Factors related to computer and internet use during the Third Age: Results from an empirical research in Greece

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D. Alexandrakis. Factors related to computer and internet use during the Third Age: Results from an empirical research in Greece. Gerontechnology 2019;18(1):47-58; https://doi.org/10.4017/gt.2019.18.1.005.00 **Introduction** Older adults' population is constantly growing worldwide. Unlike previous decades when such persons were depicted as weak and dependent on others, in recent years scientists have focused on their opportunities and capabilities. Nowadays, new technologies have improved our access to information, activities, and services and, especially for older adults, are regarded as valuable tools that help them remain healthy, active, and connected to others. However, the lack of knowledge and usage creates a division between those who can exploit ICT and those who cannot. **Purpose** This paper describes an empirical study on older citizens in order to explore their attitudes, motives, and barriers regarding computer and Internet use. Through our findings, researchers, policymakers, and educators can broaden their knowledge about the Third Age population in Greece in order to promote the benefits that derive from technology literacy and usage and improve the low rates of digital inclusion. **Method** In the current quantitative survey, stage sampling was implemented. A structured questionnaire was used in order to explore the attitudes as well as the factors that affect computer and Internet use of 155 older adults in seven different regions in Greece. **Results** According to our results, the attitudes of the majority, regarding the use of desktop or laptop computers and the Internet, are positive but only a minority of the participants use them. Additionally, a considerable number of factors, such as demographics and specific attitudes, were proven to be statistically related to the usage of these technologies.

Keywords: computer, internet, older adults, Third Age, attitudes, Greece

Introduction

During the last decades, there is a notable rise in people's longevity. Nowadays, people live longer than in the past. This came as a result of public health improvements, better nutrition, enhanced medical knowledge and technological achievements (Austad, 2009; Carr & Komp, 2011). China, for example, has one of the largest populations of older citizens worldwide. According to the National Bureau of Statistics of the People's Republic of China (2005), there were 144 million people aged 60 or older in 2005, which are 11% of the entire population. Furthermore, this percentage is estimated to reach approximately 20% in 2025 and 30% in 2050 (Pan & Jordan-Marsh, 2010). In addition, in the U.S.A., people aged 65 or older were 35 million in 2000 and 40 million in 2010, representing almost 13% of the entire population. In 2030, this percentage will grow to 20% and the number of older adults will reach 70 million people (Lam & Lee, 2007). In 2015, Greece was fourth in a sample of 25 countries, considering the population of older adults, following Japan, Germany, and Italy (He, Goodkind, & Kowal, 2016). Withal, due to the World Health Organization (2011) the population of people aged 65 or more is estimated to grow from 524 million in 2010 to almost 1.5 billion in 2050, with the developing countries on the leading edge of the increase. Eventually, the 21st century is now known as the silver century or, alternatively, the century of the older adults (Humberstone, 2010).

The significance of ICT use

The acronym 'ICT', which refers to the term 'Information and Communication Technologies' (both singular and plural), includes a set of tools, systems and software that have remarkably changed the way we communicate, interact, access and share information with each other worldwide, through our personal, social, professional and educational activities. These tools and systems include hardware (such as personal computers and tablets), software (e.g. learning games and applications), systems and networks (including the Internet). It seems that ICT acts as a catalyst for social and economic changes and a digitally literate citizenry are crucial for a society to pro-

gress and keep up with a rapidly changing world (Hilton, Hilton, Dole, & Campbell, 2014). In developed countries, mainly, ICT is being used daily by the majority of the population. The way people access and use ICT depends on cultural, social and educational issues. ICT itself is not regarded to be culturally neutral and as a result, is employed on a different degree among different cultures (McNair, 2006).

Since the early '90s, many scholars were concerned that ICT implementation might intensify existing social and economic inequalities. The reason is the fact that while economic and social processes are gradually based on digital technologies, individuals that cannot handle or access ICT may be foreclosed from essential benefits. This state of affairs is declared by the term Digital Divide (McNair, 2006) and older adults' population is exposed to it (Opalinski, 2001). In this context, ICT usage by older people is considered as an issue of significant importance.

Older adults and the Third Age

Many countries applied social policies that were focused on the needs of older adults. These facts combined with a lengthy retirement period, that most of the citizens in the western world qualify without encountering serious health limitations (James & Wink, 2007) and additionally having their freedom from the obligations of the past (Weiss & Bass, 2002) (e.g. employment, raising their children) has triggered Gerontologists' new way of thought. By the late '80s and early '90s, scholars' interest was focused gradually on the impact that a long period of a healthy retirement may have upon individuals and the society they live in (Carr & Komp, 2011). According to this perspective, old age is also regarded as a period of continued growth and development. This phase of someone's life, during which there is financial independence, good physical and psychological health, fewer responsibilities and new opportunities for leisure and self-improvement (Barnes, 2011; Rowles & Manning, 2011), is described as the Third Age (Carr & Komp, 2011).

