021). The enabling role of ICT to mitigate the negative effects of emotional and social loneliness of the elderly during COVID-19 pandemic. *International journal of environmental research and public health, 18*(8), 3923.

Lodico, M. (2006). Methods in educational research.

Loureiro, H., Mendes, A., Fernandes, A., Camarneiro, A., & Fonseca, A. (2015). HOW DO COUPLES ADJUST THEMSELVES TO RETIREMENT? *rcaap, 24*(12). doi:10.13140/RG.2.1.4442.3208

Lue, B.-H., Chen, L.-J., & Wu, S.-C. (2010). Health, financial stresses, and life satisfaction affecting late-life depression among older adults: a nationwide, longitudinal survey in Taiwan. *Archives of gerontology and geriatrics, 50*, S34-S38.

Lutz, C., & Hoffmann, C. P. (2017). The dark side of online participation: exploring non-, passive and negative participation. *Information, Communication & Society, 20*(6), 876-897.

Magill, N., Knight, R., McCrone, P., Ismail, K., & Landau, S. (2019). A scoping review of the problems and solutions associated with contamination in trials of complex interventions in mental health. *BMC Medical Research Methodology, 19*(1), 4.

Maqbool, H., & Ullah, R. (2021). SOCIAL MEDIA USAGE AND SOCIAL SUPPORT AS DRIVERS OF QUALITY OF LIFE IN ELDERLY PEOPLE. EVIDENCE FROM PAKISTAN.

Mares, J., Cigler, H., Vachkova, E. J. H., & outcomes, q. o. l. (2016). Czech version of OPQOL-35 questionnaire: the evaluation of the psychometric properties. *14*(1), 1-13.

Marques, L. P., Schneider, I. J. C., & d'Orsi, E. (2016). Quality of life and its association with work, the Internet, participation in groups and physical activity among the elderly from the EpiFloripa survey, Florianópolis, Santa Catarina State, Brazil. *Cadernos de saude publica, 32*, e00143615.

Marshall, B., Cardon, P., Poddar, A., & Fontenot, R. (2013). Does sample size matter in qualitative research?: A review of qualitative interviews in IS research. *Journal of Computer Information Systems, 54*(1), 11-22.

Mason, M. (2010). *Sample size and saturation in PhD studies using qualitative interviews.* Paper presented at the Forum qualitative Sozialforschung/Forum: qualitative social research.

Matthews, K. A., & Gallo, L. C. (2011). Psychological perspectives on pathways linking socioeconomic status and physical health. *Annual review of psychology, 62*, 501-530.

McHorney, C. A., Ware Jr, J. E., Rogers, W., Raczek, A. E., & Lu, J. R. (1992). The validity and relative precision of MOS short-and long-form health status scales and Dartmouth COOP charts: results from the Medical Outcomes Study. *Medical care*, MS253-MS265.

McLaughlin, A. C., Pryor, M., & Feng, J. (2019). Design the Technological Society for an Aging Population. In *Critical Issues Impacting Science, Technology, Society (STS), and Our Future* (pp. 218-250): IGI Global.

McNaughton, S. A., Crawford, D., Ball, K., Salmon, J. J. H., & outcomes, q. o. l. (2012). Understanding determinants of nutrition, physical activity and quality of life among older adults: the Wellbeing, Eating and Exercise for a Long Life (WELL) study. *10*(1), 1-7.

Mealor, B., & Van Belle, J.-P. (2014). *The impact of mobile phones on quality of life of the elderly.* Paper presented at the Proceedings of the 8th International Development Informatics Association Conference, Port Elizabeth, South Africa.

Megari, K. (2013). Quality of life in chronic disease patients. *Health psychology research, 1*(3).

Meyers, A. (2019). A Phenomenological Study of the Lived Experiences of Counseling Students in a Co-Facilitated Experiential Group.

Mireku, M., Barker, M., Mutz, J., & Dumontheil, I. (2019). Night-time screen-based media device use and adolescents' sleep and health-related quality of life. *Environment International, 124*, 66-78.

Mirzashahi, B., Aghajani, M., Mirbazegh, F., Zebardast, J., & Ghasemi, E. (2018). Surgical outcomes for lumbar spinal canal stenosis in elderly patients. *BIOMEDICAL RESEARCH AND THERAPY, 5*(5), 2279-2286.

Miu, D. K., & Chan, C. K. (2011). Prognostic value of depressive symptoms on mortality, morbidity and nursing home admission in older people. *Geriatrics & gerontology international, 11*(2), 174-179.

Mohadisdudis, H. M., & Ali, N. M. (2014). *A study of smartphone usage and barriers among the elderly.* Paper presented at the 2014 3rd international conference on user science and engineering (i-USEr).

Mohammad Pur, R. (2019). The Effect of Recreation Therapy on Self-esteem and Quality of life in elderly people Referred to a Daycare Center. *Journal of Gerontology, 3*(3), 21-31.

Mohammadpour, R. A., & Yousefi, Z. (2008). Factor Analysis of SF-36 Persian Version Health-Related Quality of. *World Applied Sciences Journal, 3*(4), 548-554.

Momeni, M., Hariri, N., Nobahar, M., & Noshinfard, F. (2018). Barriers and challenges experienced by seniors in using online social networks: a phenomenological study. *Middle East Journal of Rehabilitation and Health, 5*(1).

Morris, M. E., & Aguilera, A. (2012). Mobile, social, and wearable computing and the evolution of psychological practice. *Professional Psychology: Research and Practice, 43*(6), 622.

Morrow, R., Rodriguez, A., & King, N. (2015). Colaizzi's descriptive phenomenological method. *The psychologist, 28*(8), 643-644.

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International journal of qualitative methods, 1*(2), 13-22.

Muragod, A., & Sreenivas, S. (2019). Association Of Depression With Quality Of Sleep And Quality Of Life In Geriatric Population In Oldage Homes –an Observational Study. *Indian Journal of Applied Research, 9*(11).

Myhre, J. W., Mehl, M. R., & Glisky, E. L. (2017). Cognitive benefits of online social networking for healthy older adults. *The Journals of Gerontology: Series B, 72*(5), 752-760.

Navabi, N. (2017). *Elderly attitude than of practical&barrier to the use of from mobile*. Retrieved from Iran: http://pajouhan.mubabol.ac.ir/webreport/view.action?webreport_code=1000&masterCode=11003563

Navabi, N., Ghaffari, F., & Jannat-Alipoor, Z. (2016). Older adults' attitudes and barriers toward the use of mobile phones. *Clinical interventions in aging, 11*, 1371.

Nejati, V., Shirinbayan, P., Akbari Kamrani, A., Foroughan, M., Taheri, P., & Sheikhvatan, M. (2008). Quality of life in elderly people in Kashan, Iran. *Middle East Journal of Age and Ageing, 5*(2), 21-25.

Nelwamondo, F. V., Mohamed, S., & Marwala, T. (2007). Missing data: A comparison of neural network and expectation maximization techniques. *Current Science*, 1514-1521.

Neri, A. L., Borim, F. S. A., Batistoni, S. S. T., Cachioni, M., Rabelo, D. F., Fontes, A. P., & Yassuda, M. S. (2018). New semantic-cultural validation and psychometric study of the CASP-19 scale in adult and elderly Brazilians. *Cadernos de saude publica, 34*(10).

Netuveli, G., & Blane, D. (2008). Quality of life in older ages. *British medical bulletin, 85*(1), 113-126.

New technologies are more useful for seniors. (2017). Retrieved from http://www.eghtesadonline.com/%D8%A8%D8%AE%D8%B4-%D8%AA%D8%B1%D8%A8%DB%8C%D8%AA-82/214779-%D9%81%D9%86%D8%A7%D9%88%D8%B1%DB%8C-%D9%87%D8%A7%DB%8C-%D8%AC%D8%AF%DB%8C%D8%AF-%D8%A8%D8%B1%D8%A7%DB%8C-%D8%B3%D8%A7%D9%84%D9%85%D9%86%D8%AF%D8%A7%D9%86-%D9%85%D9%81%DB%8C%D8%AF%D8%AA%D8%B1-%D9%87%D8%B3%D8%AA%D9%86%D8%AF

Newman, L., Stoner, C., & Spector, A. (2019). Social networking sites and the experience of older adult users: a systematic review. *Ageing & Society*, 1-26.

Nikkhah, M., Heravi-Karimooi, M., Montazeri, A., Rejeh, N., & Nia, H. S. (2018). Psychometric properties the Iranian version of older People's quality of life questionnaire (OPQOL). *Health and quality of life outcomes, 16*(1), 1-10.

Nikkhah, M., Heravi-Karimooi, M., Rejeh, N., Nia, H. S., & Montazeri, A. J. P. (2017). Measuring quality of life in elderly populations: a review of instruments used. *16*(3), 303-314.

Nikkhah, M., HERAVI, K. M., Rejeh, N., SHARIF, N. H., & Montazeri, A. (2017). Psychometric properties of the Persian version of the Older People's Quality of Life Questionnaire (OPQOL-35).

Nikkhah, M., Heravi, M., Montazeri, A., & Rejeh, N. (2018). Psychometric properties the Iranian version of Older People's Quality Of Life questionnaire (OPQOL). *Health and quality of life outcomes, 16*(1), 174.

Noroozian, M. (2012). The elderly population in iran: an ever growing concern in the health system. *Iranian Journal of Psychiatry and Behavioral Sciences, 6*(2), 1.

Nugraha, K. A., & Sebastian, D. (2020). *Mobile Social Media Interface Design for Elderly in Indonesia.* Paper presented at the International Conference on Human-Computer Interaction.

Organization, W. h. (2018). Assistive technology, Key facts. *Geneva, May*.

