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## Use of information and communication technologies improves healthy and unhealthy elderly people's quality of life – the key role of the training setting

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### Abstract

The link between the use of ICT and QoL has only been recently theorized because ICT is not, per se, a correct and easy tool to improve elderly people's QoL. We conducted a research consisting of two studies: the first one involved healthy and unhealthy seniors and the second one was a pilot study inspired by Action Research. We aimed to investigate whether elderly people's QoL was influenced by higher beliefs, self-efficacy and positive attitudes towards ICT. Regarding the first study, most participants did not have any digital skills or only a very low level. Their perceived QoL was quite good. Their self-efficacy beliefs were very high. Their attitudes towards ICT were on the the mid-point scale. The QoL was affected by self-efficacy. In respect to the second study, data were collected before and after tests focused on improving the seniors' digital skills. The post-training data were significantly more positive than pre-training. Self-efficacy was significantly higher after training, as was perceived QoL. The results provide evidence that seniors perceive their own lives as better than other age cohorts attribute to them. The quality of the relationship between seniors and trainers represents a main point that positively affects the QoL.

Keywords: Seniors, Information and Communication Technology, Quality of Life, Active Training, Relationship

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## 1. Introduction

For a long time, ageing has been simply considered a waiting period before death. As the number of elderly people is increasing, accepting and understanding the demographic challenges should be a priority for all governments of the world. How, with scientific research lengthening life, can old age be made more meaningful? Now more than ever, reflecting on the possibility of increasing Quality of Life (QoL) among the elderly has become very important.

QoL has been recognized as a significant issue, especially regarding old age (Lawton, 1991). It is characterized by a dynamic and multiple nature (Walker, 2005) and is related to broad physical and psychological domains, social levels as well as positive feelings, social support and financial resources (Zahava & Bowling, 2004; Bowling, 1994).

With this in mind, how is it possible to improve elderly people's QoL? More specifically, one of the possible ways employs the so-called New Technologies.

As literature has already demonstrated, the New Computer Technologies (NCTs or NTs) may play an important role in both reducing the negative effects of age and improving individual possibilities; in other words, they may represent a substantial help for elderly people experiencing loneliness and, at the same time, improve their QoL. In fact, computer use is recognized as an important tool that may help elderly people to maintain an independent lifestyle (Kahana et al., 2006). It is believed that NTs offer the elderly the opportunity both to remain independent and to continue being involved in meaningful activities, even when they suffer some physical and/or cognitive limitation.

However, the link between use of NTs and QoL has only been theorized. More specifically, the literature has stressed that the centrality of personal contact should not be overlooked, because systems that allow autonomous use may potentially isolate people and make them even more lonely, rather than positively affect their well-being (Dickinson & Gregor, 2006). In other terms, using the NTs is not, per se, a correct and easy tool to improve elderly people's QoL. Thus, although the percentage of Italian families composed only of elderly people who use the NTs has been increasing in recent years (Censis, 2013), following the international trend, there is still a need to better understand whether and how technology can serve to support vital ageing (sometimes also called "active" or "successful" ageing), as well as active citizenship among the older population.

The reasons why Italian elderly people do not use PCs and the internet are very interesting. First of all, more than half (58.8%) do not feel capable of using them; secondly, about one-third (30.5%) do not consider them useful and interesting; finally, personal physical disabilities are irrelevant in this regard, because only a very low percentage (6.4%) mention them (Censis, 2013). From a psychosocial point of view and on an applicative plane, the first reason represents an essential point. In fact, it specifically concerns the capacity to cope with one's own failures or difficulties. In this, speaking about self-efficacy (Bandura, 1994) is surely relevant. It is likely that the better a person is at managing their own negative and positive emotions (Caprara, 2000), the more he or she will try new challenges.

Moreover, it means that we should focus on the learning setting, because it is very important to involve as well as motivate older learners. For instance, distinguishing between seniors and disabled seniors is essential, because, since their needs are different, their approach to ICT devices will be different.

