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DIGITAL LITERACY PROGRAM FOR COGNITIVE STIMULATION IN OLDER ADULTS IN THE LIMA REGION AND THE ICA REGION

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ABSTRACT

In the contemporary era, characterized by a progressive digitization of society, it becomes imperative to ensure that individuals of all age groups possess the requisite access and competencies to employ technological tools effectively. However, the digital divide, which predominantly affects older adults, impedes their full participation in the information society. The objective of this research was to promote digital literacy to improve cognitive stimulation in older adults in the Ica region and the Lima region. The sample comprised 81 elderly subjects from both regions. The evaluation instrument employed was a questionnaire consisting of 14 items, which were evaluated through the construct divided into two factors or dimensions: activity to communicate (1-7) and activity to remember (8-14). The design was of an experimental nature, employing a quantitative approach. The findings indicated that the digital literacy program had a substantial impact on the cognitive stimulation of older adults (p value <0.001), thereby substantiating the relationship between the dimensions that were examined. In summary, the implementation of a digital literacy program has been demonstrated to enhance cognitive stimulation in older adults. The experiment revealed that a significant number of elderly individuals use smartphones solely for making or receiving calls, remaining unaware of the extensive range of potential applications that exist. These applications, if employed, have the capacity to enhance the cognitive function of the elderly, thereby improving their quality of life.

KEYWORDS: Cognitive stimulation, older adults, digital literacy, concentration, orientation.

1. INTRODUCTION

Preserving cognitive abilities in older adults is a global challenge. As individuals advance in age, particularly after the age of 40, they often experience challenges in concentration, memory, and information retention (1). Aging has been demonstrated to be a limitation for a considerable number of individuals who believe that, as time progresses and their lifespan increases, they will be able to encounter challenges related to the acquisition of new knowledge. This perception often gives rise to a series of doubts and apprehensions regarding their ability to learn and adapt to the contemporary technological era, in which the management and proficiency in the use of technology is imperative for survival and the enhancement of quality of life .

Conversely, the population of older adults is expanding. This indicates that as time progresses, the population of long-lived individuals will undergo sustained growth. According to the World Health Organization (WHO), the average life span of the elderly has increased to 72 years (2).

In Latin America, the loss of cognitive and mental abilities is predominantly associated with diseases such as Alzheimer's, which frequently results in deleterious consequences and the death of a significant proportion of adults over 65 years of age, constituting 26.4% of the total. This phenomenon is projected to have a substantial impact by the year 2050, with the number of individuals experiencing cognitive decline in Latin America reaching 52.8% (3). It is imperative to acknowledge that cognitive ability pertains to the comprehensive operation of various cognitive functions, including perception, attention, orientation, memory, language, and calculation. In addition to this, cognitive ability encompasses the spectrum of cognitive disorders associated with alterations in mental faculties, depressive states, mild cognitive impairment, and dementia (4).

According to a study released by the National Institute of Statistics and Informatics (INEI) in Peru, the elderly population is projected to comprise approximately 25% of the total population by the year 2030. By the year 2050, this figure is expected to rise to four times its initial value (5). As individuals age, it is to be expected that they will experience a decline in certain cognitive abilities. This decline can manifest in a variety of ways, including difficulties in performing daily tasks, following instructions, or making decisions (6). Therefore, it is imperative to methodically prepare the long-lived population to confront the unknown, such as technological advancements, which have the potential to enhance cognitive function, a capacity that tends to decline particularly in advanced age.

It is noteworthy that contemporary society has become increasingly digitalized. Consequently, it is imperative to ensure that individuals of all ages have access to and the capacity to utilize technological tools effectively. However, the digital divide that affects older adults hinders their participation in the information society (7). In turn, evidence has demonstrated that social networks have a beneficial impact on maintaining the activity of older adults within their respective communities. This is due to the fact that social networks enable older adults to engage in interaction with members of their family, friends, and interest groups (8).

This research was carried out in the Ica region and the Lima region. The sample comprised 81 older adults. Individuals with this condition are susceptible to challenges related to memory, language, orientation in time, and space. The objective of technological advancement is to enhance the quality of life for older adults, with the underlying hypothesis being that it can mitigate or delay cognitive deterioration associated with aging.