Ou, J., Liang, H., & Tan, H. X. (2018). *Identifying Elderlies at Risk of Becoming More Depressed with Internet-of-Things.* Paper presented at the International Conference on Human Aspects of IT for the Aged Population.

Pagani, L., Lévesque-Seck, F., & Fitzpatrick, C. (2016). Prospective associations between televiewing at toddlerhood and later self-reported social impairment at middle school in a Canadian longitudinal cohort born in 1997/1998. *Psychological medicine, 46*(16), 3329-3337.

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research, 42*(5), 533-544.

Pallant, J. (2007). SPSS Survival Manual: A Step By Step Guide to Data Analysis Using SPSS for Windows (Version. *Buckungham, UK: Open University Press. ISBN, 35223664*.

Parker, S. G., Peet, S. M., Jagger, C., Farhan, M., Castleden, C. M. J. A., & Ageing. (1998). Measuring health status in older patients. The SF-36 in practice. *27*(1), 13-18.

Parmar, K., Law, J., Carter, B., & Hewitt, J. (2019). Frailty in Older Patients Undergoing Emergency Laparotomy: Results From the UK Observational Emergency Laparotomy and Frailty (ELF) Study. *Annals of surgery*.

Payoun, M., Fadayevatan, R., Lotfi, M., & Foroughan, M. (2020). Psychometric properties of the Persian version of PERMA-Profiler: A tool to assess flourishing in Iranian older adults. *Успехи геронтологии, 33*(3).

Pinder, C. C., & Harlos, K. P. (2001). Employee silence: Quiescence and acquiescence as responses to perceived injustice. In *Research in personnel and human resources management* (pp. 331-369): Emerald Group Publishing Limited.

Pitt, B., Pfeffer, M. A., Assmann, S. F., Boineau, R., Anand, I. S., Claggett, B., . . . Fleg, J. L. (2014). Spironolactone for heart failure with preserved ejection fraction. *New England Journal of Medicine, 370*(15), 1383-1392.

Plaza, I., MartíN, L., Martin, S., & Medrano, C. (2011). Mobile applications in an aging society: Status and trends. *Journal of Systems and Software, 84*(11), 1977-1988.

Poduthase, H. (2015). Rigor in qualitative research: Promoting quality in social science research. *Research Journal of Recent Sciences ,ISSN, 2277*, 2502.

Population of Cities in Iran. (2020). Retrieved from https://worldpopulationreview.com/world-cities/shiraz-population

Post, M. (2014). Definitions of quality of life: what has happened and how to move on. *Topics in Spinal Cord Injury Rehabilitation, 20*(3), 167-180.

Pryor, W., Nguyen, L., Islam, Q. N., Jalal, F. A., & Marella, M. (2018). Unmet needs and use of assistive products in two districts of Bangladesh: findings from a household survey. *International journal of environmental research and public health, 15*(12), 2901.

Quinn, K. (2017). *The Cognitive Benefits of Social Media Use in Later Life: Results of a Randomized, Controlled Pilot Study.* Paper presented at the Proceedings of the 8th International Conference on Social Media & Society.

Quinn, K., Smith-Ray, R., & Boulter, K. (2016). *Concepts, terms, and mental models: everyday challenges to older adult social media adoption.* Paper presented at the International Conference on Human Aspects of IT for the Aged Population.

Quintana, D., Cervantes, A., & Sáez, Y. (2018). Internet use and psychological well-being at advanced age: Evidence from the English longitudinal study of aging. *International journal of environmental research and public health, 15*(3), 480.

Quintana, D., Cervantes, A., Sáez, Y., & Isasi, P. (2018). Internet use and psychological well-being at advanced age: Evidence from the English longitudinal study of aging. *International journal of environmental research, 15*(3), 480.

Rhoads, C. (2011). The implications of "contamination" for experimental design in education. *Journal of Educational and Behavioral Statistics, 36*(1), 76-104.

Richter, D., Bannier, S., Glott, R., Marquard, M., & Schwarze, T. (2013). *Are internet and social network usage associated with wellbeing and social inclusion of seniors?–The third age online survey on digital media use in three european countries.* Paper presented at the International Conference on Universal Access in Human-Computer Interaction.

Romera-Liebana, L., Orfila, F., Segura, J., & Real, J. (2018). Effects of a primary care-based multifactorial intervention on physical and cognitive function in frail, elderly individuals: a randomized controlled trial. *The Journals of Gerontology: Series A, 73*(12), 1668-1674.

Rosales, A., & Fernández-Ardèvol, M. (2016). Beyond WhatsApp: Older people and smartphones. *Romanian Journal of Communication and Public Relations, 18*(1), 27-47.

Rosenberg, T., Montgomery, P., Hay, V., & Lattimer, R. (2019). Using frailty and quality of life measures in clinical care of the elderly in Canada to predict death, nursing home transfer and hospitalisation-the frailty and ageing cohort study. *BMJ open, 9*(11).

Rotondi, V., Stanca, L., & Tomasuolo, M. (2017). Connecting alone: Smartphone use, quality of social interactions and well-being. *Journal of Economic Psychology, 63*, 17-26.

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of personality and social psychology, 69*(4), 719.

Rylands, D., & Van Belle, J.-P. (2017). *The Impact of Facebook on the Quality of Life of Senior Citizens in Cape Town.* Paper presented at the International Conference on Social Implications of Computers in Developing Countries.

Sadeghi, M., & Kazemi, H. (2004). Prevalence of dementia and depression among residents of elderly nursing homes in Tehran province. *Iranian journal of psychiatry and clinical psychology, 9*(4), 49-55.

Şahin, D. S., Özer, Ö., & Yanardağ, M. Z. (2019). Perceived social support, quality of life and satisfaction with life in elderly people. *Educational Gerontology, 45*(1), 69-77.

Salehi, L., Salaki, S., & Alizadeh, L. (2012). Health-related quality of life among elderly member of elderly centers in Tehran. *Iranian Journal of Epidemiology, 8*(1), 14-20.

Salimi, F., Garmaroudi, G., Hosseini, S. M., & Batebi, A. (2015). Effect of self–care educational program to improving quality of life among elderly referred to health centers in Zanjan. *J Educ Community Health, 2*(2), 28-37.

Sarokhani, D., Parvareh, M., Dehkordi, A. H., Sayehmiri, K., & Moghimbeigi, A. (2018). Prevalence of depression among Iranian elderly: Systematic review and meta-analysis. *Iranian journal of psychiatry, 13*(1), 55.

Schweizer, A., Berchtold, A., Barrense-Dias, Y., Akre, C., & Suris, J.-C. (2017). Adolescents with a smartphone sleep less than their peers. *European journal of pediatrics, 176*(1), 131-136.

Seo, S.-M. (2019). The Effect of Smartphone Education on the Quality of Life, Self-efficacy, Well-being for the Elderly. *Journal of Convergence for Information Technology, 9*(5), 165-171.

Shahen, M. A. (2020). The social and family attitude toward disabled student: a study on Rajshahi city corporation area, Bangladesh. *International Journal of Innovative Science and Research Technology, 5*, 1.

Shapira, N., Barak, A., & Gal, I. (2007). Promoting older adults' well-being through Internet training and use. In: Taylor & Francis.

Sharif, F., Jahanbin, I., Amirsadat, A., & Moghadam, M. (2018). Effectiveness of life review therapy on quality of life in the late life at day care centers of Shiraz, Iran: a randomized controlled trial. *International Journal of Community Based Nursing, 6*(2), 136.

Sheykhi. (2004). A study of the elderly people living in nursing homes in Iran with a specific focus on Tehran. *African and Asian Studies, 3*(2), 103-118.

Sheykhi. (2019). Safety and Security Needs of the Aging People in Tehran, Iran. *Gerontology & Geriatrics Studies, 4*(4). doi:10.31031/GGS.2019.04.000592

Shiraz Electronic Industries Organization. (2016). Retrieved from http://www.defanews.ir/sug/

Shrestha, K., Ojha, S. P., Dhungana, S., & Shrestha, S. (2020). Depression and its association with quality of life among elderly: An elderly home-cross sectional study. *Neurology, Psychiatry, and Brain Research, 38*, 1-4.

Sim, J., Bartlam, B., & Bernard, M. (2011). The CASP-19 as a measure of quality of life in old age: evaluation of its use in a retirement community. *Quality of Life Research, 20*(7), 997-1004.

Sinclair, T., & Grieve, R. (2017). Facebook as a source of social connectedness in older adults. *Computers in human behavior, 66*, 363-369.

Sitti, S., & Nuntachampoo, S. (2013). Attitudes towards the use of ICT training curriculum for Thai elderly people. *Procedia-Social and Behavioral Sciences, 103*, 161-164.

Slegers, K., Van Boxtel, M. P., & Jolles, J. (2008). Effects of computer training and Internet usage on the well-being and quality of life of older adults: a randomized, controlled study. *The journals of gerontology series B: Psychological sciences and social sciences, 63*(3), P176-P184.

Smith. (2015). *Qualitative psychology: A practical guide to research methods*: Sage.

Smith, R., & Sarah, B. (2019). Effectiveness of incentives and follow-up on increasing survey response rates and participation in field studies. *BMC Medical Research Methodology, 19*(1), 230.

Steptoe, A., Deaton, A., & Stone, A. A. (2015). Psychological wellbeing, health and ageing. *Lancet, 385*(9968), 640.

Stoner, C. R., Orrell, M., & Spector, A. (2019). The psychometric properties of the control, autonomy, self-realisation and pleasure scale (CASP-19) for older adults with dementia. *Aging & mental health, 23*(5), 643-649.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research*: Sage publications.

Sundar, S., Oeldorf, A., Nussbaum, J., & Behr, R. (2011). *Retirees on Facebook: can online social networking enhance their health and wellness?* Paper presented at the CHI'11 Extended Abstracts on Human Factors in Computing Systems.