As life stages are not stable across human history and some of them do not even exist in some cultures, a large number of social scientists do not accept the strict delimitation of the Third Age (Macionis & Plummer, 2008). Nevertheless, many scholars and authors have dealt with its chronological definition. According to Giddens and Griffiths (2006), for example, the Third Age is ranged from 50 to 74 years, during which the individual has the opportunity to lead an active and independent life without previous years' daily family and professional obligations. Respectively, Hagley (2005) places its beginning in the middle '60s and Macionis and Plummer (2008) mention a frequent estimation between 65 and 74 years. In the current research, the Third Age is chronologically delimited between 60 and 74 years of someone's age (Klimczuk, 2013).

Older adults and ICT

Current literature includes a number of studies about the advantages that older adults might have from the use of ICT (Hernández-Encuentra, Pousada, & Gómez-Zúñiga, 2009). For instance, many of them use ICT in order to access online services such as e-banking and online shopping (Vuori & Holmlund-Rytkönen, 2005), for leisure and entertainment (Lawhon, Ennis, & Lawhon, 1996; Opalinski, 2001; Weatherall, 2000), for communication through the Internet (Adler, 2002; Carpenter & Buday, 2007; Lawhon et al., 1996; Sayago & Blat, 2010; Thayer & Ray, 2006; Vroman, Arthanat, & Lysack, 2015; Vuori & Holmlund-Rytkönen, 2005; Weatherall, 2000), to avoid social isolation (OECD, 2012; Sayago & Blat, 2010) and to be updated and informed upon everyday issues (González, Ramírez, & Viadel, 2012; Magnusson et al., 2002; Russell, Campbell, & Hughes, 2008; Vroman et al., 2015; Weatherall, 2000). They can also use technology as an assistant (Ahn, Beamish, & Goss, 2008), for educational purposes (Carpenter & Buday, 2007; Lawhon et al., 1996; Opalinski, 2001), for relief from emotional pain, loss (Opalinski, 2001), and loneliness (Blažun, Saranto, & Rissanen, 2012) or as some kind of support during the particular period of life, in which physical and cognitive changes start putting into question their previous sense of independence (Caprani, Greaney, & Porter, 2006; Czaja et al., 2006; Fozard, Rietsema, Bouma, & Graafmans, 2000; Phang et al., 2006). An interesting point among older people's views is that while they consider ICT as a utility that serves their self-sufficiency and autonomy (Adler, 2002; Lawhon et al., 1996; Vuori & Holmlund-Rytkönen, 2005), they also deem it as a tool to which might be addicted quite easily (Gatto & Tak, 2008; Hernández-Encuentra, Pousada, & Gómez-Zúñiga, 2009; Mitzner et al., 2010).

Many scholars claim that attitudes towards ICT seem to be more negative as someone's age inclines (Berner, Rennemark, Jogréus, & Berglund, 2012; Wagner, Hassanein, & Head, 2010), supporting the widely known stereotype that Third Age and ICT do not get along (Newell, 2008). In some surveys is reported that ICT products are difficult to handle (Lim, 2010; Pew Research Center, 2014), which justifies at some point why older citizens often benefit less from the advantages of the digital era (Lim, 2010) compared to younger generations. Moreover, there are researchers who seem to be skeptical about the advantages for the aging population of using computers and the Internet (Dickinson & Gregor,

2006). Due to Selwyn (2004), for example, older adults deem that they do not need ICT. According to the report of Dutton, Helsper, and Gerber (2009), their explanations for not using the Internet are lack of usefulness or interest, lack of necessary skills to manipulate ICT, lack of ICT equipment or Internet connection, and expensive equipment. In the report of Barnard, Bradley, Hodgson, and Lloyd (2013) another report conducted also in the UK is mentioned, according to which the majority of the respondents answered that the Internet does not really interest them.