The central inquiry to be examined is whether a digital literacy program exerts a positive influence on the enhancement of cognitive stimulation in older adults residing in the Ica and Lima regions. The following are the specific problems: The present study seeks to ascertain the influence of a digital literacy program on the communication activity of older adults in the Ica and Lima regions. Additionally, it will examine whether the program exerts an effect on the improvement of memory in this demographic.

Similarly, the present study's theoretical underpinnings are substantiated by extant research, particularly that of Suárez (9) and Cerda (10), who have provided foundational contributions to the field. Their diverse approaches and ideals have served as a basis for the development of this project. The practical justification for this approach is rooted in the understanding that digital literacy can play a pivotal role in addressing the cognitive decline experienced by adults. The application of technology in this context has been shown to generate a range of benefits, including the stimulation of memory and the enhancement of mental agility. The implementation of a digital literacy program is poised to offer significant social

benefits, particularly in terms of enhancing cognitive function in older adults. This initiative is expected to not only improve the quality of life for these individuals but also foster their inclusion in contemporary society.

The overarching objective of this initiative is to promote digital literacy, thereby enhancing cognitive stimulation among older adults residing in the Ica and Lima regions. The specific objectives are as follows: The implementation of digital literacy programs has been demonstrated to enhance communication skills in older adults residing in the Ica and Lima regions. The efficacy of these programs in enhancing cognitive function, particularly in memory, has also been documented.

The general hypothesis posits that the implementation of a digital literacy program exerts a substantial influence on the cognitive stimulation of older adults in the Lima and Ica region. The specific hypotheses are as follows: The implementation of the digital literacy program has been demonstrated to significantly improve communication activity in older adults in the Lima and Ica regions. The implementation of the digital literacy program has been demonstrated to have a substantial positive impact on the cognitive abilities of older adults in the Lima and Ica region.

2. DEVELOPMENT

2.1. Digital literacy

Digital literacy is defined as the ability to perform daily tasks with the assistance of technology or digital media. This necessitates active engagement, comprehensive understanding, and practical application of technological knowledge with the objective of enhancing daily life, increasing productivity, and enhancing efficiency (6).

It is imperative to underscore the way in which Wikipedia conceptualizes this notion, as it delineates that "it is the ability to locate, organize, understand, evaluate, and analyze information using digital technology." This underscores the need for both the application of technology and its comprehension.

According to EDIX (2022), digital literacy refers to the acquisition of the skills necessary to competently utilize new technologies and contemporary forms of communication. It is imperative that all individuals have equal access to the digital world and the tools necessary to navigate it. In an environment where the Internet of Things (IoT) is prevalent, those who lack digital literacy may face significant challenges in keeping pace with those who are digitally proficient (11).

Therefore, it is imperative to prioritize the digital literacy of individuals, as the utilization of technology is not a mere aspiration; rather, it is a tangible reality that evolves at an accelerated pace. In the wake of acquiring a new skill or knowledge, the emergence of artificial intelligence, the metaverse, and other related technologies occurs in a relatively brief period. The definition of "illiterate" has evolved over time. In the past, the term referred to individuals who were unable to read or write. However, in the contemporary era, the definition has expanded to encompass individuals who lack proficiency in the use of computers or mobile devices. The progress in the field is noteworthy, particularly in the realm of terminology. The advent of digital media has given rise to novel writing techniques that serve to streamline and condense terminology, thereby necessitating the acquisition of these new skills.

There are three levels of digital literacy: Learning to use, deals with the basic skills necessary to know how to use technological devices. It is the basic part to be able to implement digital literacy, such as how Facebook windows or buttons work or how to converse through Whatsapp from the smartphone. At this level, the comprehension of use encompasses the comprehension of technology's role in enhancing productivity and efficiency in routine activities undertaken in professional settings. These include the scheduling of Facebook posts and the publication of brief status updates on one's profile. The development of digital content has also been identified as a contributing factor in this step. Advancements in digital literacy are occurring as technology becomes an increasingly prevalent means of communication. In this setting, individuals acquire the knowledge and skills necessary to employ digital media effectively and to create their own content for dissemination to others. For instance, the practice of disseminating TikTok statuses or the creation of original content on disparate social networks is a clear manifestation of this phenomenon.