## 2. Research

The aim of the research was to deepen the link between QoL and use of ICT among seniors. Furthermore, we were interested to verify whether training focused on ICT could positively affect seniors' QoL.

Hence, the research consisted of two studies: in the first one, data were collected among elderly people and disabled elderly people to explore and confront their digital skills, attitudes towards the NTs and perceived QoL; the second was a pilot study, inspired by Action Research methodology, aimed

at improving seniors' perceived QoL, self-efficacy and attitudes towards NTs, with active training focused on the NTs and Facebook.

### 3. Study one

#### 3.1. Method

##### 3.1.1. Participants

Both healthy and unhealthy people were involved in the study. Twenty people with dementia were excluded. All of them lived in a big city and its environs in southern Italy.

One hundred and seven healthy seniors were approached individually while they were attending one of the senior centres. The following personal data were recorded: 37.4% were male and 62.6% female; they were aged 64-95 ( $M=73.05$  sd 7.47); 47.7% were widowers, 39.3% married, 4.7% single and 8.4% divorced. Most of them lived with other family members, while 40% lived alone.

One hundred and forty-nine unhealthy seniors (or people who claimed to be suffering from some pathology, such as diabetes, hypertension or severe osteoporosis) were approached individually while they were attending one of the senior centres or living in an old people's home. Most of them were female (62.6%), with fewer males (37.4%); they were aged 64-94 ( $M=76.09$  sd 7.12); with regard to social status, half of the participants were widowers (50.3%), 32.9% married, 10.1% single and 6.7% divorced; more or less the same percentage lived with others (42.7%) or alone (38.9%); 14.8% lived in an old people's home and 2.7% did not specify.

##### 3.1.2. Aims

We aimed to explore the following: digital skills (using PC, smartphone, tablet, software, etc.); perceived QoL; self-efficacy beliefs in managing positive and negative emotions; and attitudes towards NTs. Moreover, we were interested to verify whether self-efficacy and attitudes towards NTs affected QoL positively.

##### 3.1.3. Measures

All participants filled out a questionnaire in a face-to-face setting. Most seniors were not able to fill in the questionnaire and so the researcher read the items and wrote the answers on their behalf (Good & Hatt, 1952).

We used a semi-structured questionnaire composed as follows:

-A set of Likert scales about digital skills (level of knowledge of smartphone, PC, software).

-World Health Organization - The QoL-Bref (WHO-QoL-Bref, WHOQOL Group, 1993): this is a structured quantitative technique composed of 26 items subdivided into four areas that represent QoL in terms of physical health (e.g., "To what extent do you feel that physical pain prevents you from doing what you need to do?"), psychological health (e.g., "How satisfied are you with yourself?"), social relationships (e.g., "How satisfied are you with your personal relationships?") and environment (e.g., "How healthy is your physical environment?"). Participants responded using a five-point scale ranging from 1 (*not at all*) to 5 (*a lot*).

-Self-efficacy beliefs questionnaire (Bandura, 1994; Caprara et al., 2000), which consists of 15 items and measures the beliefs to cope with negative emotions (depression, bad feelings, discouragement)

(e.g., “I don’t feel discouraged after heavy criticism”) and positive emotions (enjoying their own and others’ happiness and positive challenges) (e.g., “I am good at enjoying myself with my friends and family”). Participants answered using a five-point scale ranging from *not at all* (1) to *a lot* (5).

-MTUAS, Media and Technology Usage and Attitudes Scale. This scale measures knowledge and attitudes towards NTs. Elderly people’s attitudes towards NTs were assessed using 12 items on the attitude subscales: six to assess positive attitudes; three for negative attitudes; and three to assess anxiety/dependence level towards being without technology, or dependence on it (Rosen et al., 2013).

### 3.2. Results and discussion

The means and standard deviations of all the considered measures are shown in Table 1. Overall, the results showed quite an encouraging frame.

Most participants did not have any digital skills or only a very low level.

