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Original Article

University Open to Older People: factors associated with the use of information and communication technologies

Universidade Aberta à Terceira Idade: fatores associados ao uso das tecnologias de informação e comunicação

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ABSTRACT
Objective: to identify the factors associated with the use of information and communication technologies by older students at a University Open to Older People. **Methods:** this was an analytical, cross-sectional study with 102 participants of both sexes. This was an analytical, cross-sectional study with 102 participants of both sexes. The study collected data from older people via web to characterize the socioeconomic and technological profile through a self-completed questionnaire. **Results:** the findings of the present study revealed the existence of a significant association between the frequency in higher education and the use of notebook (p=0.021) and smart TV (p=0.031). Additionally, the analysis observed an association between the monthly family income higher than four minimum wages and the use of tablet (p=0.026), smart TV (p=0.006) and printer (p=0.002) by the sample participants. **Conclusion:** education level and socioeconomic status were some intervening factors in the use of technologies by the older individuals enrolled in a University Open to Older People. **Contributions to practice**: the study provides information on the profile of older students regarding the main factors associated with the use of information technologies. With this, activities that enable greater integration and motivation of this population can be programmed and offered.
Descriptors: Aged; Digital Inclusion; Information Technology; Quality of Life.

RESUMO
Objetivo: identificar os fatores associados ao uso das tecnologias de informação e comunicação por pessoas idosas de uma Universidade Aberta à Terceira Idade. **Métodos:** estudo analítico, transversal, que contou com 102 participantes, de ambos os sexos. Os dados para caracterização do perfil socioeconômico e tecnológico dos idosos foram coletados via web, por meio de questionário autopreenchido. **Resultados:** os achados obtidos na presente pesquisa revelaram que há associação estatisticamente significante entre a frequência no ensino superior e o uso de notebook (p=0,021) e smart TV (p=0,031). Adicionalmente, foi observada associação entre a renda mensal familiar superior a quatro salários mínimos e o uso de tablet (p=0,026), smart TV (p=0,006) e impressora (p=0,002) pelos participantes da amostra. **Conclusão:** o grau de escolaridade e o nível socioeconômico configuraram-se como alguns fatores intervenientes na utilização de tecnologias pelos idosos matriculados em uma Universidade Aberta à Terceira Idade. **Contribuições para prática**: o estudo disponibiliza informações sobre o perfil dos alunos idosos em relação aos principais fatores associados à utilização das tecnologias de informação. Com isso, poderão ser programadas e ofertadas atividades que possibilitem maior integração e motivação dessa população.
Descritores: Idoso; Inclusão Digital; Tecnologia da Informação; Qualidade de Vida.

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Introduction

The use of virtual media is growing every day, especially among people over 60 years of age or older, who represent 11.4% of the population. Especially in older individuals, probably due to the evolution in the ease and accessibility of using these technologies, this growth was more remarkable[1].

Recently, there is a recent population growth of older people and a continuous increase over the years, demonstrating that human aging has been expanding worldwide[2-3]. This advance tends to present new social perspectives and has driven the search for mechanisms that aim to improve the health conditions of older individuals[4].

Thus, in this context, the advent of modern technologies that have brought significant changes in obtaining information, communication, leisure, and reasoning becomes relevant[5-6]. However, failure to adopt these new technological means can lead to digital exclusion, which, in turn, can result in prejudice and loss of opportunities[7].

Among the groups most affected by the digital exclusion, older persons stand out due to the difficulty of accessing the most advanced technologies and the restrictions imposed by age[8]. Faced with the constant changes in the technological universe, older people need to adapt to use new technological resources with greater autonomy[5-6]. In this sense, self-management, understood as the ability to manage one's own life or to take care of oneself autonomously, is considered a meaningful indicator of health and quality of life in old age[4,9].

Now, it is possible to affirm that the aging process may be associated with difficulties in adaptation or readaptation, especially when it comes to appropriation of information and communication technologies by older people[10]. Understanding this social and demographic scenario, our hypotheses are that: (i) using technological equipment depends on having attended higher education (ii) using technological equipment depends on having higher family monthly income (above four minimum wages).

By evaluating these hypotheses, the objective is to obtain data that contribute to the formulation of public policies. In addition, researchers expect that these data will be applicable to the non-governmental sectors and ordinary citizens in conducting concrete actions to enable and increase digital inclusion. It improves the quality of life of this population, contributing to a more egalitarian society in which the older people can participate more actively in society.