Szabo, A., Allen, J., Stephens, C., & Alpass, F. (2018). Longitudinal Analysis of the Relationship Between Purposes of Internet Use and Well-being Among Older Adults. *The gerontologist*.

Tajvar, M., Arab, M., & Montazeri, A. (2008). Determinants of health-related quality of life in elderly in Tehran, Iran. *BMC public health, 8*(1), 1-8.

Tak, S. H., Benefield, L. E., & Mahoney, D. F. (2010). Technology for long-term care. *Research in gerontological nursing, 3*(1), 61-72.

Tangcharoensathien, V., & Woranan, S. (2018). Improving access to assistive technologies: challenges and solutions in low-and middle-income countries. *WHO South-East Asia journal of public health, 7*(2), 84.

Tarlov, A. R., Ware, J. E., Greenfield, S., Nelson, E. C., Perrin, E., & Zubkoff, M. (1989). The Medical Outcomes Study: an application of methods for monitoring the results of medical care. *Jama, 262*(7), 925-930.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International journal of medical education, 2*, 53.

Teymoori, F., Dadkhah, A., & Shirazikhah, M. (2006). Social welfare and health (mental, social, physical) status of aged people in Iran. *Middle East Journal of Age and Ageing, 3*(1), 39-45.

Thakur, N., & Han, C. (2021). A review of assistive technologies for activities of daily living of elderly. *Assisted Living: Current Issues and Challenges*.

Thapaliya, M. P. (2016). A report on disability in Nepal. *Australian Himalayan Foundation: Sydney, Australia*.

Therrien, Z., & Hunsley, J. (2012). Assessment of anxiety in older adults: A systematic review of commonly used measures. *Aging & mental health, 16*(1), 1-16.

Thompson, C., Syddall, H., Rodin, I., Osmond, C., & Barker, D. J. (2001). Birth weight and the risk of depressive disorder in late life. *The British journal of psychiatry, 179*(5), 450-455.

Toepoel, V. (2013). Ageing, leisure, and social connectedness: how could leisure help reduce social isolation of older people? *Social indicators research, 113*(1), 355-372.

Tsai, H.-H., Cheng, C.-Y., Shieh, W.-Y., & Chang, Y.-C. (2020). Effects of a smartphone-based videoconferencing program for older nursing home residents on depression, loneliness, and quality of life: a quasi-experimental study. *BMC geriatrics, 20*(1), 1-11.

Tsai, H.-H., & Tsai, Y.-F. (2011). Changes in depressive symptoms, social support, and loneliness over 1 year after a minimum 3-month videoconference program for older nursing home residents. *Journal of medical Internet research, 13*(4), e93.

Tsai, H.-H., Tsai, Y.-F., Wang, H.-H., Chang, Y.-C., & Chu, H. H. (2010). Videoconference program enhances social support, loneliness, and depressive status of elderly nursing home residents. *Aging and Mental Health, 14*(8), 947-954.

Vahdaniniya, M., Goshtasbi, A., Montazeri, A., & Maftoun, F. (2006). Quality of life related to health in the Elderly: A study of population. *Payesh Journal, 4*(2), 113-120.

Van Buuren, S. (2018). *Flexible imputation of missing data*: CRC press.

van der Heide, L. A., Willems, C. G., Spreeuwenberg, M. D., Rietman, J., & de Witte, L. P. (2012). Implementation of CareTV in care for the elderly: the effects on feelings of loneliness and safety and future challenges. *Technology and Disability, 24*(4), 283-291.

van Ingen, E., Rains, S. A., & Wright, K. B. (2017). Does social network site use buffer against well-being loss when older adults face reduced functional ability? *Computers in human behavior, 70*, 168-177.

Vance, D. E., Wadley, V. G., Ball, K. K., Roenker, D. L., & Rizzo, M. (2005). The effects of physical activity and sedentary behavior on cognitive health in older adults. *Journal of aging and physical activity, 13*(3), 294-313.

Wagner, N., Hassanein, K., & Head, M. (2010). Computer use by older adults: A multi-disciplinary review. *Computers in human behavior, 26*(5), 870-882.

Wang, P., Yap, P., Koh, G., Chong, J. A., Davies, L. J., Dalakoti, M., . . . Luo, N. (2016). Quality of life and related factors of nursing home residents in Singapore. *Health and quality of life outcomes, 14*(1), 112.

Ware, J., & Gandek, B. (1998). Methods for testing data quality, scaling assumptions, and reliability: the IQOLA Project approach. *Journal of Clinical Epidemiology, 51*(11), 945-952.

Wenze, S. J., Armey, M. F., & Miller, I. W. (2014). Feasibility and acceptability of a mobile intervention to improve treatment adherence in bipolar disorder: a pilot study. *Behavior modification, 38*(4), 497-515.

White, H., McConnell, E., Clipp, E., Branch, L. G., Sloane, R., Pieper, C., & Box, T. L. (2002). A randomized controlled trial of the psychosocial impact of providing internet training and access to older adults. *Aging & mental health, 6*(3), 213-221.

WHO. (1996). *WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment: field trial version, December 1996*. Retrieved from

WHO. (2015). *Global status report on road safety 2015*: World Health Organization.

WHO. (2016). *World health statistics 2016: monitoring health for the SDGs sustainable development goals*: World Health Organization.

Wilson, I. B., & Cleary, P. D. (1995). Linking clinical variables with health-related quality of life: a conceptual model of patient outcomes. *Jama, 273*(1), 59-65.

Winstead, V., Anderson, W. A., Yost, E. A., Cotten, S. R., Warr, A., & Berkowsky, R. W. (2013). You can teach an old dog new tricks: A qualitative analysis of how residents of senior living communities may use the web to overcome spatial and social barriers. *Journal of Applied Gerontology, 32*(5), 540-560.

Wirihana, L., Welch, A., Williamson, M., Christensen, M., Bakon, S., & Craft, J. (2018). Using Colaizzi's method of data analysis to explore the experiences of nurse academics teaching on satellite campuses. *Nurse Researcher (2014+), 25*(4), 30.

Woodward, A. T., Freddolino, P. P., Blaschke-Thompson, C. M., Wishart, D. J., Bakk, L., Kobayashi, R., & Tupper, C. (2011). Technology and aging project: training outcomes and efficacy from a randomized field trial. *Ageing International, 36*(1), 46-65.

Yamamoto-Mitani, N., Aneshensel, C. S., & Levy-Storms, L. (2002). Patterns of family visiting with institutionalized elders: The case of dementia. *The journals of gerontology series B: Psychological sciences and social sciences, 57*(4), S234-S246.

Yan, Y., Xin, T., Wang, D., & Tang, D. (2014). Application of the Geriatric Anxiety Inventory-Chinese Version (GAI-CV) to older people in Beijing communities. *International Psychogeriatrics, 26*(3), 517-523.

Yu, R. P., Ellison, N. B., McCammon, R. J., & Langa, K. M. (2016). Mapping the two levels of digital divide: Internet access and social network site adoption among older adults in the USA. *Information, Communication & Society, 19*(10), 1445-1464.

Zar, A., Hoseini, S., & Sukhaki, M. (2017). The evaluation of quality of life and its association with physical activity in Shiraz elderly homes *Journal of Geriatric Nursing, 3*(3).
Zickuhr, K., & Madden, M. (2012). Older adults and internet use. *Pew Internet & American Life Project, 6*(17).

Appendix A

A.1 Human Ethic Committee approval

The second-level heading in your appendices uses the ‘App2’ style. The paragraphs use the ‘Body Text’ style.

Research Management Office

T 64 3 423 0817
PO Box 85084, Lincoln University
Lincoln 7647, Christchurch
New Zealand
www.lincoln.ac.nz

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5 December 2018

Application No: 2018- 41

Title: Effect of confidence and competency with Smartphone technology on quality of life for Iranian Elderly people

Applicant: S Hosseini

The Lincoln University Human Ethics Committee has reviewed the above noted application. Thank you for your response to the questions which were forwarded to you on the Committee's behalf.

I am satisfied on the Committee's behalf that the issues of concern have been satisfactorily addressed. I am pleased to give final approval to your project.

Please note that this approval is valid for three years from today's date at which time you will need to reapply for renewal.

Once your field work has finished can you please advise the Human Ethics Secretary, Alison Hind, and confirm that you have complied with the terms of the ethical approval.

May I, on behalf of the Committee, wish you success in your research.

Yours sincerely

Grant Tavinor
Chair, Human Ethics Committee

PLEASE NOTE: The Human Ethics Committee has an audit process in place for applications. Please see 7.3 of the Human Ethics Committee Operating Procedures (ACHE) in the Lincoln University Policies and Procedures Manual for more information.

A.2 Consent Form

Consent Form

Name of Project: *Effect of confidence and competency with Smartphone technology on quality of life for Iranian Elderly people*

I have read and understood the description of the above-named project. On this basis I agree to participate in the project, and I consent to publication of the results of the project with the understanding that anonymity will be preserved. I also understand that I have a right to end participation at any stage of the research at will and am not required to reveal the reason for withdrawal.

- ☐ I consent to having an audio recording made of my interview.
- ☐ I do not consent to having an audio recording made of my interview but agree to notes being made.

I will respect the privacy of information given to me by others participating in the interview sessions and not discuss the information they have provided, with other people outside of the interview sessions.

Name:

Signed: _____ Date:

A.3 Questionnaire

Participant ID: _____

Please complete to **ALL** of the questions. This questionnaire collects some demographic information about you and then asks a series of questions to which you are asked to state the level to which you agree or disagree with them.

Are you over 60? Yes / No

Do you currently own and use a smartphone? Yes / No

If you answered **Yes** to both questions above please continue below, if you answered No to either, then unfortunately you are ineligible for our study.