With respect to QoL, the data showed positive levels of perceived QoL in all subscales. Healthy participants had a higher (*Paired Sample Test*,  $p < 0.001$ ) evaluation across all the physical and psychological dimensions. In contrast, the unhealthy seniors performed better in the psychological dimension than the others (*Paired Sample Test*,  $p < 0.001$ ), which did not differ from each other.

A high average score was registered with respect to self-efficacy among both healthy and unhealthy seniors, which indicated that the elderly felt fairly self-efficacious in coping with both positive emotions (such as joy and happiness) and, in particular, negative emotions (for instance, frustration and discouragement) (*Paired Samples Test*,  $p < 0.001$ ). The latter data are particularly important for the use of NTs. Indeed, for elderly people, approaching the NTs means having a go at learning something new; thus being, or believing themselves to be, good at overcoming potential frustration may represent an important ability to keep trying instead of giving up and feeling incapable.

In respect to the attitudes towards the NTs, as expected, the situation was rather worrying. More specifically, on the one hand neither group of participants showed any attitudes of anxiety at all ( $M = 1.70$  and  $M = 1.42$ ); but, on the other hand, both positive and negative attitudes were on the mid-point scale. In other words, they did not feel anxious about the use of NTs, but they also did not take a clear position, probably because they did not understand these types of tools. To reinforce our explanation, 20 participants did not have any idea what the NTs were about; in fact they were unable to fill in this part of the questionnaire. This would exclude the hypothesis that it was an effect linked to the so-called “reaction to an object” (Cacciola & Marradi, 1988); in this, the individual does not react to items, but to actions, situations or facts mentioned by items. In this way, individuals would refuse to fill in the questionnaire simply because of their non-acceptance of the NTs.

Table 1. Means, Standard Deviation and Cronbach’s alpha

Measures		Healthy Seniors			Unhealthy Seniors		
		<i>M</i>	<i>sd</i>	<i>alfa</i>	<i>M</i>	<i>sd</i>	<i>alfa</i>
WHO Bref	Environment	3.77	0.64	0.79	3.52	0.51	0.63
QoL	Social Relations	3.74	0.72	0.68	3.46	0.76	0.67
1-5 point scale	Physical	4.11	0.62	0.76	3.52	0.74	0.69
	Psychological	4.02	0.62	0.72	3.76	0.60	0.60
Self-Efficacy	Positive Emotions	4.34	0.69	0.95	4.47	0.69	0.94

1-5 point scale	Negative Emotions	3.80	0.89	0.95	3.67	0.85	0.95
Attitudes vs	Positive	3.15*	1.13	0.91	3.18*	1.10	0.92
NTs							

Prior to running the regression analysis, we first calculated a unique average score of self-efficacy, aggregating all the items of positive and negative emotions (healthy seniors:  $M=4.06$ ,  $sd=0.72$  and unhealthy seniors:  $M=4.05$ ,  $sd=0.67$ ); next, we conducted a regression analysis considering attitudes towards the NTs as independent variables as well as self-efficacy and the four QoL factors as dependent measures.

Looking at Table 2, it can be noted that:

-With regard to the nts, the more negative the attitude towards the nts, the higher the perceived qol in the field of social relations indeed the higher the anxiety, the lower the perceived qol in the physical domain. Any role was played by the positive attitudes

-Emotional self-efficacy influenced positively all four of the QoL factors;

-Self-efficacy affected perceived QoL, whereas attitudes towards the NTs did not affect QoL.

