Encouraging Seniors to Get Active: Implementing a Gamification Strategy on Television

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Abstract. People are intrinsically social, so regularly socialising with others is essential for a healthy life. Considering the successive scientific and technological developments that, by increasing the average life expectancy, have resulted in the gradual growth of the senior population, socialisation dynamics gain even greater importance. Generally, in old age, people see a reduction in their participation in social contexts or activities because, after retiring, they spend more time at home and inevitably lose an essential part of their frequent contact with others. To uphold seniors' social connections, it is justified to develop and evaluate novel technological resources aimed at fostering closer interactions with others. Considering that older adults are the most frequent users of television and that the advent of interactive television allows access to a myriad of new features, the ProSeniorTV was developed, It is based on a gamified system for television capable of: *i)* proactively inform the user (via TV notifications) about events/social activities taking place in their municipality of residence; and *ii)* motivating and rewarding participation in these same events/activities, encouraging seniors to leave their homes and socialise. The developed system consists of various mini-games and a player ranking. The user can test their cognitive abilities (using the mini-games) and turn their participation in the events they are notified of into game points that will allow them to progress in the player ranking. Following the completion of the laboratory-based testing of the proposed system and the pilot test, it was determined that a gamified approach integrated into television could serve as a highly motivating factor for the third-party age to become more actively involved in social events and activities.

Keywords: Gamification System · Interactive Television · Proactivity · Senior Population · Social Interaction

1 Introduction

In the Western world, where there is generally access greater access to superior living conditions and more advanced healthcare, there is a trend for people to live longer, resulting in a gradual and pervasive ageing of populations. This information is corroborated by statistical data made public by both national and European organisations. For example,

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the INE (2020) states that the Aging Index is expected to double in Portugal. The value of 1.59 seniors per 1 young person, recorded in 2018, is projected to increase to 3 seniors per 1 young person by 2080. In this context, data from the European Commission (2021) also reveals that there will be an increase of 5 years in the average age of the European Union population between 2019 and 2070. This is primarily due to the rise in the ageing population and the decrease in the younger working-age population in this region.

The ageing process is complex, involving various factors and occurring throughout life (Dias 2012). Thus, in addition to the chronological aspect, the ageing process also involves, according to multiple authors (Lucca 2015; Schneider & Irigaray 2008), three other factors: *i)* the physical or biological factor, which relates to the functioning of each individual's organism and the associated changes that occur throughout life; *ii)* the social or sociocultural factor, associated with the social "role" envisioned for each age group; and *iii)* the psychological factor, which refers to the psychological capacities of each individual to adapt to the surrounding environment. In practice, in terms of physical or biological aspects, the decline of some capacities that can increase seniors' vulnerability can be observed, such as: *i)* reduced vision (Woodhead & Yochim 2022); *ii)* hearing loss (Rodrigues et al. 2018); *iii)* reduced motor skills (Coelho 2019); *iv)* reduced ability to concentrate and direct attention (S. Silva et al. 2014); or *v)* decreased memory capabilities (Woodhead & Yochim 2022). Regarding the social or sociocultural factors, there may be a reduction in social interactions and the size of the social network (Woodhead & Yochim 2022). As for the psychological factor, an increase in depression and anxiety can be observed, resulting, among other causes, from the awareness of the physical/biological changes associated with the ageing process (Weyerer et al. 2013). As most changes associated with the ageing process are negative, delaying these changes for as long as possible becomes an increasingly widespread concern in an ageing society. It is pertinent to preserve the quality of life of individuals as they age. Additionally, considering the concept of functional age, it is indeed possible to delay the adverse effects of ageing. In practice, functional age and chronological age are two distinct terms. For example, an 80-year-old person may be functionally younger than someone younger (e.g., 65) due to better physical and cognitive health (Papalia et al. 2009). The United Nations (1982) states that engaging in activities that allow seniors to optimise their capacities and maintain good health is crucial for active and healthy ageing. Considering that older adults are the age group most at risk of exclusion (Dias 2012) and that, due to the changes resulting from the ageing process, they require more social and even health care (Fulop et al. 2019), the social engagement of older adults is an essential component to ensure they experience an active ageing process with a good quality of life (OMS 2015). In line with this, it is known that among older adults, social relationships resulting from interactions with family/friends or participation in sports groups or volunteering are associated with: *i)* good cognitive health (Townsend et al. 2021); *ii)* better life satisfaction (Tani et al. 2022); *iii)* more excellent emotional stability (Locsin et al. 2021); and *iv)* a better physical condition (Wang et al. 2021).