Part 1:

1. **What is the highest educational qualification you have:** _____
2. **Are you:** Male / Female
3. **Do you have children** Yes / No
4. **Marital Status:**

☐ Single ☐ Married ☐ Divorced ☐ Widowed

5. **How long you have been using a smart phone?** ..... (months)
6. **What do you use your smartphone for (check all that apply)**

☐Making phone calls ☐SMS/Text Messaging ☐ Text Chat ☐ Videos / YouTube

☐ Games ☐ E-mail ☐ Checking news ☐ Learning knowledge

☐Sharing Knowledge ☐Voice/ Video call ☐ Social media ☐ Searching the internet

7. **Confident are you using your smart phone:**

☐not confident ☐reasonably confident ☐confident ☐very confident

8. **On average, how long do you spend using your smart phone each day:**

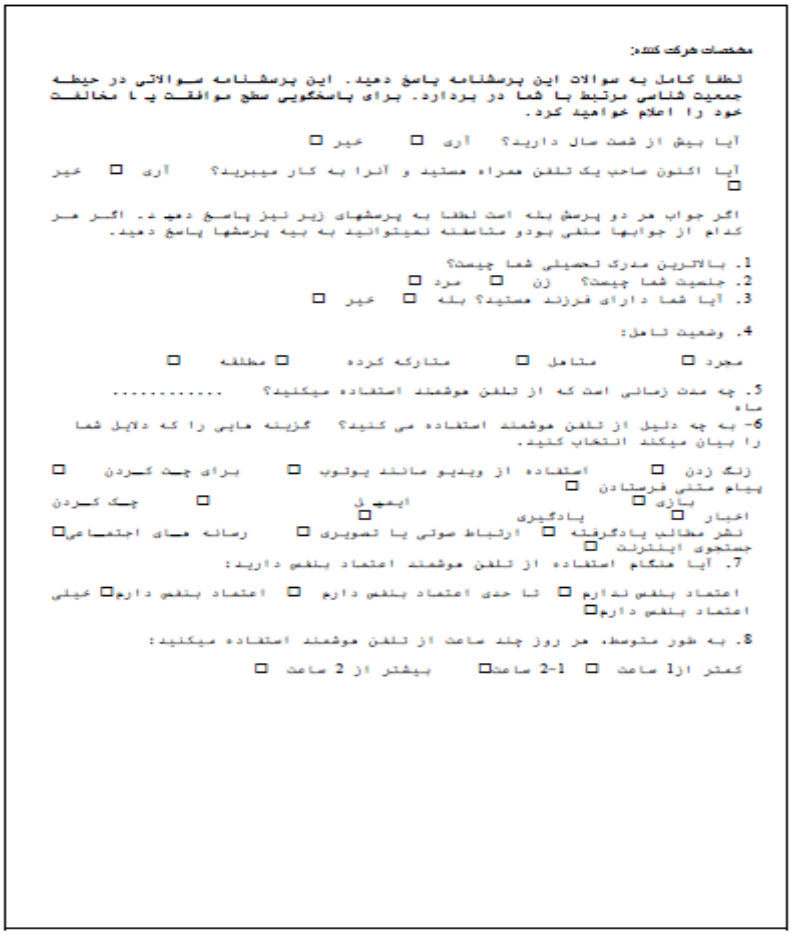
☐Less than 1 hour ☐1-2 hours ☐more than 2 hours

Part 2:

	Often	Sometimes	Not often	Never
My age prevents me from doing the things I would like to do				
I feel that what happens to me is out of my control				
I feel free to plan for the future				
I feel left out of things				
I can do the things I want to do				
Family responsibilities prevent me from doing the things I want to do				
I feel that I can please myself what I do				
My health stops me from doing the things I want to do				
Shortage of money stops me from doing things I want to do				
I look forward to each day				
I feel that my life has meaning				
I enjoy the things that I do				
I enjoy being in the company of others				
On balance, I look back on my life with a sense of happiness				
I feel full of energy these days				
I choose to do things that I have never done before				
I feel satisfied with the way my life has turned out				
I feel that life is full of opportunities				
I feel that the future looks good for me				

Appendix B

B1 Questionnaire (Farsi Language)



مشخصات شرکت کننده:

لطفا کامل به سوالات این پرسشنامه پاسخ دهید. این پرسشنامه سوالاتی در حیطه جمعیت شناسی مرتبط با شما در بردارد. برای پاسخگویی سطح موافقت یا مخالفت خود را اعلام خواهید کرد.

آیا بیش از شصت سال دارید؟ آری ☐ خیر ☐

آیا اکنون صاحب یک تلفن همراه هستید و آنرا به کار میبرید؟ آری ☐ خیر ☐

اگر جواب هر دو پرسش بله است لطفا به پرسشهای زیر نیز پاسخ دهید. اگر هر کدام از جوابها منفی بودو متاسفانه نمیتوانید به بیه پرسشها پاسخ دهید.

1. بالاترین مدرک تحصیلی شما چیست؟
2. جنسیت شما چیست؟ زن ☐ مرد ☐
3. آیا شما دارای فرزند هستید؟ بله ☐ خیر ☐
4. وضعیت تاهل:

مجرد ☐ متاهل ☐ متارکه کرده ☐ مطلقه ☐

5. چه مدت زمانی است که از تلفن هوشمند استفاده میکنید؟ ..... ماه

6- به چه دلیل از تلفن هوشمند استفاده می کنید؟ گزینه هایی را که دلایل شما را بیان میکند انتخاب کنید.

زنگ زدن ☐ استفاده از ویدیو مانند یوتوب ☐ برای چت کردن ☐ پیام متنی فرستادن ☐
بازی ☐ ایمیل ☐ چک کردن ☐
اخبار ☐ یادگیری ☐
نشر مطالب یادگرفته ☐ ارتباط صوتی یا تصویری ☐ رسانه های اجتماعی ☐
جستجوی اینترنت ☐

7. آیا هنگام استفاده از تلفن هوشمند اعتماد بنفس دارید:

اعتماد بنفس ندارم ☐ تا حدی اعتماد بنفس دارم ☐ اعتماد بنفس دارم ☐ خیلی اعتماد بنفس دارم ☐

8. به طور متوسط، هر روز چند ساعت از تلفن هوشمند استفاده میکنید:

کمتر از1 ساعت ☐ 1-2 ساعت ☐ بیشتر از 2 ساعت ☐

قسمت 2

هرگز	اغلب نه	گهگاه	اغلب	
				سنم اجازه انجام کارهایی را که دوست دارم نمیدهد.
				فکر میکنم هر چیزی که برایم اتفاق می افتد از کنترلم خارج است.
				کاملا برای برنامه ریزی احساس آزادی میکنم.
				احساس میکنم از همه چیز دور هستم.
				کارهایی را که دوست دارم میتوانم انجام دهم.
				مسئولیتهای خانوادگی جلوی انجام دادن کارهایی را که دوست دارم، می گیرد.
				فکر می کنم آنچه انجام می دهم باعث رضایتم می شود.
				وضعیت سلامتم اجازه انجام کارهای دلخواهم را نمیدهد.
				وضعیت مالی نه چندان خوب جلوی انجام کارهای دلخواهم را میگیرد.
				هر روز نگاه رو به جلو دارم.
				احساس می کنم زندگیم معنا دار است.
				از انجام کارهایم لذت میبرم.
				از بودن با دیگران لذت میبرم.
				در یک تعادل روحی، با شادی به گذشته خویش مینگرم.
				این روزها پر از انرژی هستم.
				کارهایی را برای انجام دادن انتخاب می کنم که قبلا انجام نداده ام.
				از آنچه که زندگی ام است احساس رضایت دارم.
				فکر میکنم زندگی پر از موفقیت است.
				احساس میکنم آینده خوبی را پیش رو دارم.

B2 Interview Questions

Hi,

Thank you for contributing to our study. I'd like to ask you a few questions related to how your use your smartphone and how that impacts your life.

1: Can you tell me about how you started using a smartphone and what tasks you use it for?

2: How has your use of a smartphone changed over time?

3: Focusing on the most popular social media application in Iran (Telegram, WhatsApp and Instagram), what you would think are the negative impacts/limitations of using smartphones?

4: Focusing on the most popular social media application in Iran (Telegram, WhatsApp and Instagram), what you would think are the positive impacts/advantages of using smartphones?

B3 Interview Questions (Farsi Language)

سلام

از همکاریتان در انجام این مطالعه سپاسگذاریم. مایلم چند پرسش درباره نحوه به کارگیری تلفن هوشمند و تاثیرش بر روی زندگیتان از شما بپرسم.