On the contrary, albeit some researchers have depicted that the age of the individual has a negative impact on ICT usage (Carpenter & Buday, 2007; Peacock & Künemund, 2007), others do not confirm it (Knight & Pearson, 2005; Tian & Robinson, 2008). Likewise, although, on the one hand, the person's gender (Mann, Belchior, Tomita, & Kemp, 2005; Morris, Venkatesh, & Ackerman, 2005; Selwyn, Gorard, Furlong, & Madden, 2003) and the financial cost (Barnard et al., 2013; Carpenter & Buday, 2007; Saunders, 2004) of the equipment are considered by many scholars to affect ICT usage, on the other hand, there are surveys that do not corroborate it (Hogan, 2006; Knight & Pearson, 2005; Melenhorst, Rogers, & Bouwhuis, 2006; Mitzner et al., 2010). Nowadays, ICT adoption by older adults constantly rises (Anderson & Perrin, 2017; Eurostat, 2017; OECD, 2012) and a growing number of researchers and designers acknowledge the fact that older citizens are just a different kind of users, compared to younger generations, with diverse and unique skills, constraints and expectations for technology (Harley & Fitzpatrick, 2009; Lindsay, Jackson, Schofield, & Olivier, 2012). After all, they consist of a heterogeneous group of people with a great variety of attributes, motives, experiences, cognitive and physical states (Loos, 2012).

Yet, in spite of the potential or actual advantages of new technologies and their implementation in older adults' everyday life, in many countries technology adoption still seems to be low (e.g. Eurostat, 2017), which leads to the conclusion that, perhaps, the interaction between someone's age and ICT should be confronted as something more than just a question of usability (Hernández-Encuentra et al., 2009).

ICT usage statistics

Due to a research that was made in Spain from October 2006 to May 2007, only 1.5% of the correspondents whose age was 65 or above had accessed the Internet the previous day (AIMC, 2007). In addition, in a similar study, in Spain as well, it was depicted that 74.6% of the participants had not used the Internet and 54.7% had never used computers in the past (González et al., 2012). In China, due to a national survey that was conducted in 2008, only 3.9% of the Internet users were 50 years old or older (Pan & Jordan-Marsch, 2010). Nine years later, in 2017, 5.2% of people aged 60 years or more were Internet users (Statista, 2018). On the contrary, in Slovenia during 2011, the percentage was only 2.1% among people aged 65 to 74 (Statistical Office of the Republic of Slovenia, 2011) and five years later, in 2016, that percentage had risen to 28% (Eurostat, 2017). Moreover, there are many other reports that confirm the fact that older adults are the group which is least connected to the Internet compared to other age groups (e.g. Barnard et al., 2013; Eurostat, 2017; Hernández-Encuentra et al., 2009).

According to Pew Research Center (2014), in the U.S.A., in April 2012, 53% of people aged 65 or more were using the Internet. One year later, 59% used the Internet, 77% used a cell phone and 47% had a high-speed broadband connection at home. Internet and broadband adoption rates among the older population are growing steadily, but are still lower enough than the national average.

Apart from the United States of America, in Europe, Scandinavian and Swiss older adults access the Internet at a higher rate compared to their peers in southern and eastern Europe. Regarding Finland, 43% of the Finn peers have used the Internet at least once during the last three months and 19% uses it several times during the day (Statistics Finland, 2010). In 2016, in the European Union (EU-28), the share of the elderly citizens aged 65 to 74 that were using the Internet once a week was 45%, whereas in Greece the percentage was only 14%, in Bulgaria 12% and in Romania 13% (Eurostat, 2017).

Importance of the current study

Although many theoretical discussions are made about the older adults' population in general, the field of empirical research seems to progress at a lower pace (Chatzitheochari & Arber, 2011). Moreover, as mentioned above, the findings of many studies, regarding usage and attitudes towards ICT, are often opposing to each other (*Table 1*). Many researchers point out the complexity of the relationship between older people and ICT, confirming the need for further research upon this particular period in people's lives. For instance, Wagner et al. (2010) suggest that other conceptualizations of age, apart from the chronological age, should be evaluated and utilized by the researchers as well, depending on the subject of their study. The respondents' life span concept of age (Kooij, de Lange, Jansen, & Dikkers, 2008) or the psychosocial age, which stands for the individual's perception of age and may influence someone's attitudes towards ICT (Wagner et al.,