In this sense, the objective was to identify the factors associated with the use of information and communication technologies by older students at a University Open to Older People.

Methods

It is cross-sectional analytical research whose sample consisted of 102 older persons of both sexes, aged 60 years or older, enrolled in the University Open to Older People (*Universidade Aberta à Terceira Idade*-UNATI) of the State University of Maringá, located in the State of Paraná, Brazil. The university is free of charge to enrolled students. The sample was calculated based on the number of students enrolled during the 2021 school year (n=138) to collect the data. Applying the rule for the sample calculation for proportions, considering correction factor for finite populations and confidence level (1-α) of 95% and sampling error of 5% (0.05), we arrived at a sample of 102 participants. After issuing the opinion of the Research Ethics Committee on the project, the researchers invited the older persons to participate in the research.

The authors developed the questionnaire of the socioeconomic profile (age, sex, marital status, education, monthly income, profession, and retirement), the questionnaire of the technological profile (degree of difficulty, perceptions of utility, interest and frequency of use, both of technological equipment previously selected according to the interests of the research and

the purposes of information and communication technologies). Researchers used Google Forms to apply the questionnaires and the Informed Consent.

The study considered as inclusion criteria older persons of both sexes, regularly enrolled participants. It excluded those who filled out the questionnaires incorrectly and those who received the questionnaires and did not answer them. Data were collected individually as per the availability of the participants from November 22 to December 15, 2021. The UNATI secretariat initially provided a list with the e-mail addresses of those enrolled to approach the research participants. Then, participants received a link to the electronic form containing the invitation, informed consent, and questionnaires for data collection.

After completing the electronic forms, the computer system generated a code and randomly assigned it to each questionnaire. It eliminates the possibility of identifying, in subsequent stages, the responses of a given participant.

The study analyzed the data collected through descriptive statistics (tables, absolute and relative frequencies) and inferential ($p<0.05$). It investigated possible associations between some socioeconomic variables and the use of technologies through the Chi-square test.

The investigation respected all ethical precepts, according to resolution 466/2012. This study was approved by the Research Ethics Committee of Cesumar University, receiving an opinion nº 5,123,449/2021 and Presentation Certificate of Ethical Appreciation nº 53155321.0.0000.5539.

Results

In the sociodemographic characterization of the sample (n=102), Table 1 demonstrates that most of the older persons were between 60 and 70 years old; were female, white, married, with complete/incomplete higher education, retired, with a family monthly income of 4 to 10 minimum wages.

Table 1 – Sociodemographic characterization of the older individuals from the University Open to Older People (n=102). Maringá, PR, Brazil, 2022

Variables	n (%)
Age group (years)	
60 to 70	58 (56.8)
71 to 80	39 (38.2)
81 to 90	5 (4.9)
Sex	
Male	18 (17.6)
Female	84 (82.4)
Marital status	
Single(a)	16 (15.7)
Married	54 (52.9)
Separated, unmarried, or divorced	16 (15.7)
Widower	15 (14.7)
Stable union	1 (1.0)
Schooling	
Elementary school/complete / incomplete	6 (5.9)
High school/full / incomplete	24 (23.5)
Higher education complete / incomplete	44 (43.2)
Post-Graduate	28 (27.4)
Retired	
Yes	92 (90.2)
No	10 (9.8)
Approximate monthly income of your family (minimum wages)	
Up to 2	15 (14.7)
2 to 4	30 (29.4)
4 to 10	41 (40.2)
10 to 20	16 (15.7)

Table 2 shows the association between older persons having attended higher education and the use of the following equipment: laptop/notebook computer ($p=0.021$), smart TV ($p=0.031$), and multimedia projector ($p=0.017$).