Digital literacy should not be an exclusionary phenomenon for older adults. In the contemporary era, technology permeates all aspects of society, and it is evident that individuals of all ages, including children, adolescents, and adults, encounter challenges when attempting to navigate these devices. The advent of the novel Coronavirus disease (Covid-19) precipitated an imperative for the elderly population to acquire proficiency in the utilization of electronic devices. This was driven by the necessity to engage in video calls with their

relatives, as in-person visits were curtailed, particularly among this susceptible demographic.

Despite the prevalence of denial regarding the use of digital devices, particularly among the elderly, who often exhibit a reluctance to adopt new technologies, it is important to emphasize the efficacy of patience and consistent repetition in facilitating digital literacy. These strategies can serve as effective tools to enhance the inclusion of the elderly in the rapidly evolving digital landscape. According to data from the INE, in 2019, only 23.4% of individuals over the age of 74 had utilized the internet in the previous three months. Of those, 11.9% used the internet daily. This underscores the necessity for initiatives that prioritize digital literacy education for the aging population, with a focus on both instruction and the pursuit of knowledge (12).

It is imperative to acknowledge that investing in digital literacy is a strategic investment in the future. Ensuring equitable access to the internet and cultivating the capacity to utilize its resources are paramount. A substantial body of research has demonstrated that the implementation of digital strategies has been shown to enhance motor, visual, and cognitive abilities, as well as emotional well-being. Moreover, the utilization of technological devices has been observed to mitigate feelings of restlessness, isolation, and incapacity in older adults (13).

Concurrently, the implementation of such a measure would serve to mitigate numerous existing disparities, including: The concept of infrastructure encompasses a wide range of applications, including the Internet of Things (IoT) and the development of smart cities. The implementation of digital literacy prepares us for a 100% digitized world, with the same opportunities for everyone and the ease of employing these resources in our future smart home. Ensuring the dissemination of quality digital education is paramount, as it is instrumental in providing this type of digitized education to individuals with limited resources, ranging from children to the elderly. The following objectives have been identified:

1. Ensure universal access to technology.
2. Reduce the digital divide through the provision of complimentary internet access.
3. Enhance the speed of Wi-Fi networks.

It is imperative to prioritize the utilization of qualified personnel, that is, professionals who have undergone extensive training in the digital domain and possess a firm grasp on pedagogical methodologies. These individuals must be adept in facilitating the instruction of digital media in a patient and creative manner.

Non-literacy can engender a novel form of social disparity, manifesting in various domains. From an economic perspective, it is not feasible to compete financially with developing countries, much less with developed countries. In the context of education, there is a latent risk of a decrease in the quality of education. Moreover, within the population, there is a prevalent sentiment of exasperation due to the inability to utilize technological resources that could facilitate the simplification of daily tasks.

2.2. Cognitive stimulation

Cognitive stimulation is a series of activities designed to preserve or enhance cognitive function in general. These activities encompass exercises in memory, perception, attention, concentration, language, and executive functions, including problem-solving, planning, reasoning, and self-control.

Cognitive stimulation is a multifaceted intervention aimed at enhancing or preserving individuals' cognitive abilities. It is a strategy employed to mitigate the age-related decline in cognitive function. These alterations can be attributed to (14):

1. The passing of the years
2. Dementia
3. Cognitive decline
4. Neurodegenerative diseases
5. Alzheimer's, vascular, or Lewy bodies

This type of cognitive stimulation is also used as a tool for preventing cognitive decline, and as cognitive rehabilitation in diseases that occur with cognitive impairment (15). Cognitive stimulation is the set of actions taken to maintain or improve cognitive functioning through certain stimuli or exercises. It is an excellent alternative that will help improve the speed and flexibility of memory (16).

Cognitive stimulation serves so that when people who do not suffer from cognitive impairment associated with a disease, the brain is trained and managed to be stimulated, which allows optimal functioning of cognitive abilities. To a certain extent, it is about delaying cognitive decline, helping to improve quality of life through recovering self-esteem, self-efficacy and personal autonomy, as well as learning new skills. But when there is already cognitive impairment, it is done for cognitive rehabilitation. With the sole purpose of delaying cognitive decline.