Table 1. Factors affecting computer and Internet (ICT) usage

Factors as statements	Relative literature
ICT usage does not meet my needs	Barnard et al. (2013), Dutton, Helsper, & Gerber (2009), Morris, Goodman, & Brading (2007), Selwyn (2004) **contradicting** Adler (2002), Carpenter & Buday (2007), Lawhon et al. (1996), Opalinski (2001), Vroman et al. (2014), Vuori & Holmlund-Rytkönen (2005)
I am too old to occupy with ICT usage	Chaffin & Harlow (2005), Morris et al. (2007), Saunders (2004), Turner et al. (2007)
I am anxious or I have uncomfortable feelings when I use ICT	Turner et al. (2007), Mitzner et al. (2010), Wagner et al. (2010), Wilfong (2006)
Some components of the computer cause physical discomfort to me	Bitterman & Shalev (2004), Charness & Holley (2004), Dauz, Moore, Smith, Puno, & Schaag (2004), Gatto & Tak (2008), Mitzner et al. (2010), Saunders (2004)
I am not ready to use ICT without having someone to support me in case I need help	Dauz et al. (2004), Kim (2008), Newell (2008), Saunders (2004)
My attitudes towards ICT usage are positive	Pew Research Center (2004), Mitzner et al. (2010) **contradicting** Ellis & Kurniawan (2000), Zimmer & Chappell (1999), Wagner et al. (2010)
ICT are essential tools to everyone's life	Sayago & Blat (2010) **contradicting** Selwyn (2004)
I use ICT for entertainment	Lawhon et al. (1996), Opalinski (2001), Weatherall (2000)
ICT are effective tools for getting the news and being updated	González et al. (2012), Magnusson et al. (2002), Russell et al. (2008), Vroman et al. (2014), Weatherall (2000)
ICT are effective tools for me in order to acquire knowledge and new skills	Carpenter & Buday (2007), Lawhon et al. (1996), Opalinski (2001)
ICT are effective tools for me in order to communicate with friends and family	Adler (2002), Carpenter & Buday (2007), Lawhon et al. (1996), Opalinski (2001), Sayago & Blat (2010), Thayer & Ray (2006), Vroman et al. (2014), Vuori & Holmlund-Rytkönen (2005), Weatherall (2000)
ICT equipment is costly	Barnard et al. (2013), Carpenter & Buday (2007), Dutton et al. (2009), Saunders (2004), Mann et al. (2005) **contradicting** Melenhorst et al. (2006), Mitzner et al. (2010)
I have no time to get involved with ICT	Gatto & Tak (2008), Saunders (2004), Turner et al. (2007)
ICT are effective tools for someone in order to manage loneliness	Blažun et al. (2012), Saunders (2004), Sayago & Blat (2010)
I do not regard ICT as safe and I do not trust them	Gatto & Tak (2008), Hernández-Encuentra, Pousada, & Gómez-Zúñiga (2009)[20], Mitzner et al. (2010), Wagner et al. (2010)
I have to use ICT in order to keep up with modern life	Sayago & Blat (2010), Turner et al. (2007)
ICT help me being independent	Adler (2002), Ahn et al. (2008), Lawhon et al. (1996), Vuori & Holmlund-Rytkönen (2005)

2010), have been recommended likewise.

In Greece, despite the fact that 2,734,621 individuals are 60 years old or more, which counts for 25.4% of the whole population (Hellenic Statistical Authority, 2019), academic literature and research concerning ICT and older adults is limited. Additionally, the number of older adults in Greece that have access to the Internet at least once a week remains quite low compared to the majority of the European countries (Eurostat, 2017). Although the importance of ICT usage and training that is focused on vulnerable groups of citizens is widely accepted, the needs of older people often seem to be ignored. As the Third Age is considered to be the 'golden years' of one's adulthood (Barnes, 2011) and a creative period with potentials for personal development and leisure, the purpose of this study is to explore the attitudes of the Third Age older adults in Greece, regarding the use of computers and the Internet, as well as their motives and the barriers that could affect the acceptance and usage of these technologies. Thus, through this research, we make an attempt to broaden our knowledge about the specific characteristics, attitudes, and needs of the Third Age people in Greece in order for policymakers, gerontologists,

Table 2. Demographics of the sample

	Number	Percentage
Gender		
Male	69	44.52%
Female	82	52.90%
Age		
60-64	65	41.94%
65-69	54	34.84%
70-74	69	21.94%
Education		
Primary school	43	27.74%
Middle school	20	12.90%
High school	43	27.74%
University	43	27.74%

educators, and designers to promote more effective technology usage and digital inclusion, as well as the benefits that derive from it. In particular, the research questions are:
(1) Which are the attitudes of the Third Age older adults in Greece, regarding the use of computers and the Internet?
(2) Which are the factors that affect the use of computers and the Internet by the Third Age older adults in Greece?

Method

Participants

The sample of the current research consisted of 155 participants that were living in Greece, had retired and their age was between 60 and 74 years (*Table 2*). The inclusion criteria for participation in the survey were based on the specific attributes of the Third Age (Barnes, 2011; Carr & Komp, 2011; Klimezuk, 2013; Rowles & Manning, 2011). The sampling procedure that was applied resembles to stage sampling (Cohen, Manion, & Morrison, 2007).