1. میتوانید درباره چگونگی شروع استفاده از تلفن هوشمند توضیحی به من بدهید و اینکه برای چه کارهایی از آن استفاده میکنید؟

2. استفاده شما از تلفن همراه هوشمند چه تغییراتی در طول زمان داشته است؟

3.با تمرکز بر محبوب ترین برنامه رسانه های اجتماعی در ایران (تلگرام ، واتس اپ و اینستاگرام)، به نظر شما تأثیرات /محدودیت های منفی استفاده از تلفن های هوشمند چیست؟

4. با تمرکز بر محبوب ترین برنامه رسانه های اجتماعی در ایران (تلگرام ، واتس اپ و اینستاگرام)، به نظر شما تأثیرات /مزایای مثبت استفاده از تلفن های هوشمند چیست؟

Appendix C

C1 Pilot Study (the average of all categories and total indices of the Quality of Life)

Socio-demographic characteristics of the participants (n=37)

Characteristic	Frequency	Percentage	Mean±SD
Age			66.49±3.00
Gender			
Male	21	46.8%	
Female	16	42.2%	
Educational level			
Under Diploma	16	43.2%	
Diploma	15	40.5%	
Bachelor	4	10.8%	
Master and Upper	2	5.4%	
Number of Children			
No children	0	0%	
One children	11	29.7%	
2-3 children	10	27%	
More than 3 children	16	43.2%	
Duration of Using Smartphone			
Less than 1 year	1	5.6%	
One to three years	7	48.9%	
More than 3 years	10	43.5%	
Marital Status			
Single	0	0%	
Married	27	73%	
Widow/er	6	16.2%	
Divorced	4	10.8%	

The Mean and Standard Deviation of the QOL and its domains among the participants (n=37)

Variable	Mean±SD	Max	Min
Control	7.00±2.15	11	3
Autonomy	9.54±2.32	13	4
Pleasure	5.24±3.31	13	0
Self-realization	6.11±2.09	9	0
Total	27.89±5.83	39	17

Appendix D

D1 How to Use Instagram (Farsi Language)

مختصري دربارء شبکه اجتماعی اینستاگرام

شبکه اجتماعی اینستاگرام بیش از 50 میلیون کاربر در سراسر جهان دارد و بی‌دلیل نیست که فیس‌بوک این شبکه اجتماعی را به بهای یک میلیارد دلار خریداری کرده است. از زمانی که «کوین سیستروم» و «مایک کریگر» این شبکه را در سال 2010 راه اندازی کردند تا به امروز اقبال بسیاری به خود دیده و هر روزه شمار بیشتری از کاربران به اعضای آن می‌پیوندند.

امروزه، تلفن های همراه هوشمند این امکان را به مردم میدهد که در همه جا و هر لحظه از طریق اینترنت و به آسانی به اینستاگرام دسترسی داشته باشند. از این رو این بخش از مطالعه به نحوه آموزش استفاده اینستاگرام از طریق تلفن های همراه هوشمند برای سالمندان در خانه های سالمندی شهر شیراز می پردازد.

مراحل کار کردن با اینستاگرام .

بر روی اینستاگرام که با رنگ قرمز علامت گذاری شده کلیک نمایید

سپس وارد صفحه شخصی خود در اینستاگرام میشوید. با بالا و پایین کشیدن انگشت خود بر روی صفحه تلفن همراه هوشمند میتوانید عکس ها، ویدوها و همچنین تبلیغاتی که دوستان شما در اینستاگرام به نمایش گذاشته اند را مشاهده نمایید

این قسمت از اینستاگرام که با مستطیل قرمز علامت گذاری شده است را استوری مینامند که شما میتوانید ویدئو های زنده و عکس ها را با دوستانتان به اشتراک بگذارید. همچنین شما میتوانید استوری دیگران را در این قسمت با کلیک کردن بر رویشان مشاهده نمایید

معرفی پنج گزینه‌ی اصلی برنامه

گزینه ها رو از سمت چپ به راست بررسی میکنیم

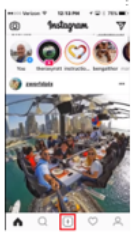
گزینه‌ی اول (خانه) : مربوط به بخش اصلی برنامه (فیدها) است. این بخش پست‌های ارسال شده توسط اشخاصی که آن‌ها را دنبال (فالو) کرده‌اید به ترتیب زمان انتشار در این بخش به نمایش گذاشته می‌شوند.

گزینه‌ی دوم (جستجو) : بخش جستجوی اینستاگرام است که شامل چند ابزارک مختلف است. با کلیک روی گزینه‌ی ذره‌بین، به صفحه‌ای منتقل می‌شوید که عکس‌ها و ویدئوهایی به صورت اتفاقی از حساب‌های اینستاگرام به شما نمایش داده می‌شوند.

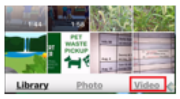
این انتخاب‌ها بر اساس علایق شما صورت می‌گیرد، به این معنا که اینستاگرام افراد دنبال (فالو) شده توسط شما را آنالیز می‌کند و بر اساس آن، صفحه ها (پیج‌ها) و پست‌هایی که ممکن است برای شما جالب باشد را نمایش می‌دهد. در کنار کادر جستجو آیکون کوچکی نیز قرار دارد که با استفاده از آن به جای عکس ها و ویدئوهای اتفاقی، شناسه (آیدی) کاربران مختلف را به صورت تصادفی مشاهده می کنید که می توانید در صورت تمایل آن ها را فالو کنید.

گزینه سوم (انتراک گذاری)

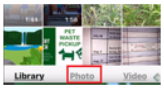
برای بار گذاری عکس یا فیلم ابتدا گذشته پایین که با مربع قرمز رنگ مشخص شده کلیک نمایید :

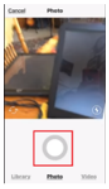


در این قسمت شما ۳ گزینه مشاهده میکنید که در سمت راست تصویر گزینه video میباشد که در صورت کلیک بر روی این قسمت شما میتوانید در همان لحظه فیلم برداری نموده و سپس در اینستاگرام بار گذاری نمایید



در قسمت وسط گزینه photo با همان عکس میباشد که شما بر روی این گزینه و سپس کلیک بر روی دایره ای که با رنگ قرمز مشخص شده میتوانید در همان لحظه عکس گرفته و سپس در اینستاگرام بار گذاری نمایید.

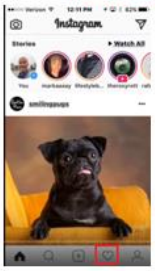




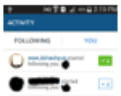
همچنین در قسمت چپ تصویر گزینه Library و یا Gallery میباشد که به شما این امکان را میدهد که ویدئو ها و عکس هایی که در تلفن همراه هوشمند خود ذخیره کرده اید را در اینستاگرام بارگذاری نمایید

GALLERY یا Library در همین بخش گزینه‌ای نیز وجود دارد که با کلیک بر روی آن، به آلبوم عکس (گالری) گوشی منتقل خواهید شد. این گزینه برای زمانی مناسب است که قصد اشتراک‌گذاری عکس یا ویدئویی از کارت حافظه را داشته باشید.

گزینه‌ي چهارم (اعلان) : بخش مديريت اعلان‌ها است.

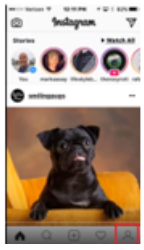


اين بخش همانطور كه در تصوير پايين نيز مشخص است شامل دو برگه جداگانه با عنوان **You** و **Following** است.



در بخش **You** اگر كسي براي شما درخواست دوستي بفرستد، عكس شما را لايک كند يا براتان كامنت(ديدگاه) بگذارد به شما اطلاع رساني خواهد شد. در تب دوم نيز مي‌توانيد اطلاعات مختصري از افرادي كه آن‌ها را فالو (دنبال)كرده‌ايد پيدا كنيد. براي مثال مي‌توانيد متوجه شويد كه دوستانتان چه عكس‌هايي را لايک(پسنديدن) يا به نام‌گذاري چه صفحه‌اي را فالو كرده است .نحوه‌ي كاركرد آن نيز به اين صورت است كه با باز كردن اينستاگرام در صورتي كه اعلان جديدي براي شما وجود داشته باشد، يک نقطه نارنجي رنگ روي اين گزينه ظاهر مي‌شود تا به شما اين موضوع را اطلاع‌رساني كند.

گزينه پنجم (پروفايل شخصي) : قسمتي كه پروفايل شخصي شما است. در اين بخش تمامي عكس‌ها و ويدئوهايي كه ارسال كرده‌ايد وجود دارند.



شما مي‌توانيد بعد از ارسال پست با كليك بر روي گزينه‌ي سه‌نقطه در زير هر عكس و انتخاب گزينه‌ي **Edit** (ويرايش) ، به ويرايش آن بپردازيد. براي حذف نيز كافي است تا در همين بخش، روي گزينه‌ي **Delete** (حذف)لمس كنيد. گزينه هاي ديگه هم به اين شكل است :

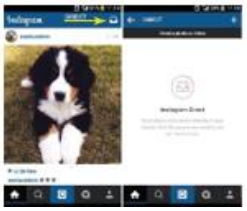
Share : اشتراك گذاري عكس با ويدئو با دوستان

Copy Share URL : كپي آدرس عكس با ويدئو براي اشتراك گذاري

Download : دانلود عكس يا ويدئو اشتراكي

Share URL : اشتراك گذاري لينك عكس يا ويدئو با دوستان

آموزش ارسال پيام خصوصي توسط **Direct** (مستقيم)



در اينستاگرام نيز مي توانيد مانند شبكه هاي اجتماعي ديگر با دوستان خود به صورت خصوصي در تماس باشيد.

براي اينكار بايد از دايركت مسيج (پيام مستقيم) استفاده كنيد تا بتوانيد به صورت متني يا ارسال عكس و ويدئو، با دوستان خود به صورت دو نفره گفتگو كنيد.

دسترسي به اينباكس(صندوق ورودي):دايركت مسيج (پيام مستقيم)به اين صورت است كه در صفحه ي اصلي برنامه و در منوي آبي رنگ بالا، بايد آيكون مربوط به دايركت مسيج(پيام مستقيم) را لمس كنيد تا وارد صندوق دريافت و ارسال شويد. براي ارسال پيام دايركت (مستقيم)به افراد نيز كافيست به پيج(صفحه)آن ها رفته و با لمس سه نقطه در بالاي صفحه، **Send Message** (ارسال پيام)را انتخاب كنيد.

پيدا شدن اكانت(حساب) شما توسط دوستان

در منوي (قسمت)تنظيمات اينستاگرام با كليك روي گزينه‌ي **Find Contacts**، اينستاگرام به بررسي شماره‌هاي موجود در تلفن شما مي‌پردازد و هر كدام از آن‌ها را كه در اين شبكه‌ي اجتماعي عضو باشد، به شما معرفي خواهد شد. البته اين امر تنها در صورتي ممكن است كه افراد در بخش اطلاعات كاربري‌شان، شماره موبايل خود را ثبت كرده باشند.