It should be noted that cognitive stimulation is included within the non-cognitive therapies for multiple mental pathologies that occur with cognitive impairment. Among the benefits of cognitive stimulation are:

1. **Delay the onset of mental pathologies** such as dementia and Alzheimer's. Avoiding its evolution and effects.
2. **Brain plasticity** prevents the rigidity of the human brain.
3. **Personal autonomy** to perform routine tasks
4. **Social interaction** boosts self-esteem
5. **Increased brain functions** acting in specific areas of the brain thanks to psychostimulation.
6. **Decreased anxiety and stress**
7. **Prevents memory loss.**
8. **Improves the quality of life of the elderly**

It is imperative to exercise caution when implementing cognitive stimulation techniques to ensure their efficacy. These techniques are designed to assist individuals in overcoming challenges, such as memory impairment, difficulty recalling personal information, or solving mathematical problems. Cognitive impairment is defined as a decline in cognitive functions, including but not limited to judgment, memory, thinking, learning, and memory. It has been established that, over time, this phenomenon may be regarded as a standard process or as a precursor to the onset of dementia.

It is imperative to acknowledge that elderly individuals afflicted with this cognitive impairment frequently experience a loss of orientation in time and space, exhibit impaired rapid decision-making capabilities, and often encounter difficulties in making informed choices. Early detection of cognitive impairment in older adults is crucial, as it can help to slow down its progression and improve the quality of life for these individuals.

The severity of cognitive impairment is categorized as follows: At this stage, elderly individuals typically exhibit significant memory impairment and an inability to carry out daily activities. Moderate Impairment: In this degree of impairment, elderly individuals frequently experience memory impairment, characterized by forgetfulness of recent events or conversations. They also often encounter difficulties in problem-solving, which were previously manageable for them. Mild impairment is characterized by intermittent memory deficits and challenges in maintaining concentration.

Several technological applications have been developed to assist in the mitigation of cognitive deterioration. These include (17): Cognitive stimulation platforms encompass a range of interactive games, learning applications, and memory games. These platforms are designed to adapt to the unique needs and pace of each user by personalizing the experience. Virtual assistants, voice assistants capable of adapting to cognitive or speech disabilities, which help manage tasks and serve as reminders, are another example of assistive technology. Virtual reality constitutes immersive environments that can be utilized for therapeutic activities and cognitive stimulation, thereby supporting the enhancement of skills in a controlled setting. Social connectivity technologies facilitate communication between family members and caregivers using simple platforms such as video calls and social networks.

In this manner, certain studies function as a foundation for further analysis. One such study examines the digital literacy program for older adults, focusing on its design of a sustainable strategy grounded in the Techpeoplecare methodology in the city of Lima, Peru. The objective of this research is to design a technical proposal for digital literacy aimed at the elderly population of the city of Lima, Peru. The proposed initiative is intended to reduce the digital divide and promote the full inclusion of this age group in society. The methodology and experience of TechPeopleCare of the TEDECO UPM group will serve as a reference, and the proposal will be adapted to the local context. The sample population comprised adults over the age of 60. The research methodology employed a qualitative approach, utilizing in-person interviews as the data collection instrument. The findings of the study have enabled the identification of certain attitudes and perceptions held by older adults concerning digital technologies. Furthermore, the analysis has illuminated the obstacles that these demographic faces in accessing hardware and the internet (9).

A study was conducted on the internet access and digital inclusion services available to older adults at the municipal public library in the district of Jesús María. The objective of the study was to determine whether the perception of internet access services at a public library is significantly related to the level of digital inclusion among older adult users. To this end, the methods of the quantitative, observational, cross-sectional, prospective approach were used, and a non-experimental design was developed; all this within the framework of descriptive-relational level research. An instrument (survey type) was developed for the study. The present study examined the application

of the instrument to a total of 35 older adults. The analysis of the data obtained revealed that, at a significance level of 5% and a probability of error of 0.031 (3.1%), internet access service perception at the municipal public library was directly and significantly related to the level of digital inclusion perceived by older adult users in the district of Jesús María (18).