Survey instrument and data collection

The research took place during April and May 2014 and the fieldwork included both rural and urban territories. The selection of the regions was random. Initially, 250 questionnaires were distributed in places where older adults use to gather, such as Older Adults' Open Care Centers, voluntary organizations and coffee houses in the county of Attica, Thessaloniki, Rethymnon, Achaia, Euboea, Karditsa, and Rodopi. Considering the characteristics of the survey objectives, the design of the research was based on the quantitative methodology (Glesne & Peshkin, 1992; King, Keohane, & Verba, 1994).

The tool implemented for data collection is the closed response questionnaire and was mainly consisted of Likert-type 4-scale questions and multiple choice (single answer mode) closed questions. Since many scholars argue that people tend to choose the answer that is closer to the neutral choice (Courage & Baxter, 2005) and the middle point of an even Likert scale reflects the neutral response, we decided to use even number of categories in the scales in order to force the respondents to lean on the choice that better suits them (Dowling & Brown, 2010; Jackson, 2014). In order for us to answer our research questions, the final version of the questionnaire included 25 items, which were based on the results of other surveys in the field (*Table 1*). Before starting the data collection, a pilot study was conducted with five older adults, that were not included in the final sample, in order to confirm the workability of the questionnaire.

Statistical analysis

Computer package SPSS ver. 22 was used for statistical analysis. In order to investigate any possible statistical valid relationship between specific factors and computer or Internet usage by older adults, Pearson's Chi-square test was implemented on the selected data. In the following sections, we use the general term 'ICT' instead of the phrase 'computers (desktop or laptop) and the Internet'.

Results

Demographics

Our sample consisted of 69 men (44.52%) and 82 women (52.90%) (*Table 2*). Three age groups were formed: 65 individuals (41.94%) were between 60 and 64 years of age, 54 (34.84%) were between 65 and 69 and 34 (21.94%) were between 70 and 74. Regarding the highest level of education received, 43 participants reported that they had finished primary school (27.74%), 20 participants (12.90%) had graduated from middle school, 43 participants (27.74%) had graduated from high school and 43 participants (27.74%) had a university degree.

General findings on technology usage

There were 69 older adults (44.52%) that could have access to a computer and 66 (42.58%) who could have access to the Internet. Regarding the frequency of computer and Internet usage, 85 individuals (54.84%) declared that they never use the computer and 91 (58.71%) that they never use the Internet. On the contrary, approximately one out of four participants (23.87%) reported using the computer and the Internet at least once a week. Furthermore, 56 older adults (36.13%) answered that computer and internet implementations do not meet their needs, which performs as a paraphrase of Perceived Usefulness (PU) in this research. Also, 42 individuals (27.09%) declared that they are too old to pay attention to the particular technologies. Almost half of the respondents (49.03%) claimed that they were feeling younger compared to their actual age, 70 participants (45.16%) as young as their age is and

Table 3. Respondents' attitudes and views about computer and Internet use

Items	Strongly disagree	Disagree	Agree	Strongly agree	Mean	Std. deviation
Computer and Internet usage does not meet my needs	18.06%	32.90%	23.23%	12.90%	2.36	.973
I am too old to occupy with computer and Internet usage	26.45%	35.48%	16.77%	10.32%	2.12	.970
I am anxious or I have uncomfortable feelings when I use the computer and the Internet	30.97%	32.90%	14.19%	7.74%	1.98	.945
Some components of the computer (e.g. mouse, monitor) cause physical discomfort to me	25.81%	36.77%	17.42%	10.32%	2.14	.961
I do not feel ready to manipulate efficiently the computer and the Internet on my own without having someone to support me in case I need help	19.35%	21.04%	31.61%	18.71%	2.54	1.043
My attitudes towards computer and Internet usage are positive	7.74%	8.39%	56.13%	21.94%	2.98	.809
Computers and the Internet are essential tools to everyone's life nowadays	2.58%	9.03%	52.90%	30.32%	3.17	.706
The computer and the Internet could be used for entertainment	30.32%	22.58%	40.00%	16.13%	2.65	.932
Computers and the Internet are effective tools for getting the news and being updated	5.16%	6.45%	54.84%	23.23%	3.07	.748
Computers and the Internet are effective tools for me in order to acquire knowledge and new skills	6.45%	14.19%	50.32%	21.94%	2.94	.817
Computers and the Internet are effective tools for me in order to communicate with friends and family	12.26%	20.65%	37.42%	23.87%	2.77	.974
Computers and Internet equipment are costly	10.32%	10.32%	32.26%	5.81%	2.36	.763
I have no time to get involved with computers and the Internet	14.84%	44.52%	21.29%	5.81%	2.21	.805
Computers and the Internet are effective tools for someone in order to manage loneliness	7.74%	26.45%	44.52%	15.48%	2.72	.837
I do not regard computers and the Internet as safe and I do not trust them	13.55%	42.58%	26.45%	8.39%	2.33	.841
I have to use computers and the Internet in order to keep up with modern life	12.90%	35.48%	36.13%	9.03%	2.44	.849
The computer and the Internet help me being independent	17.42%	36.77%	29.68%	7.10%	2.29	.866

9 participants (5.81%) older than they are.