Table 2. Regression Analysis - Healthy Seniors

	Environment			Social Relations			Physical			Psychological		
	<i>beta</i>	<i>t</i>	<i>p</i>	<i>beta</i>	<i>t</i>	<i>p</i>	<i>beta</i>	<i>t</i>	<i>p</i>	<i>beta</i>	<i>t</i>	<i>p</i>
Pos. Att. vs NTs	-0.026	-0.231	Ns	0.211	1.63	ns	0.147	1.25	ns	0.003	0.031	Ns
Neg. Att. vs NTs	0.019	0.197	Ns	0.347	3.11	=0.003	-	-0.959	ns	0.049	0.528	Ns
Anxiety vs NTs	-0.130	-1.29	Ns	0.017	0.139	ns	-	-3.01	=0.003	-	-0.057	Ns
Self-Efficacy	0.583	6.35	<.001	0.334	3.093	=0.003	0.459	4.79	<0.001	0.641	7.13	<0.001

In regard to the unhealthy seniors, positive attitudes towards the NTs positively affected social relationship factors and anxiety affected both physical and psychological factors of QoL.

In addition, self-efficacy for the unhealthy seniors affected all the QoL factors.

Table 2a. Regression Analysis - Unhealthy Seniors

	Environment			Social Relations			Physical			Psychological		
	<i>beta</i>	<i>t</i>	<i>p</i>	<i>beta</i>	<i>t</i>	<i>p</i>	<i>beta</i>	<i>t</i>	<i>p</i>	<i>beta</i>	<i>t</i>	<i>p</i>
Pos. Att. vs NTs	0.042	0.385	ns	0.263	2.27	0.025	0.096	0.887	ns	-	-	Ns
Neg. Att. vs NTs	-	-1.84	ns	0.070	0.601	ns	0.012	0.114	ns	-	1.034	Ns
	0.200									0.110		

Anxiety vs NTs	-	-	ns	0.016	0.171	ns	0.182	2.13	<b>0.036</b>	0.192	2.276	<b>0.025</b>
Self-Efficacy	0.353	2.28	<b>&lt;0.001</b>	0.230	2.651	<b>0.009</b>	0.405	4.975	<b>&lt;0.001</b>	0.438	5.468	<b>&lt;0.001</b>

## 4. Study two

### 4.1. Method

In order to deepen elderly people's QoL due to NTs' use, we adopted a methodology inspired by Action Research (Lewin, 1931). Thus, first of all, we administrated a questionnaire in order to assess the following: knowledge and attitudes towards the NTs; perception of QoL; and self-efficacy beliefs. Secondly, we organized a training programme to improve digital skills among seniors. We focused on the NTs in general and, more specifically, on Social Networks such as Facebook. Finally, we administrated the same questionnaire at the end of the training in order to assess the changes.

#### 4.1.1. Participants

Twenty-five seniors were involved in the pilot study. They were aged 60-95 (mean 78.36); 20 were women and the others men; seven frequented a fairly large seniors' centre and 18 lived in old people's homes. Most of them suffered from poor health.

#### 4.1.2. Aims

We aimed to verify whether the increase in QoL could be solely attributed to the training focused on NTs and, more specifically, on Facebook.

#### 4.1.3. Measures

The above-mentioned measures were used. Thus, participants filled out a questionnaire with the following: knowledge of the NTs; MTUAS responses; and perceived QoL concerning the two main indexes, QoL and quality of health. In addition, self-efficacy beliefs were also assessed.

### 4.2. Laboratories

Laboratories were held twice a week, for two hours; at first, they were focused on New Technologies (computer, tablet, digital photo camera), followed by sessions focusing on Facebook. We met the participants six times. As was stressed earlier, increased attention was placed on the quality of the relationship between student and trainer. The setting was one-to-one (trainer to student) or one to two (students). Each student had a laptop or a tablet. We preferred an active methodology; thus, any participant could approach the laptop or tablet in his/her own time, without stress.

At first, the trainer and participants talked about the NTs in a general sense, in order both to establish the elderly people's level of knowledge and to improve their understanding. Secondly, the seniors needed a lot of practice because they found it difficult to get used to the touch-screen devices. Another problem was the keyboard: seniors found it difficult to tap; hence, they spent time trying to improve this. When they became accustomed to the NTs, the seniors learnt about the internet and got used to links. In the second half, training was focused on e-mail and above all Facebook, in order to help each senior to keep in touch with his/her own families, friends, interest groups, etc.