The research, entitled "The Digital Transformation and Inclusion of Older Adults in Care in the Chimbote Zonal Headquarters – Migrations 2022," sought to examine the digital mechanism created to obtain appointments for the processing of electronic passports. This mechanism has given rise to divergent opinions among the population. Some individuals regard the option of scheduling appointments online as advantageous, as it eliminates the need for in-person visits to institutions. Conversely, others encounter challenges due to digital divides, underscoring the need for policies that address these disparities. The central objective of this research is to ascertain the impact of digital transformation on the appointment scheduling process for older adults seeking to obtain electronic passports. To this end, the research was basic, quantitative, with a correlational, non-experimental, and cross-sectional descriptive design. The sample consisted of 50 users (older adults) to whom two questionnaires were applied. The present study found that there was a direct, strong, and significant relationship between digital transformation and the inclusion of older adults who turned to the Zonal Headquarters of Migrations in Chimbote in 2022 (19).

Similarly, research is needed on the use of information and communication technologies with the elderly. The Berta Arias de Botero Foundation has established a series of Wellness Centers for the elderly in the city of Colombia. The objective of this study is to analyze the contribution of the use of information and communication technologies to the active aging of the elderly. The present study is predicated on a qualitative and phenomenological paradigm. The sample was composed of older adults belonging to the wellness center for the elderly. The results of the study indicated that the integration of Information and Communication Technologies (ICTs) plays a pivotal role in facilitating active aging, thereby enhancing social inclusion. This integration enables access to a range of programs and services, in addition to fortifying support networks. However, the discussion surrounding the relationship between ICT utilization and cognitive function, as well as the accessibility of resources, remains a subject of ongoing research and debate (20).

The present study is an examination of artistic expression among the elderly in Bogotá, Colombia, as manifested through social networks. The primary objective of this initiative was to empower elderly individuals to utilize social networks in a secure manner, thereby fostering their artistic, expressive, and aesthetic endeavors. The sample population comprised 10 older adults, with a gender distribution of seven women and three men. To collect the necessary data, a combination of interview methods, expert judgment, and rubric were employed. Consequently, the initiative addresses the prevailing need to promote and facilitate the use of social networks among older adults. By taking such measures, the digital divide is not only overcome but also a substantial contribution is made to enhancing the quality of life, thereby fostering an active, connected, and fulfilling senior population. The implementation of inclusive strategies and digital literacy programs specific to this demographic is presented as a fundamental response to this emerging social challenge (21).

In Argentina, a research study was conducted about active aging through the lens of digital literacy in individuals over the age of 65. The challenge of the twenty-first century. The overarching objective of the initiative was to promote active aging through the cultivation of digital literacy skills. The sample population comprised 10 elderly individuals. The interview, questionnaire, and observation are instruments that are used to collect information. The findings indicate that the incorporation of digital literacy fosters active aging and enhances the quality of life for all individuals, particularly older adults (22).

In Ecuador, an analysis is conducted of the digital literacy and communication processes of the elderly population of the community of Manantial de Chanduy. In a similar manner, it examines the factors that influence digital literacy. The research methodology employed in this study is a combination of qualitative and quantitative approaches. The survey and the interview were used in the study. The sample was comprised of 29 older adults. Consequently, there is a growing imperative for older adults to enhance their digital literacy skills, with a particular focus on enhancing communication processes. The conclusion of the study indicates a substantial impact of digital literacy on the communication processes of the

adult subjects surveyed. The subjects indicated that acquiring digital literacy skills would facilitate their access to information, communication with family members, and participation in society (7).

A body research was conducted on the relationship between physical activity, mental health, and social networks with memory in older adults during the pandemic. This research was carried out in Cuernavaca, Mexico. The objective of this study was to determine whether physical activity, mental health, social support networks, and lifestyle are associated with the functioning of episodic (objective) memory and self-perception of memory (subjective). Additionally, the study sought to ascertain which of these factors exert the most significant influence on memory in older adults experiencing voluntary confinement due to the novel Coronavirus (SARS-CoV-2) pandemic. A total of 100 elderly students participated in the study. The instrument employed for this study was online interview. The results indicate that maintaining good mental health, engaging in physical and cognitive activities, cultivating social support networks, ensuring proper sleep hygiene, and possessing adequate literacy skills for the effective use of electronic devices and applications are conducive to optimal memory functioning (23).