Alongside the ageing process of populations, it is also observed that the habits of seniors are changing regarding the use of new information and communication technologies (ICT). This stems from older people's awareness of the benefits that can be

derived from such usage. For instance, ICT can be essential in promoting active ageing by allowing seniors to overcome their limitations during social interaction, which becomes more accessible through text messaging and voice or video calls. It can also facilitate access to information (Locsin et al. 2021). Furthermore, in today's networked society, technologies are imperative for the inclusion of its citizens (Dias 2012). Consequently, seniors are beginning to adapt to this new paradigm. This adaptation is evident in the statistical data from OberCom (2021), which revealed, for example, that the percentage of the Portuguese population in the age group between 65 and 74 years old using the Internet increased from 1.3% in 2002 to 39% in 2020. This reveals that seniors have gradually increased their digital literacy and begun to access the Internet, for example, to obtain information about community events and services (van Boekel et al. 2017). Also, regarding the use of ICT by older adults in Portugal, it is known that they are the ones who use television (TV) the most in their daily lives. The data from OberCom (2021) also revealed that, in Portugal, people over 64 years old represented almost 30% of total audiences in 2020.

Despite the observed progress among older people in the use of new technologies and TV, many elderly individuals, after retiring, still tend to view old age as a stagnant stage of life, without engaging in any beneficial activities for general well-being. These activities may be leisure, educational, work-related, or other types of events. This results in the aforementioned negative impacts on the physical and mental health of older people. The loss of social connections, which can give rise to feelings of isolation and loneliness, is a consequence of becoming less active. This, in turn, may result in the loss of certain physical and cognitive abilities, making elderly more dependent on others. In light of the demographic shift towards an ageing population, it is becoming increasingly evident that there is a pressing need to devise strategies that encourage older individuals to remain active and to foster their social networks. These networks can prove to be of significant importance in situations where assistance is required, as they can contribute to a healthy ageing process. With this goal in mind, this article presents the ProSeniorTV prototype (a gamified platform for interactive television (iTV)), as well as the results of a lab test and a pilot test aimed at validating the proposed prototype in terms of its ability to combat loneliness and isolation among the elderly (encouraging active ageing) through this gamified approach integrated into iTV.

With that in mind, the Sect. 2 of this article addresses why a gamified approach might be beneficial for improving seniors' quality of life. In the Sect. 3, proactive technologies currently available and why they may be attractive for the daily lives of older adults are discussed. The Sect. 4 presents the proposal for a proactive gamified prototype integrated into television and aimed at the senior audience, intending to promote the participation of older individuals in social activities. The Sect. 5 presents the results of evaluating the prototype in a laboratory setting, collaborating with User Experience (UX) specialists. The Sect. 6 covers the pilot test results already conducted with a real user. Finally, in the Sect. 7, future work intended to be developed after the conclusion of the pilot test is presented.

2 Seniors and Gamified Approaches

A game can be described as "a formal system based on rules with a variable and quantifiable outcome, where different outcomes are assigned to different values, the player exerts effort to influence the outcome, feels emotionally connected to the outcome, and the consequences of the activity are optional and negotiable" - our translation (Juul 2015, para. 8). This emotional connection is quite strong, as it is intrinsic to human nature. Throughout the history of humanity, it has been observed that people tend to devise strategies to turn demanding everyday tasks into more motivating, intriguing, and enjoyable activities (Chou 2015). Therefore, it can be said that humans tend to "gamify" their daily tasks, and the concept of gamification cannot be restricted to specific usage contexts/scenarios (Deterding et al. 2011).