Feelings of anxiety that often come with technology implementation do not seem to characterize the majority of the respondents since only 34 (21.93%) of them confirmed this aspect. The responses to the statement "*Some components of the computer (e.g. mouse, monitor) cause physical discomfort to me*" were mainly negative (62.58%). Additionally, most of the participants (50.32%) declared that they were not ready to manipulate efficiently the computer and the Internet on their own without having someone to support them in case they need help. In the current survey, this variable is regarded as an indicator of self-efficacy.

In most cases (78.07%), the respondents' attitudes towards ICT were positive. There were 129 individuals (83.22%) who regarded computers and the Internet as essential tools to everyone's life, 87 (56.13%), that can be used for entertainment, 121 (78.07%), who believed that computers and the Internet are effective tools for getting the news and being updated and 112 (72.26%) who regarded them as a means to acquire knowledge and new skills. Also, 95 (61.29%) older adults confirmed their use for communication with their friends and family and 93 (60%) who considered them to be effective tools in order to manage loneliness. As for the statement "*The computer and the Internet help me being independent*", the majority of the surveyed who answered the par-

Table 4. Computer usage statistical correlations

Computer usage correlated with	Value	df	p-value
Chronological age	28.377	6	.000
The subjective feeling of age compared to one's chronological age	9.785	6	n.s.
Educational level	41.958	12	.000
Gender	.842	3	n.s.
Perceived usefulness	40.473	9	.000
The mentality of being too old to occupy with these technologies	45.651	9	.000
Anxiety	31.800	9	.000
Self-efficacy	51.198	9	.000
Positive attitudes towards these technologies	28.615	9	.001
Perceived as a matter of importance in everyone's daily life	19.306	9	.023
Perceived as a tool for entertainment	42.883	9	.000
Perceived as a means to obtain knowledge and new skills	20.568	9	.015
Perceived as a way to communicate with friends and family	31.876	9	.000
High financial cost	21.662	9	.010
Available time to spend on it	33.891	9	.000
Perceived as an effective tool for someone in order to manage loneliness	13.550	9	n.s.
Perceived as a safe and trustworthy tool	21.311	9	.011
Its use contributes to one's autonomy	35.402	9	.000

ticular question (54.19%) disagreed.

Most of the respondents, 54.84% and 59.36% respectively, did not confirm either the aspect that the specific ICT equipment is costly or the statement *"I have no time to get involved with these technologies"*. There were also 87 participants (56.13%), who disagreed with the statement *"I do not regard the computer and the Internet as safe and I do not trust them"* and 75 (48.38%) who were opposed to the aspect that computer and Internet usage is requisite in order for them to keep up with modern life. Mean and standard deviation of the retrieved responses are depicted in *Table 3*.

Factors associated with technology usage

Due to the statistical analysis, frequency of desktop or laptop computer usage (Q6) and frequency of Internet usage (Q7) appear to be related to older adults' chronological age, educational level, PU, the mentality of being too old to occupy with ICT, self-efficacy, positive attitudes towards using them and whether the individual regards these technologies either as a matter of importance in everyone's daily life or as a tool for entertainment. In addition, Q6 and Q7 are related to whether the participants considered these technologies as a means to obtain knowledge and new skills or as a way to communicate with others.

Furthermore, Q6 and Q7 are statistically related to the person's available time to spend on ICT and his/her beliefs either on how costly these technologies are or on how much the computer and the Internet are considered to contribute to his/her autonomy. They are also related to the anxiety towards these technologies, as well as to safety issues (*Tables 4* and *5)*.

Chi-square test did not result in any statistical valid connection between gender and computer usage ($X^2(3)=.842$, n.s.) or gender and Internet usage ($X^2(3)=.462$, n.s.). Also, neither computer nor Internet usage is statistically connected with reducing feelings of loneliness ($X^2(9)=13.550$, n.s. and $X^2(9)=16.101$, n.s. respectively). Although the way that someone may feel compared to his/her chronological age (e.g. younger or older) was not in a statistically significant association with either frequency of computer usage ($X^2(6)=9.785$, n.s.) or frequency of Internet usage ($X^2(6)=7.578$, n.s.), it seems to be associated with positive attitudes towards ICT ($X^2(6)=16.455$, $p<.05$) and computer anxiety ($X^2(6)=17.063$, $p<.05$).