Table 2 – Association between the education of the older individuals at the University Open to Older People with technological equipment (n=102). Maringá, PR, Brazil, 2022

Variables	Education / Higher Education		X^2*	p
	Did not attend (n=30) n (%)	Attended (n=72) n (%)		
Desktop computer				
No	19 (63.3)	35 (48.6)	1.842	0.175
Yes	11 (36.7)	37 (51.4)		
Laptop / notebook				
No	16 (53.3)	21 (29.2)	5.350	0.021†
Yes	14 (46.7)	51 (70.8)		
Tablet				
No	22 (73.3)	53 (73.6)	0.001	0.977
Yes	8 (26.7)	19 (26.4)		
Cell phone / smartphone				
No	1 (3.3)	5 (6.9)	0.499	0.480
Yes	29 (96.7)	67 (93.1)		
Smart TV				
No	15 (50.0)	20 (27.8)	4.640	0.031†
Yes	15 (50.0)	52 (72.2)		
Printer				
No	20 (66.7)	33 (45.8)	3.682	0.055
Yes	10 (33.3)	39 (54.2)		
Multimedia projector				
No	30 (100.0)	60 (83.3)	5.667	0.017†
Yes	0 (0.0)	12 (16.7)		
Bank ATM				
No	6 (20.0)	7 (9.7)	2.011	0.156
Yes	24 (80.0)	65 (90.3)		

*Chi-square test; †Significance level, p<0.05; ATM: Automated Teller Machine

Table 3 – Association between the monthly family income of the older individuals of the University Open to Older People with the use of technological equipment (n=102). Maringá, PR, Brazil, 2022

Variables	Monthly family income (minimum wages)		X^2*	p
	Up to 4 (n=45) n (%)	> 4 (n=57) n (%)		
Desktop computer				
No	27 (60.0)	27 (47.4)	1.611	0.204
Yes	18 (40.0)	30 (52.6)		
Laptop / notebook				
No	17 (37.8)	20 (35.1)	0.079	0.779
Yes	28 (62.2)	37 (64.9)		
Tablet				
No	38 (84.4)	37 (64.9)	4.929	0.026†
Yes	7 (15.6)	20 (35.1)		
Cell phone / smartphone				
No	2 (4.4)	4 (7.0)	0.301	0.583
Yes	43 (95.6)	53 (93.0)		
Smart TV				
No	22 (48.9)	13 (22.8)	7.590	0.006†
Yes	23 (51.1)	44 (77.2)		
Printer				
No	31 (68.9)	22 (38.6)	9.245	0.002†
Yes	14 (31.1)	35 (61.4)		
Multimedia projector				
No	42 (93.3)	48 (84.2)	2.016	0.156
Yes	3 (6.7)	9 (15.8)		
Bank ATM				
No	6 (13.3)	7 (12.3)	0.025	0.874
Yes	39 (86.7)	50 (87.7)		

*Chi-square test; †Significance level, p<0.05; ATM: Automated Teller Machine

Table 3 shows that there were significant associations between family monthly income higher than four minimum wages and the use of the following equipment: tablet, smart TV, and printer.

Discussion

There is a shortage of actions that provide a supportive environment with leisure activities, socialization, interaction, and recreational options for older

individuals. Considering that extension projects and activities are essential for good academic formation, universities open to older people develop such beneficial actions not only for them but also for the academics of their respective universities[11].

UNATIs seek to promote good aging through several stimulating activities, providing favorable conditions for physical, mental, and social development. It aims to provide social interactions through interdisciplinary work involving physical educators, nurses, physiotherapists, nutritionists, psychologists, and more. The older people attending the University tend to demonstrate fewer symptoms of depression, better perception of quality of life, and good levels of physical activity and social well-being, as they strengthen a positive view of active aging[11-14].

The use of technologies among older persons is interfered by the physical and functional limitations of aging (e.g., reduced vision and mental decline), hindering memory. The process of learning and accepting technological devices is hampered by rapid changes in technology and the fact that it was presented to them when they were in middle age[15].

Therefore, older persons most often learn through their family members, who assist them to use technologies; however, those older individuals who do not have a strong family or social bond become even more isolated from technological devices[16-17]. Another condition that significantly influences the use of this technologies is their low economic condition that makes it difficult to acquire such devices, especially after the COVID-19 pandemic, which provided an increase in the search for electronic products[16,18].

Among the participants in the present study, there was a predominance of older persons ranging in age from 60 to 70 years, female and mostly married. Research has shown greater adherence of women in activities aimed at active aging, which contributes to having a longer life expectancy than men in health and well-being during old age[11,13]. Another aspect is the social support, such as the support of a spouse, which can have a positive effect on the health and well-beingbeing of an older person[12,18].