### 4.3. Results

Generally speaking, the results were interesting and gave us useful information about the adopted methodology. Focusing on the NTs, the results were pleasing, with great changes occurring between the start and end of training, but, of course, that was mostly due to a very low initial knowledge of the NTs. In other words, we worked as if in a blank situation, because the participants started with almost no technological knowledge and practical skills.

Before training, in regard to knowledge of the NTs, seven people had some knowledge and only two people had fairly good knowledge of software such as Microsoft Word or Excel, but not the internet. The others had only confused ideas in that regard, one person remembering their grandchildren's habits.

After training, results were more encouraging, because all the participants had become acquainted with a range of devices such as smartphone, tablet, PC, internet and Facebook; they learnt to tap, had an e-mail address and some of them had set a Facebook profile. Notably, although interested in the training, many people were quite reluctant to sign up on Facebook.

Table 3 shows our participants' improvement in ICT skills by the end of the training. All of the considered items were significant.

Table 3. NTs Skills: Before and After Training

	Before		After		<i>t</i>	<i>p</i>
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>		
Can you... (1-5 point scale)	1.20	0.58	2.44	0.71	-9.35	<0.001
Switch on/off the PC?	1.20	0.58	2.44	0.71	-9.35	<0.001
Switch on/off the PC?	1.20	0.58	2.44	0.71	-9.35	<0.001
Use the keyboard?	1.20	0.58	2.56	0.77	-8.39	<0.001
Save and open a document?	1.16	0.55	1.76	0.93	-3.93	0.001
Surf on internet?	1.21	0.72	2.38	1.25	-4.61	<0.001

Before training, our participants did not have show a particularly strong attitude towards the subject matter. Their positive attitude was on the mid-point scale. It is possible that they knew so little about the subject that they therefore did not have an attitude towards it.

Vice versa, after training, the situation changed; the results showed a fairly positive attitude towards the NTs and were significantly more positive ( $M=3.09$ ,  $sd$  0.926 vs  $M=3.56$ ,  $sd$  0.978,  $p=0.048$ ) than before.

With regard to perceived QoL, it became significantly higher after our course (before:  $M=3.32$ ,  $sd$  1.11 vs  $M=3.64$ ,  $sd$  0.69,  $t=-2.18$ ,  $p=0.039$ ). There was no difference in perceived quality of health.

A high average score was registered with respect to self-efficacy, which indicated that the elderly felt fairly self-efficacious in coping with negative emotions (for instance, frustration and discouragement). The latter emotion is particularly important in regard to the use of NTs.

In addition, the last average was significantly higher than average before the training ( $M=3.97$ ,  $sd$  0.16 vs  $M=3.64$ ,  $sd$  0.19,  $t=3.14$ ,  $p=0.004$ ).

## 5. Conclusions

Taken overall, the results of this research provide evidence that elderly people perceive their own lives as better than other age cohorts attribute to them. In this, the literature has not only underlined the fact that negative stereotypes towards the elderly are culturally pervasive and persistent (see: Cuddy et al., 2005; Sharps et al., 1998), but also that elderly people express a higher Quality of Life than younger ones attribute to them (Mauceri et al., 2014; with regard to stereotypes at school, see: Damigella & Licciardello, 2014).

In regard to our main aim, this project was able to make the link between attitudes towards the NTs and perceived Quality of Life.

On the one hand, our participants were not “educated” at using ICT. In other words, they did not have a clear idea of what ICT is. On the other hand, our elderly participants had a very high level of self-efficacy in managing negative emotions. This latter was really useful during the training.

We should also consider that, although the numbers of elderly people who use computers have been rapidly increasing, too often their requirements are not sufficiently kept in mind by the designers of computer systems and software (Goodman, Syme and Eisma, HCI, 2003).

A methodology particularly focused on elderly people's specific needs could involve all participants and improve their digital skills. It is likely that a close relationship between trainer and students, as well as a small-group context, represent the key factors for success (Castiglione et al., 2012).

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