Discussion

A deep understanding of the older adults' perceptions and usage of ICT is crucial in order to maximize the potential that technology can offer for advancing quality in everyday life. In this article, we selected and employed facts from previous surveys in order to empirically examine some of the factors related to computer and Internet use by Third Age older adults in Greece. Our aim was to validate specific research results, as well as to trace their attitudes and behavior, concerning new technologies. A noteworthy finding that was not mentioned previously in this paper is that the data were collected during the financial crisis in Greece, which has caused a

Table 5. Internet usage statistical correlations

Internet usage correlated with	Value	df	p-value
Chronological age	27.311	6	.000
Subjective feeling of age compared to one's chronological age	7.578	6	n.s.
Educational level	44.027	12	.000
Gender	.462	3	n.s.
Perceived usefulness	44.409	9	.000
The mentality of being too old to occupy with these technologies	48.863	9	.000
Anxiety	37.548	9	.000
Self-efficacy	47.820	9	.000
Positive attitudes towards these technologies	28.377	9	.001
Perceived as a matter of importance in everyone's daily life	21.180	9	.012
Perceived as a tool for entertainment	46.730	9	.000
Perceived as a means to obtain knowledge and new skills	21.570	9	.010
Perceived as a way to communicate with friends and family	30.937	9	.000
High financial cost	21.711	9	.010
Available time to spend on it	31.903	9	.000
Perceived as an effective tool for someone in order to manage loneliness	16.101	9	n.s.
Perceived as a safe and trustworthy tool	20.976	9	.013
Its use contributes to one's autonomy	38.341	9	.000

deep impact on citizens' everyday life.

Based on the research results, although computer and internet usage among older adults in Greece appears to be more frequent compared to survey results in other countries, such as China (5.2%) (Statista, 2018), Bulgaria (12%) and Romania (13%) (Eurostat, 2017), it remains at low levels compared to others (Eurostat, 2017; Pew Research Center, 2014). A reason for this difference in technology diffusion among these countries could be also sought in whether or not technology and educational programmes were efficiently utilized and focused on older adults' needs. As for that, many researchers have suggested that design for aging requires the understanding of their characteristics and their involvement in the design process (Lindsay et al., 2012; Loos, 2012). Regarding the percentage of the participants who had never used the computer, our findings (54.84%) coincide remarkably with González's et al. (2012) study in Spain (54.7%).

Although many respondents declared that ICT does not meet their needs, that they feel too old to get involved with it and have feelings of anxiety, which partially fall in with other surveys (Barnard et al., 2013; Selwyn, 2004; Turner et al., 2007; Wilfong, 2006), the majority of the individuals who took part in our research disagreed. What is more, contrary to other surveys (Chappell & Zimmer,1999; Ellis & Kurniawan, 2000), participants' attitudes towards computer and Internet usage were positive (Mitzner et al., 2010; Pew Research Center, 2004). Also, they regarded computers and the Internet as essential tools for someone's everyday life (Sayago & Blat, 2010), for entertainment (Lawhon et al., 1996; Opalinski, 2001; Weatherall, 2000), for getting the news and being updated, for education, for communication (Adler, 2002; Carpenter & Buday, 2007; Lawhon et al., 1996; OECD, 2012; Opalinski, 2001; Sayago & Blat, 2010; Vroman et al., 2015; Vuori & Holmlund-Rytkönen, 2005) and as a means to confront loneliness (Blažun et al., 2012; Opalinski, 2001). Despite the fact that many participants regarded these technologies as tools that help them being independent (Adler, 2002; Lawhon et al., 1996; Vuori & Holmlund-Rytkönen, 2005), the majority did not confirm it. Moreover, some of the surveyed wrote down on the questionnaire their deep concern about how addictive ICT is (Gatto & Tak, 2008; Hernández-Encuentra et al., 2009; Mitzner et al., 2010), even though there was no such question included.

Most of the participants did not verify that new technologies, such as computers and the Internet, are costly (Mitzner et al., 2010) or that they have no time to get involved with them, even though others had a different view (Turner et al., 2007). Respectively, many older adults, not the majority though, answered that they do not trust computers and the Internet, that these technologies are not reliable or safe (Gatto & Tak, 2008; Hernández-Encuentra et al., 2009; Mitzner et al., 2010; Wagner et al., 2010) and people are obliged somehow to use them in order to keep up with modern life (Turner et al., 2007). The perceived low self-efficacy on ICT also features

the majority of them.