The following dimensions have been considered in the measurement of cognitive ability: The act of communicating is associated with the development of interaction skills, the exchange of ideas, and, most notably, the effective transmission of information (24). The act of remembering involves the process of retrieving information stored in memory. This function enables the access of encoded and stored information in the brain (25).

It is imperative to acknowledge that the integration of technologies within this demographic necessitates a discussion of salient factors, given its potential utilization for entertainment, streaming, gaming, and other applications. Similarly, the device can be programmed to provide reminders to take medications or engage in daily physical activity (26). Therefore, older adults are not familiar with current technologies, which poses a challenge due to physical and cognitive barriers (27).

3. MATERIALS AND METHODS

The study was carried out with the support of existing technological applications such as YouTube, TikTok and smartphone applications. A pre-test and post-test were applied since the design is experimental of the pre-experimental type.

The formula used for this research was given as follows:

$$M = \quad O_1 \xrightarrow{X} O_2$$

Where:
M= Elderly people
O1= Baseline, measurement of indicators at the beginning of the intervention
X = Digital Literacy Program
O2 = Starting line, measurement of indicators at the end of the intervention.

The nature of the research is of an applied character, with the results of the study emphasizing the implementation of products, prototypes, or models that have been materialized at a level of technological transfers and maturity (28). The research is of an applicative nature insofar as it seeks to provide a solution to a given problem. The population under consideration is composed of 100 older adults, with ages ranging from 65 to 85 years, who hail from the Ica and Lima regions. The sample consists of 81 elderly subjects. The instrument to be utilized is the questionnaire because it allows the evaluation of the dependent variable. The present questionnaire was subjected to factor analysis, which initially comprised 20 items. Those items that did not demonstrate adequate common variance for the selection of the instrument were eliminated. It should be emphasized that the statistical parallel analysis only registered two factors to be developed. The first factor, designated as "communication activities," and the second factor, designated as "activities to remember," are the two factors that must be considered. Items with a value of 0.3 or less were eliminated, resulting in the retention of 14 items. The number of factors was determined through parallel analysis, which demonstrated an adequate correlation of construct validity at the exploratory level (KMO of 0.77, very close to 0.8, which is considered acceptable).

Table 1: Factor load - dependent variable

		Factor		
N°	Items	1	2	Uniqueness
2	recognizes the numbers with 2 digits that are shown on the cell phone screen	0.850		0.983
3	Recognizes the numbers with 3 digits that are shown on the cell phone screen	0.841		0.303
4	recognizes the numbers with 4 digits that are shown on the cell phone screen	0.792		0.418

5	Recognizes the letter shown to them on the cell phone screen	0.804		0.402
6	Recognizes how many syllables are in the word shown on the cell phone screen	0.695		0.481
10	You know your cell phone number or that of a close family member		0.382	0.763
12	Do you remember the location of the cards in the games through mobile applications?		0.505	0.732
13	Repeat colors as shown on screen	0.407	0.327	0.606
14	Sends a wasap message with ease describing the image shown to it		0.839	0.301
15	Understand the TikTok video and explain it with ease		0.721	0.400
16	Send messages by WhatsApp for the birthday of one of the family members		0.748	0.468
17	Time of day use cell phone	0.377		0.795
19	He uses Google of his cell phone to get some important information		0.562	0.751
20	Use YouTube to listen to music from the memory		0.572	0.595

Note: The "minimal residue" extraction method

Table 2 presents the operationalization of the dependent variable with its respective dimensions to be evaluated and its indicators.

Table 2: Dimensions of the cognitive stimulation variable

Variable	Dimension	Indicator
Cognitive stimulation Exercise and skill compensation activity, whose purpose is to preserve intellectual capacity and teach strategies that reduce cognitive decline. (24)	Communication activity	• Number system • Letter system • Simple Math Operations • Repetition of phrases • Verbal fluency
	Activity to remember	• Delayed Recall • Orientation • Identification

3.1. Development of the digital literacy program

The interviewers underwent a 30-minute training session to master the instrument's operation and familiarize themselves with the technological prerequisites necessary for the successful execution of the digital literacy program, the objective of which was to enhance cognitive stimulation in older adults. The subjects were provided with the informed consent document and the photocopied forms of the instrument for both the pre- and post-test, which were obtained from two elderly members of their households. Similarly, it is imperative to ascertain the cognitive abilities of the elderly population and to determine whether the participants utilize the technological benefits available to them. In a similar manner, the principal investigator and collaborators also collected information in their surrounding areas.