The main findings of this study showed an association between the factors "older people attend higher education" and "have a family monthly income greater than four minimum wages" with a greater use of information and communication technology equipment. In this sense, the digital inclusion of older individuals becomes increasingly relevant, contributing to their insertion and performance the society. However, there is a shortage of strategies and methods aimed at this end[19], especially considering the importance of sociodemographic variables since they tend to influence the emotional aspects in older people of the UNATI[12].

These are significant findings, given that information and communication technologies tend to provide greater rapprochement among older persons, breaking with some barriers, especially during the current pandemic. The relevance of such universities in this process is also highlighted, as they aim to reduce the limitations found during aging and improve the quality of life through activities that seek to raise the capabilities of the older people, their sociocultural environment and, currently, also work with these technologies[20].

The COVID-19 pandemic has significantly increased the use of technologies by older adults worldwide, seeking to maintain social contact through remote activities, especially for leisure, entertainment, and communication purposes[21]. This fact tends to improve the perceptions of confidence and the ability of older people in the use of technological means, in addition to increasing their quality of life and reducing loneliness[22].

There is a relationship between higher education, higher income, and access to technologies, which applies to older people worldwide and was observed in the study participants enrolled in the university. Contrary to this trend, the results of this research differ from those found in other studies since not all instruments presented this relationship; this may be a result of the scenario and the possible adaptation of older people to these technologies over time[23-25].

Educational level and family income are determining factors for the access and use of information and communication technologies by older people. In addition, such access is more common among older individuals who live in urban areas and have greater mobility[26]. Older individuals must have access to specific educational programs aimed at developing more advanced skills in technology, such as the use of messaging applications and social networks, so that they can benefit from information and communication technologies[27].

In addition, factors such as perceived usefulness and ease of use, self-efficacy, and motivation are relevant determinants of the use of technologies by older people. Although there is a relationship between higher education and higher income with greater access to technologies, it is necessary to create specific strategies and methods to include older individuals in this process[28-29].

The process of adaptation of older people to technologies can be hindered by physical and functional limitations as well as by economic issues. The importance of family and social support is highlighted so that older individuals can access and learn to use modern technologies efficiently and safely, in addition to the need to develop technological devices with greater accessibility, ease, and practicality of use for this public[30].

Therefore, it is known of difficulty of older people in the digital age, being members of the disadvantaged group of digitally illiterate people. This article corroborates the information in the literature on the relationships between "income/use of technologies" and "education level/use of technologies" but demonstrates that this is not valid for all types of equipment, finally confirming the hypotheses (i) and (ii) initially raised.

Study limitations

The present study was limited to performing cross-sections in the investigated sample, collecting data at a specific time. Older individuals who consented to participate in the study were part of a specific group enrolled in the University Open to Older People.

Contributions to practice

This study seeks to minimize a gap in the literature on the subject by demonstrating the factors associated with the use of current technologies in the older people's lives. In addition, the study provides a theoretical and practical depth on the current lifestyles of the older individuals regarding the use and access to technologies, seeking to contribute to professionals who work or intend to work with this population.

Conclusion

Most individuals attending the University Open to Older People and who are participants in this study are between 60 and 70 years and are retired. Complete or incomplete higher education had a statistically significant association with the use of laptop/notebook computer, smart TV, and multimedia projector. Monthly household income showed a significant association with tablets, smart TV, and printer for those earning more than four minimum wages.

The study shows that the higher the level of education, the easier it becomes for older people to use the latest technologies, combined with the fact that the monthly income provides the acquisition of these technologies. Therefore, that digital inclusion must be achieved by older people of all levels of education and monthly income, allowing them more knowledge and autonomy in daily activities.

Authors' contribution

Conception and design or analysis and interpretation of the data; writing of the manuscript or relevant critical review of the intellectual content; agreement to be responsible for all aspects of the manuscript related to the accuracy or completeness of any of its parts

so that problems are thoroughly investigated and resolved: Scarponi AP, Santos NQ, Batista DM.

Writing of the manuscript or relevant critical review of the intellectual content; agreement to be responsible for all aspects of the manuscript: Aranha MRM, AIZAVA PVS.

Conception and design or analysis and interpretation of the data; final approval of the version to be published; agreement to be responsible for all aspects of the manuscript: Bertolini SMMG.

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