در صورتي كه مايليد حساب كاربري شما در جستجوي دستي **Contact** ها براي دوستانتان نمايش داده نشود، تنها كافي است تا شماره‌هاي از خود در اكانت(حساب) ثبت نكنيد.

لايك(پسنديدن) كردن عكس‌ها و جمع‌آوري آن‌ها

در اينستاگرام امكان لايك(پسنديدن)كردن پست‌ها وجود دارد. تنها با دوبار كليك روي هر عكس، تصوير مورد نظر به ليست عكس‌هاي لايك شده (پسنديده شده)وسط شما اضافه مي‌شود و آيكون قلب زير آن نيز قرمز مي‌شود براي آنلايك (نپسنديدن)كردن عكس‌هاي لايك شده (پسنديده شده) نيز كافي است تا روي قلب قرمز شده كليك كنيد تا دوباره به حالت عادي بازگردد.

D2 How to Use Web Browser in a Smartphone, and How to Search Information and News in a Smartphone (Farsi Language)


مقدمه

اینترنت شبکه ای از کامپیوترهای به هم متصل شده است که امکان انتقال فایل های متنی، صوتی و
تصویری بین آنها وجود دارد. این امکان، ارسال پیام های شخصی به صورت پست الکترونیک (email) و
با رجوع به پایگاههای اطلاعاتی (homepage) و دستیابی به اطلاعات موجود در آنها به صورت چند
رسانه ای را فراهم آورده است. به کمک شبکه ی اینترنت امکان برقراری ارتباط و دستیابی به اطلاعات به
صورت آنی و بی درنگ امکان پذیر شده است که این امر موجب ارتباط بیشتر جوامع بشری و رشد و
توسعه ی هر چه بیشتر علوم و فنون و فرهنگ و هنر می گردد.

از این رو است که این باور به وجود آمده است که عصر اطلاعات از راه رسیده است و بشر در یک دهکده ی
جهانی زندگی می کند.
در اینترنت گفت و گو به صورت مکتوب و یا به صورت صوتی همراه با تصویر، امکانپذیر است. در گفت و گوی
مکتوب (chat) با استفاده از نرم افزار مناسب امکان گفت و گو به صورت الکترونیک با یک فرد به طور
خصوصی یا وارد شدن به اتاق های گفت و گو و شرکت در بحث و مناظره با دیگران وجود دارد.

تار جهان گستر World Wide Web.

آن چه که به تار جهان گستر معروف شده است و به طور اختصاری وب (Web) نامیده می شود یک مجموعه ی
بسیار بزرگ از اطلاعات است که به صورت چند رسانه ای (همراه با صورت و تصویر) در کامپیوترهای موجود در
سراسر جهان به صورت پایگاههای اطلاعاتی، ذخیره شده است.
با استفاده از نرم افزارهای ویژه که به مرورگر Web معروف شده، مانند Internet Explorer می توان به این
مجموعه های اطلاعاتی دسترسی پیدا کرد.

جست و جوگرها

در وب برنامه های جست و جوگر گوناگون وجود دارد که به کمک آنها پیدا کردن مسیر دست یافتن به اطلاعات
مورد نظر یا پیدا کردن سایت های اطلاعات به سادگی امکان پذیر می شود. معروفترین جست وجوگرها عبارتند

جستجوگر گوگل است:

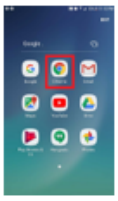
Http://www.google.com

گوگل یک جست و جوگر عمومی است، جست و جوگرهای خاص نیز وجود دارند. به کمک جست وجوگرهایی
نظیر گوگل می توان مسیر دست یابی به اطلاعات ویژه را مورد راهیابی قرار داد

امروزه تلفن های هوشمند همراه این امکان را به مردم میدهد که در همه جا و هر لحظه از طریق اینترنت و به آسانی به گوگل
دسترسی داشته باشند. از این رو این بخش از مطالعه به نحوه استفاده از جستجوگر وب و همچنین چگونگی جستجوی اطلاعات
و اخبار از طریق تلفن های هوشمند همراه می پردازد.

نحوه کار کردن با گوگل.

ابتدا وارد تلفن هوشمند همراه خود شده و آیکن گوگل که در وسط صفحه با رنگ قرمز علامت گذاری شده را کلیک نمایید.

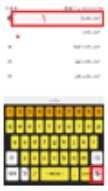


سپس شما وارد صفحه گوگل میشوید.

در وسط صفحه گوگل، در قسمتی که با رنگ قرمز هایلات شده است، به کاربران این امکان را میدهد که کلمه، عبارت و یا
سایت مورد نظرشان را در گوگل جستجو کنند.

به طور مثال، در قسمت جستجوء اخبار سلامت را تایپ نمایید، سپس گزینه Go

در پایین صفحه که با رنگ قرمز هایلایت شده را کلیک نمایید



سپس در این قسمت با کلیک کردن بر روی هر لینک آبی میتوانید مطالب مفید و مورد نظر خود را مشاهده نمایید

مثال دیگر: برای تحقیق در باره قرص استامینوفن، در قسمت جستجو استامینوفن را تایپ و سپس گزینه

Go را کلیک نمایید

سپس در این قسمت با کلیک کردن بر روی هر لینک آبی میتوانید مطالب مفید و مورد نظر خود را مشاهده نمایید

از این طریق میتوانید اطلاعات مورد نیاز خود را در باره قرص استامینوفن کسب نمایید

D3 How to Use Telegram (Farsi Language)


آموزش تلگرام

مقدمه :

تلگرام را می‌توان در حال حاضر محبوب‌ترین اپلیکیشن پیام‌رسان در ایران دانست که با امکانات فوق‌العاده‌ی خود موفق به جلب توجه چند ده میلیون کاربر ایرانی شده است. برنامه تلگرام هم روی گوشی فایل نصب است هم روی کامپیوتر و لپ تاپ که اصطلاحا به آن نسخه دسکتاپ (Desktop) می گویند.

امروزه، تلفن های همراه هوشمند این امکان را به مردم میدهد که در عده جا و هر لحظه از طریق اینترنت و به آسانی به تلگرام دسترسی داشته باشند. از این رو این بخش از مقاله به نحوه آموزش استفاده تلگرام از طریق تلفن های همراه هوشمند برای سالمندان در خانه های سالمندی شهر شیراز می پردازد.

برای شروع ابتدا وارد تلفن هوشمند همراه خود شده و آیکن تلگرام که در وسط صفحه با رنگ قرمز علامت گذاری شده را کلیک نمایید.

کار با صفحه اصلی تلگرام

صفحه اصلی تلگرام دارای چندین بخش است.در سمت چپ بالا آیکون یا تعداد سه خط را می بینید که منوی اصلی تلگرام می باشد. کنار آن نوشته Telegram هست که با کادر رنگی مشخص شده است.دقت کنید وقتی ارتباط شما با تلگرام برقرار نشد عبارت Telegram متاهده می شود اما اگر اینترنت فعال باشد با مشکل دیگری باشد عبارت Waiting For network دیده می شود.سمت راست صفحه گزینه جستجو است. شما می توانید با استفاده از این گزینه یک عبارت را در بین گفتگوها جستجو کنید. در صفحه اصلی تلگرام چت ها و کانال ها را مشاهده می کنید.

می‌خواهید یک گفتگو یا گروه یا کانال همیشه در بالا قرار داشته باشد آن را لمس کرده و چند ثانیه نگه دارید سپس Pin to top را بزنید.

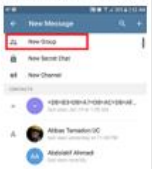
با انتخاب گزینه Clear history کلیه فایلهای دانلود شده در این گفتگو یا گروه یا کانال از گوشی شما پاکسازی می شود.

با گزینه Delete می توان به طور کامل یک گفتگو را حذف کرد.

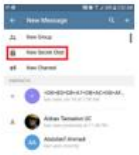
با گزینه Leave Channel می توانید از کانال خارج شوید(به اصطلاح لفت دهید)

در قسمت پایین سمت راست یک دایره توپر آبی که یک مداد وسط آن است مشاهده می کنید. با انتخاب آن چند گزینه مشاهده خواهید کرد.

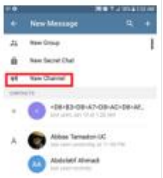
با انتخاب New Group شما می توانید یک گروه جدید ایجاد کنید و مخاطبین خود را به این گروه ها اضافه نمایید.



با انتخاب New Secret Chat شما می توانید در یک محیط رمزنگاری شده و کاملا امن به گفت و گو با دوست و مخاطب خود بپردازید. برای تایید این نوع چت ، شما باید از طریق این گزینه مخاطب را انتخاب کنید و هنگامی که او آنلاین شد ، ارتباط میان شما برقرار می شود . چت رمزنگاری شده امنیت پیام شما را بالا می برد و حریم خصوصی شما نیز در آن رعایت می شود . در این حالت می توانید با خیالی آسوده اقدام به گفت و گو و ارسال اطلاعات شخصی خود کنید امنیت این بخش از سوی شرکت تلگرام تضمین شده می باشد.

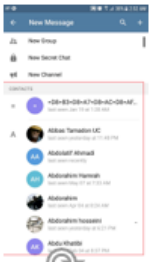


با انتخاب گزینه New Channel شما میتوانید یک کانال برای خود ایجاد کنید و نوشته ها و مطالب خود را درج کنید تا اعضای کانال آنها را مشاهده کنند.