3.2. Material Development

Part of the intervention consists of the following stages:

It begins with the preparation of the videos helped by TikTok tools.

Figure 1: Reference videos.

After that, the actions that will be carried out before implementation are carried out.

1. How to verify that the elderly person has a smartphone, important for the digital literacy workshop questionnaire to be completed. In the same way that it has wifi or mobile data, it proceeds to verify or install an app on mobile devices such as TikTok, YouTube, Wasap and Memo Games.
2. It begins with the pre-test or taking of the instrument.

The intervention begins with the actions of the items you defend or that have scores 1-2 in order to remember or strengthen their cognitive abilities. The booster is taken every two days until the post-test date (2 weeks).

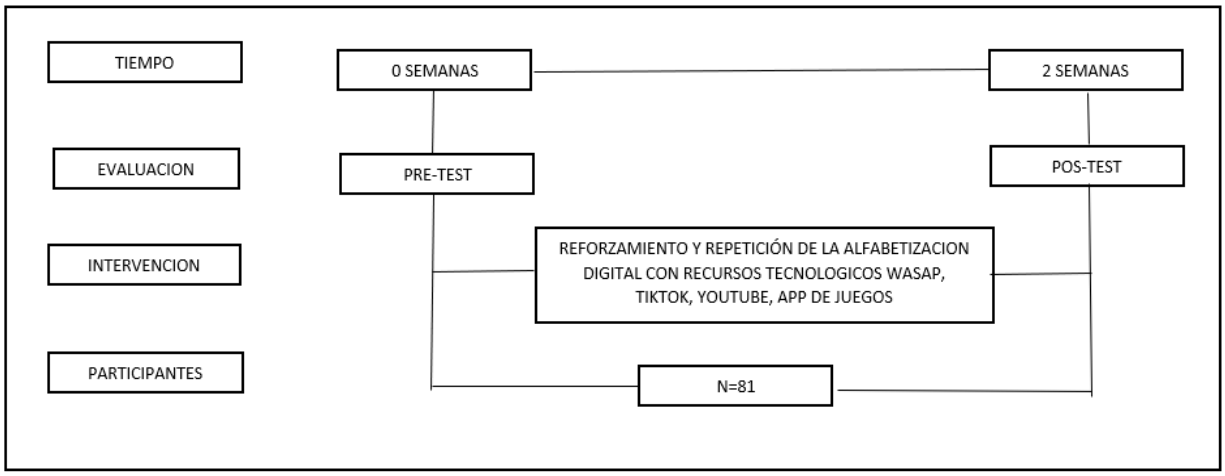

Figure 2: Planning of activities

4. RESULTS

The sample was made up of 81 adult participants aged 65 to 85 years, with a mean age of 73.14 ± 5.7 years, with a predominance of older adults between 65 and 71 years representing 45.7%, in addition 61.7% were female and 38.3% male, in addition 50.6% came from the city of Lima.

Table 3: Demographic characteristics of older adults

		N	%
Age	Average ± deviation	73.14 ± 5.7	
	65 - 71 years old	37	45.7
	72 - 78 years old	27	33.3
	79 - 85 years old	17	21
Sex	Men	31	38.3
	Women	50	61.7
Region	Lima	41	50.6
	Ica	40	49.4
	Total	81	100

Source: Survey of older adults in the Lima and Ica region

Table 4 shows that the implementation of the digital literacy program significantly influences the cognitive stimulation of older adults (*p*-value <0.001), it can also be seen that when applying the pre-test, 54.3% of the elderly present moderate cognitive stimulation, after teaching digital strategies, the post-test was applied, resulting in 63% presenting mild cognitive stimulation.

Table 4: Implementation of a digital literacy program in the cognitive stimulation of older adults in the Lima and Ica region.