In general, there seems to be an inconsistency regarding the results of the first research question and the frequency of computer and Internet usage. On the one hand, not only the minority of the participants had access to computers or the Internet, but also many of them were not using these facilities at all. Additionally, some older adults stated that these technologies do not meet their needs and that they are too old for paying attention to these issues. On the other hand, their attitudes about these technologies were mainly positive and only a few of the respondents had to deal with problems such as anxiety or physical discomfort when handling these devices. If we take into account the fact that almost half of them did not feel confident enough to use these technologies without support, we suppose that the implementation of educational programmes on ICT usage could fill the aforementioned gap between their attitudes and their behavior.

Furthermore, as for the second research question, frequency of computer usage and frequency of Internet usage seem to be in a statistical relationship with older adults' attitudes, personal views and characteristics, such as chronological age (Carpenter & Buday, 2007; Peacock & Künemund, 2007), educational level (Juznic, Blazic, Mercun, Plestenjak, & Majcenovic, 2006; Tak & Hong, 2005), PU (Hernández-Encuentra et al., 2009; Pan & Jordan-Marsh, 2010), feeling too old to handle these technologies (Barnard et al., 2013; Carpenter & Buday, 2007; Chaffin & Harlow, 2005; Saunders, 2004; Turner et al., 2007), anxiety (Wilfong, 2006), self-efficacy (Cody, Dunn, Hoppin, & Wendt, 1999; Czaja et al., 2006) and attitudes towards new technologies (Chappell & Zimmer, 1999; Ellis & Kurniawan, 2000). ICT implementation for communication, entertainment or training is also connected with computer and Internet usage. The degree to which ICT is perceived by the individual to be costly (Carpenter & Buday, 2007; Mann et al., 2005; Saunders, 2004), safe and reliable (Gatto & Tak, 2008; Hernández-Encuentra et al., 2009; Mitzner et al., 2010; Wagner et al., 2010), supportive to his/her autonomy (Adler, 2002; Lawhon et al., 1996; Vuori & Holmlund-Rytkönen, 2005) and important in order for him/her to respond to modern life activities (Hernández-Encuentra et al., 2009) seems to be connected with computer and Internet use as well. As for the gender and the reduction of loneliness, no connection was found between these factors and ICT use, confirming Hogan's (2006) and Knight's and Pearson's (2005) findings as for the former and contradicting Blažun's et al. (2012) findings as for the latter. Individual's perception of age and his/her attitudes towards ICT (Wagner et al., 2010) are statistically related, despite the fact that perception of age does not seem to be in a statistical relationship with ICT usage itself. Besides, a person's attitudes and his/her behavior are not always in agreement (Johnson & Christensen, 2012; Wicker, 1969), which can be another indication of the existence of other factors which interfere with one's behavior (Zellman, 1975). Moreover, as participants' chronological age and computer anxiety are related, the analogous results in the surveys of Dyck, Gee, and Smither (1998) and Laguna and Babcock (1997) are partly confirmed.

Limitations and further research

A basic limitation of this research was the small size of the sample, due to which we cannot make safe conclusions about the Third Age population in Greece. Additionally, the data collection duration of this survey lasted two months and was focused on desktop and laptop computers, without taking into account other popular ICT devices such as smartphones or tablets.

These limitations prompt our suggestions for future work: (1) Repeat the research with a larger sample; (2) Extend its duration; (3) Explore participants' preferences among several technological devices (desktops, laptops, tablets, smartphones, smart TVs etc.); and (4) Include people from different cultures.

Furthermore, new questions are raised for future research. For example: (A) How specific cultural, social and psychological attributes influence ICT adoption? (B) Would participation in ICT training programmes increase technology use and adoption, which seems to be the case according to our findings? (C) Which other factors affect older adults' attitudes towards these programmes? (D) Could technology acceptance models be successfully extended and enriched with age-related factors?

In sum, our results depict a positive picture of Third Age older adults' perceptions in Greece regarding computer and Internet usage. The information that is provided through our findings can be utilized by gerontologists, policy makers, educational programme designers, and educators so as to better meet the needs and preferences of the older citizens. Although there has been significant research dedicated to the use of ICT by older adults globally, there is still an excessive amount of opportunities for further study in this increasingly important field. Also, we hope that the current article will draw attention to this relevant area of study in Greece and facilitate researchers worldwide with a foundation upon which future knowledge can be built as for the social, cultural, personal and psychological factors that affect the implementation and usage of new technologies.

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