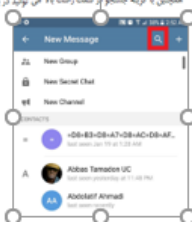


تفاوت گروه و کانال: در گروه همه اعضای گروه می‌توانند مطلب ارسال کنند و با هم به گفتگو بپردازند، اما در کانال فقط شما که مدیر کانال هستید و با چند نفر دیگر که شما آنها را مدیر کرده اید میتوانند مطلب ارسال کنند و بقیه کاربران قادر به درج مطلب در کانال نیستند و فقط می توانند مطالب را مشاهده کنند.

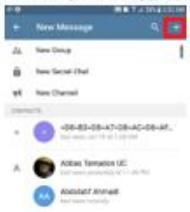
لیست Contact مخاطبان شما هستند،می توانید یکی از آنها را انتخاب کنید و به گفتگو بپردازید.



همچنین با گزینه جستجو در سمت راست بالا می توانید در بین مخاطبان خود جستجو کنید.



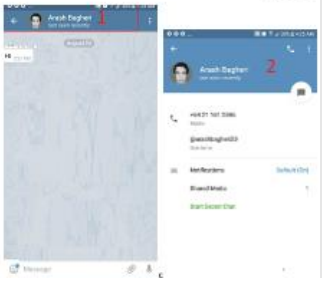
برای افزودن یک مخاطب از این قسمت علامت+ را بزنید



سپس نام و نام خانوادگی و شماره تلفن مخاطب خود را وارد کنید و تیک سمت راست بالا را بزنید تا ذخیره شود.

شروع گفتگو با یک شخص: با یکی از مخاطبین خود را انتخاب کنید مشاهده میکنید که صفحه گفتگو باز میشود. حال به جزئیات این صفحه می‌پردازیم.

اگر روی نام مخاطب کلیک کنید صفحه اطلاعات او ظاهر می شود. در این صفحه نام مخاطب، شماره تلفن و نشانه کاربری در تلگرام را مشاهده می کنید



در سمت راست بالا،سه نقطه را بزنید منویی باز می شود که دارای گزینه های زیر است.

Share با این گزینه می توانید مخاطب خود را با سایر مخاطبان خود به اشتراک بگذارید

Block با این گزینه میتوانید این مخاطب را محدود نمایید که نتواند به شما پیغامی ارسال کند

Edit با این گزینه میتوانید نام و نام خانوادگی مخاطب را ویرایش کنید.

Delete با این گزینه می توانید مخاطب را حذف کنید.

Add shortcut با این گزینه می توانید یک میانبر از این مخاطب در صفحه اصلی گوشی خود ایجاد کنید که با زدن آن میانبر مستقیم به صفحه گفتگوهای این مخاطب هدایت شوید

با زدن برگشت از این منو خارج می شویم

قسمت پایین صفحه گفتگو محل درج متن می باشد. شما می توانید در این قسمت متن متن فارسی - انگلیسی و... را وارد نمایید.

با زدن نماد شکلک در سمت چپ می توانید از شکلک های متنوع استفاده کنید.

در سمت راست کادر متن، علامت سنجاق را می بینید که با زدن آن می توانید عکس، ویدئو، فایل و غیره ارسال نمایید.

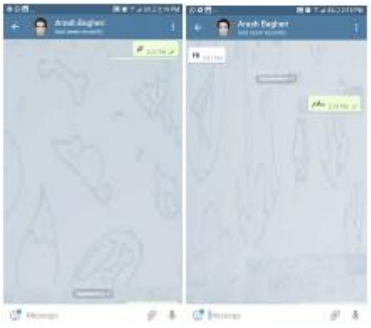
نکته: در این قسمت باید نهایت دقت را به خرج دهید! مواظب باشید عکس و فیلم های شخصی خود را به اشتباه ارسال نکنید.دست راست ؛ علامت میکروفون است که با استفاده از آن می توانید پیام صوتی برای مخاطب خود ارسال نمایید.

ویرایش عکس قبل از ارسال:

وقتی علامت سنجاق را زدید یک نیم صفحه باز میشود در بالای این منو نماد دوربین است که میتوانید عکس بگیرید و کنار آن عکسهای اخیرا گرفته شده را مشاهده می کنید.

اگر می‌خواهید عکس را ارسال کنید دایره کوچک داخل عکس را بزنید تا تیک بخورد سپس گزینهSend را بزنید تا عکس ارسال شود

حال فرض کنیم متنی را فرستادید بعد از اینکه متن ارسال شد در پایین متن یک علامت تیک ظاهر می شود که به معنای ارسال موفق می باشد، اگر مخاطب شما پیام شما را باز کند و بخواند تیک دومی هم اضافه می شود.همچنین زمان ارسال پست کنار تیک و تاریخ ارسال در قسمت مشخص شده با کادر قرمز را می بینید که البته به تاریخ میلادی است.



یکبار روی متن ارسال شده بزنید منویی ظاهر می‌شود که شامل گزینه‌های زیر است:

Reply پاسخ دادن به این پیام

Copy کپی کردن این پیام

Forward هدایت و یا فوروارد کردن این پیام به مخاطب یا گروه یا کانال دیگر

Edit ویرایش کردن پیام

Delete حذف پیام

کار با منوی تلگرام

اگر تعداد سه خط در سمت چپ بالا را بزنید منوی اصلی تلگرام باز میشود. قسمت بالای آن که رنگ پس زمینه آن آبی نیز می باشد اطلاعات خود شماست با زدن روی تعداد اثر مانند کنتاکتوس با خودتان باز می شود و شما می توانید به خودتان متن، فایل و... بفرستید. در واقع از این قسمت میتوانید به عنوان بایگانی تلگرام استفاده کنید و پیام های مورد علاقه خود را در این قسمت ذخیره نمایید.

گزینه بعدی New group می باشد که با آن میتوانید یک گروه ایجاد کنید.

با گزینه New Secret chat می توانید یک کنتاکتوی محرمانه با یکی از مخاطبین خود شروع کنید

با گزینه New channel می توانید یک کانال برای خود ایجاد کنید.

گزینه Contacts لیست مخاطبین شما را نمایش میدهد آن را انتخاب کنید با استفاده از تعداد جستجو در سمت راست بالا می توانید به جستجو در بین مخاطبان خود بپردازید و نیز با زدن گزینه + می توانید مخاطبی را به لیست مخاطبان خود اضافه نمایید.

با گزینه invite friends می توانید دوستان خود را از سایر اکانت ها مانند جیمیل اینستاگرام و غیره به تلگرام دعوت نمایید.

به منوی اصلی برمی گردیم گزینه Calls لیست تماس های صوتی از طریق تلگرام را نمایش میدهد.

گزینه بعد Invite Friends می باشد که همانگونه که گفتیم مربوط به دعوت دوستان است.

گزینه بعدی Settings است که در یک فصل مجزا آن را بررسی می‌کنیم و گزینه آخر Telegram FAQ که سوالات متداول و رایج درباره تلگرام در آن صفحه درج شده است البته به زبان انگلیسی می باشد.

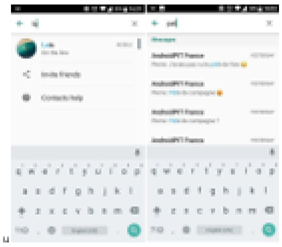
D4 How to Use WhatsApp (Farsi Language)

آموزش واتساپ از طریق تلفن‌های همراه هوشمند برای سالمندان در خانه های سالمندی شهر شیراز

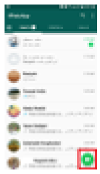
چگونه یک کاربر مشخص را در واتس اپ جستجو کنیم؟


5
New group
New contact

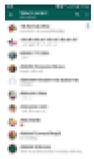

WhatsApp
Ado
Adrian
Andrew



همچنین واتس اپ این امکان را به شما می دهد که از لیست مخاطبین خود اسکرول | پیمایش کنید که نام آن شخص را پیدا کنید. زمانی که وارد واتس اپ می شوید روی گزینه پایین صفحه که با رنگ قرمز علامت گذاری شده کلیک نمایید



سپس شما میتوانید لیست تمامی مخاطبین خود که به واتس اپ دسترسی دارند مشاهده نمایید



چگونه در واتس اپ پیام های متنی و صوتی برای مخاطب مورد نظرمان ارسال کنیم؟

پس از انتخاب مخاطب مورد نظرتان، برای ارسال پیام، در قسمت پایین صفحه که با رنگ قرمز هایلایت شده است متن خود را تایپ نمایید

سپس بر روی گلابه سبز رنگ که در پایین صفحه با رنگ قرمز علامت گذاری شده کلیک می نمایید

همچنین برای ارسال پیام صوتی برای مخاطب مورد نظرتان، ابتدا انگشت خود را بر روی گلابه که در پایین صفحه با رنگ قرمز علامت گذاری شده نگاه داشته، در این حالت، اپلیکیشن [برنامه] شروع به ضبط صدا می کند و تا زمانی که دست خود را از روی آن برداریم، این کار ادامه پیدا می کند.

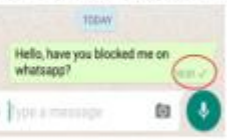
زمانی که هر که دست خود را برداریم، پیام صوتی شما ارسال خواهد شد.

همان طور که در عکس مشاهده میکنید، صداهای ارسالی توسط شما به صورت سبز رنگ و همچنین صداهای ارسالی توسط مخاطبتان سفید رنگ میباشد

برای شنیدن صدای ارسال شده توسط مخاطب شما، روی گلابه ای که با رنگ قرمز علامت گذاری شده کلیک نمایید و سپس صدا پخش میشود

بررسی دریافت تیک دوم:

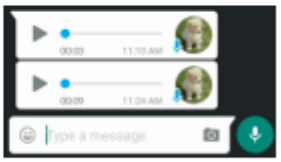
زمانی که به یک کاربر پیامی ارسال می کنید، در زیر پیام با قیافه وضعیت پیام به شما نمایش داده خواهد شد. زمانی که تیک اول خورده شود، به این معنی است که پیام از جانب شما به سمت سرور واتس اپ، ارسال شده است. تا زمانی که تیک دوم نخورده باشد، به این معنی است که پیام شما بروی دستگاه شخص موردنظر، هنوز دریافت نشده است.