		N	%	P value
Cognitive stimulation pre-test	Severe	21	25.9	
	Moderate	44	54.3	
	Mild	16	19.8	< 0.0011
Cognitive stimulation post test	Severe	6	7.4	
	Moderate	24	29.6	
	Mild	51	63	
	Total	81	100.0	

Source: Survey of older adults in the Lima and Ica region

1: Wilcoxon Sign Range Test

Table 5 shows how the digital literacy program significantly improves communication activity in older adults (*p*-value <0.001), in addition to applying the cognitive stimulation pre-test, 53.1% of the older adults had moderate communication activity, after teaching them some digital strategies, the post-test was applied, resulting in 66.7% showing mild communication activity.

Table 5: Implementation of the digital literacy program in its dimension communication activity in older adults in the Lima and Ica region.

		N	%	P value
Pre-test communication activity	Severe	15	18.5	
	Moderate	43	53.1	
	Mild	23	28.4	
Post-test communication activity	Severe	6	7.4	< 0.0011
	Moderate	21	25.9	
	Mild	54	66.7	
	Total	81	100	

Source: Survey of older adults in the Lima and Ica region
1: Wilcoxon Sign Range Test

It can be evidenced that the digital literacy program significantly improves the activity to remember in older adults (*p*-value < 0.001), likewise when applying the cognitive stimulation pre-test, 39.5% of the older adults presented a moderate level when performing activities to remember, after teaching some digital strategies the post-test was applied, resulting in 43.2% presenting a mild level in activities to remember.

Table 6: Implementation of the digital literacy program in its activity dimension to remember in older adults in the Lima and Ica region.

		N	**%**	**P value**
Pre-test activity to remember	Severe	44	54.3	
	Moderate	32	39.5	
	Mild	5	6.2	< 0.0011
Post-test activity to remember	Severe	16	19.8	
	Moderate	30	37	
	Mild	35	43.2	
	Total	81	100.0	

Source: Survey of older adults in the Lima and Ica region
1: Wilcoxon Sign Range Test

5. DISCUSSION AND CONCLUSIONS

The findings indicate that the implementation of the digital literacy program has a substantial impact on the cognitive stimulation of older adults (*p*-value <0.001). The present data align with the conclusions of Vicencio (19), which demonstrated a direct, substantial, and significant relationship between digital transformation and the inclusion of older adults. In a similar vein, Jaimes' study, which evaluated the perception of internet access services, demonstrated a direct and significant relationship between internet access and the level of digital inclusion perceived by older adult users (18).

Conversely, the evaluation of the dimensions reveals a substantial enhancement in the communication activity of older adults, attributable to the digital literacy program (*p*-value = 0.001). The present study's findings align with those of Ríos (7), which demonstrated that digital literacy exerts a substantial influence on the communicational processes of older adults. The study noted that the acquisition of technology skills enables older adults to enhance their access to information, facilitate communication with family members, and engage more fully in society. However, in contrast to the findings of Granda et al. (20), which indicated that ICTs promote active aging by facilitating access to programs, services, and the augmentation of support networks, this study does not ascertain or explore the potential impact on cognitive ability.

Upon evaluating the following dimension, it becomes evident that the digital literacy program exerts a substantial influence on the memory function of older adults (*p*-value < 0.001). A parallel can be drawn with Lino (23), which demonstrated that maintaining optimal mental well-being, engaging in regular physical and cognitive activities, cultivating social support networks, adhering to proper sleep hygiene practices, and ensuring proficient literacy in the use of electronic devices and applications are conducive to enhancing memory function. Ilunion (26) posits that the integration of technology in older adults can enhance the efficacy of reminders, such as medication adherence, heart rate monitoring, and adherence to medical appointments.

The findings of this study indicate a substantial relationship between digital literacy and cognitive stimulation, as well as significant variations in their

dimensions between the pre-test and the post-test conducted on older adults. It is imperative to underscore the significance of digital literacy in the elderly population. Many elderly individuals primarily utilize technological devices, such as smartphones, for basic communication purposes, often remain unaware of the vast array of potential applications and the cognitive stimulation these devices can offer, which can significantly enhance their quality of life.

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