همچنین، زمانی هم که تیک دوم خورده شود و در تیک به رنگ آبی درآید به این معنی است که شخص موردنظر، علاوه بر دریافت پیام، آن را مشاهده کرده است.

چگونه یک پیام صوتی به صورت مخفی گوش دهیم؟

زمانی که یک پیام صوتی از یکی از دوستان خود دریافت می کنید، به صورت پیش فرض این پیام با استفاده از اسپیکر (بلندگو) اصلی دستگاه پخش می شود. مشکلی در این بخش وجود دارد این است که ممکن است نخواهید دیگران آن پیام را بشنوند؛ برای حل این مشکل تنها کافیست که پیام صوتی موردنظر را پخش کنید و سپس گوشی را مقابل گوش خود قرار دهید. (اپلیکیشن) برنامه) به صورت خودکار پیام را از اسپیکر (بلندگو) مکالمه ی دستگاه برای شما پخش می کند و دیگران قادر به شنیدن آن نخواهند بود.



چگونه از ارسال یک پیام صوتی جلوگیری کنیم؟

احتمالاً شما هم تجربه ی این موضوع را داشته اید که به صورت تصادفی دستتان بروی دکمه ی ضبط صدا خورده باشد. در این حالت، اپلیکیشن (برنامه) شروع به ضبط صدا می کند و تا زمانی که دست خود را از روی آن برندارید این کار ادامه پیدا می کند. زمانی که هر که دست خود را برداریم، پیام صوتی شما ارسال خواهد شد. اگر پس از شروع ضبط از ارسال آن منصرف شدید، تنها کافیست که بدون برداشتن انگشت خود از روی صفحه، آن را به سمت چپ حرکت دهید تا پیام صوتی حذف شود و برای کاربر موردنظر ارسال نشود.

چگونه یک فایل در واتس اپ ارسال کنیم؟

ابتدا به چت(گپ)با شخصی که قصد ارسال فایل برای او را دارید مراجعه کنید. سپس بروی علامت گیره ی بالا ضربه بزنید

پس از آن هم گزینه ی Document یا مدارک را انتخاب کنید.

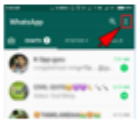
با استفاده از این بخش می توانید به فایل های موجود در حافظه ی دستگاه گوشی خود دسترسی داشته باشید و آن ها را برای مخاطبین خود ارسال کنید.

چگونه در واتس اپ تماس های صوتی و تصویری برقرار کنیم؟

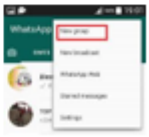
انجام این کار ساده تر از چیزی که هست، نمیدان نیست! برای این کار تنها کافیست که به چت(گپ) بیائی از درستان

چگونه یک گروه جدید ایجاد کنیم؟

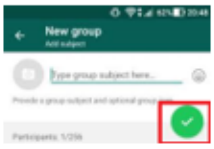
گروه ها بدون شک یکی از بهترین راه های ارتباط اشخاص با یکدیگر هستند. برای ساختن گروه جدید می توانید با ضربه زدن بروی دکمه ی منو



• گزینه ی New group یا گروه جدید را انتخاب کنید.

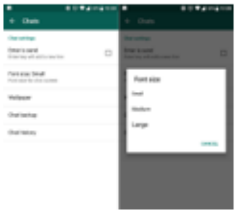


پس از آن مخاطبینی که قصد دارید در گروه شما حضور داشته باشند را انتخاب کنید. سپس هم بروی گزینه ی تایید ضربه بزنید تا گروه شما ساخته شود.



چگونه فونت نوشته های WhatsApp را تغییر دهیم؟

با مراجعه به منوی تنظیمات و بخش Chats و سپس بخش Font Size می توانید سایز فونت نمایش داده شده را تغییر دهید و آن را مناسب با نیاز خود، کوچکتر یا بزرگتر کنید.



Appendix E

E1 Descriptive statistic (Mean, SD) scores of Quality of Life and its at pre-test

	Intervention Group		Control Group	
Variable	Mean	SD	Mean	SD
C1	1.47	.73	1.50	.77
C2	1.98	.73	1.95	.69
C3	2.00	.56	1.41	.79
C4	1.79	.58	1.98	.62
Summary	7.25	1.81	6.83	1.80
A1	1.61	.64	1.82	.77
A2	1.68	.65	2.01	.62
A3	1.61	.69	1.95	.72
A4	1.63	.58	2.02	.59
A5	1.29	.59	1.55	.65
Summary	7.81	1.97	9.35	2.16
P1	1.27	.64	1.03	.66
P2	.98	.68	.97	.82
P3	1.07	.67	.90	.75
P4	1.05	.70	.90	.79
P5	1.37	.64	1.15	.68
Summary	5.73	2.85	5.00	3.20
S-R1	1.15	.55	1.18	.59
S-R2	.93	.49	1.15	.51
S-R3	1.23	.62	1.17	.64
S-R4	1.19	.57	1.15	.63
S-R5	1.19	.57	1.33	.68
Summary	5.68	2.10	5.97	2.23
QUALITY OF LIFE	26.47	4.21	27.15	5.51

E2 Descriptive statistic (Mean, SD) scores of Quality of Life and its subscales in post-test

	Intervention Group		Control Group	
Variable	Mean	SD	Mean	SD
C1	1.61	.59	1.51	.72
C2	2.02	.73	1.91	.64
C3	2.05	.59	1.47	.77
C4	1.91	.53	2.00	.61
Summary	7.62	1.61	6.90	1.70
A1	1.73	.61	1.82	.77
A2	1.78	.62	2.00	.71
A3	1.83	.65	1.95	.77
A4	1.69	.56	1.98	.68
A5	1.30	.59	1.55	.67
Summary	8.35	1.79	9.30	2.28
P1	1.42	.53	1.08	.59
P2	1.17	.59	.92	.79
P3	1.24	.57	.85	.71
P4	1.76	.65	1.08	.67
P5	1.61	.56	1.21	.64
Summary	7.25	2.19	5.16	2.79
S-R1	1.15	.48	1.05	.56
S-R2	1.44	.56	1.18	.57
S-R3	1.25	.57	1.02	.65
S-R4	1.25	.51	1.01	.62
S-R5	1.19	.57	1.07	.61
Summary	6.36	1.73	5.32	2.00
QUALITY OF LIFE	29.59	3.42	26.68	5.05

E3 Descriptive statistic (Mean, SD) scores of Quality of Life and its subscales in 3 different stages of time for the intervention and control groups in follow-up test

	Intervention Group		Control Group	
Variable	Mean	SD	Mean	SD
C1	1.54	.59	1.48	.79
C2	1.97	.69	1.91	.69
C3	1.98	.60	1.43	.72
C4	1.89	.51	1.93	.76
Summary	7.41	1.51	6.77	2.11
A1	1.74	.63	1.85	.78
A2	1.81	.60	2.00	.71
A3	1.83	.65	1.95	.72
A4	1.76	.57	1.97	.71
A5	1.30	.59	1.48	.70
Summary	8.47	1.75	9.28	2.33
P1	1.52	.54	1.10	.57
P2	1.17	.56	.87	.70
P3	1.25	.51	.85	.68
P4	1.86	.57	1.12	.71
P5	1.69	.53	1.15	.60
Summary	7.56	2.00	5.10	2.67
S-R1	1.16	.46	1.07	.61
S-R2	1.52	.57	1.18	.59
S-R3	1.32	.57	1.08	.69
S-R4	1.27	.55	.95	.68
S-R5	1.22	.56	1.07	.69
Summary	6.58	1.68	5.40	2.50
QUALITY OF LIFE	30.02	3.40	26.55	.3.40

E4 Mean difference of each question in the CASP-19 for the intervention group

Variable	Question	Pre-Test and Post-Test	Post-Test and follow up-Test	Pre-Test and Follow up-Test
		Mean Difference	Mean Difference	Mean Difference
Control	My age prevents me from doing the things I would like to do	0.14	-0.07	0.07
Control	I feel that what happens to me is out of my control	0.04	-0.05	-0.01
Control	I feel free to plan for the future	0.05	-0.07	-0.02
Control	I feel left out of things	0.12	-0.02	0.10
Autonomy	I can do the things I want to do	0.12	0.02	0.14
Autonomy	Family responsibilities prevent me from doing the things I want to do	0.10	0.03	0.13
Autonomy	I feel that I can please myself what I do	0.22	0.00	0.22
Autonomy	My health stops me from doing the things I want to do	0.07	0.07	0.14
Autonomy	Shortage of money stops me from doing things I want to do	0.02	0.00	0.02
Pleasure	I look forward to each day	0.15	0.10	0.25
Pleasure	I feel that my life has meaning	0.19	0.00	0.19
Pleasure	I enjoy the things that I do	0.17	0.08	0.19
Pleasure	I enjoy being in the company of others	0.71	0.10	0.81
Pleasure	On balance, I look back on my life with a sense of happiness	0.24	0.08	0.32
Self-Realization	I feel full of energy these days	0.00	0.02	0.02
Self-Realization	I choose to do things that I have never done before	0.51	0.08	0.59
Self-Realization	I feel satisfied with the way my life has turned out	0.02	0.07	0.09
Self-Realization	I feel that life is full of opportunities	0.06	0.02	0.08