In a digital context, gamification can be defined as the act or action of adopting game design elements in contexts that are not necessarily related to games. Adopting these game elements is expected to transform products (unrelated to games) into more enjoyable and engaging services (Deterding et al. 2011). Thus, various game elements can be used in a gamification strategy, such as: *i)* scoring systems; *ii)* levels; *iii)* challenges; *iv)* competition among users; *v)* narratives; *vi)* customisation; or *vii)* rewards (Deterding et al. 2011; Inácio Busarello 2016).

In the current scientific context, there is already research on the benefits that games (including digital games or gamified approaches) can generate at various levels, regarding intrinsic and extrinsic factors to humans.

Intrinsically, evidence supports the idea that games can be beneficial for maintaining cognitive abilities when used regularly (De Paula et al. 2020), as these abilities are trainable and improvable (Glass et al. 2013). The study by Oei & Patterson (2013), for example, demonstrated that playing video games helps improve attention, memory (including associative memory), and perception, among others. Moreover, as leisure activities, games are recommended to counteract the changes that occur with ageing (Levin et al. 2017).

As mentioned in the introduction of this article, in old age, individuals' physical or biological capacities deteriorate the most. Therefore, developing games and gamified approaches targeting an elderly audience could be relevant. This demographic benefits the most from such an approach, especially considering seniors with enhanced cognitive abilities tend to exhibit higher levels of independence and better quality of life (Barnes et al. 2007).

Extrinsically, there is evidence that using games or gamified approaches can be beneficial for promoting social interactions. In this regard, the study by Fonseca et al. (2017) suggests that games could be important for fostering social relationships among neighbours. Additionally, Nijholt's study (2017) mentions that games could support collaboration between people in leisure or work contexts. It is also worth noting the survey by Harrington & O'Connell (2016), which found that the use of pro-social video games by school-age children was positively related to their abilities to cooperate, share, and interact outside the gaming context. Therefore, extrinsically, the benefits of using games or gamified strategies justify their application/adaptation to older adults, as social factors are also crucial for active and healthy ageing.

3 Seniors and Proactive Technologies

One of the main reasons that turned the TV into a widely used device among the senior population is the fact that TV provides information under a push-oriented approach, where the viewer does not need to perform any search action, as the information is presented automatically (T. Silva et al. 2016). The proactive strategy followed by TV, regarding the automatic selection and presentation of information to the viewer, demonstrates that seniors are open to using other types of technologies with similar proactive approaches (T. Silva et al. 2019). Once again, statistical data precisely highlights this, as, according to Kadylak & Cotten (2020), in that year, 29% of seniors in the United States were willing to use devices integrated with Digital Personal Assistants (DPA) in their daily lives. These devices can perform a wide range of actions, from entirely reactive to entirely proactive (Sarikaya 2017).

It is worth noting that Digital Personal Assistants (DPAs) are intelligent software that mainly aims to assist humans in task automation, with examples such as Siri or Google Assistant (Hu et al. 2021). Therefore, technological solutions with proactive capabilities, such as those integrating DPAs, can complement contracted support services for elderly assistance, functioning as essential aid tools in the daily lives of seniors, both in health and social contexts (O'Brien et al. 2020).

4 Proposal for a Proactive Gamified Prototype Integrated into Television and Targeted at the Senior Audience

Considering the central objective of promoting social interactions that lead to an active and healthy ageing process among the senior population, this paper describes the prototype called *ProSeniorTV*, which aims to promote the participation of older individuals in social events organised in their municipality of residence.

In terms of functionality, we defined that the developed prototype should proactively present notifications through the TV. These notifications would inform viewers about social events and allow navigation to a gamified interface developed in Unity. This interface is hosted on a Raspberry Pi 4 connected via HDMI to the viewer's television, as depicted in Fig. 1. To enable the presentation of notifications on the user's TV, we used the *OverTV*[1] service (Velhinho et al. 2023), developed and tested by DigiMedia, in the Department of Communication and Art research unit at the University of Aveiro (Portugal).

To navigate the system interface, the user only needs to select a specific notification (by clicking the OK button on their remote control). This action triggers an HDMI-CEC command sent to the TV from a Node.js server integrated into the Raspberry Pi. The command automatically switches the HDMI source on the television to the one through which the Raspberry Pi is connected.

In the interface, the user can access three main functionalities: *i)* access one of the three cognitive stimulation mini-games offered by the interface to earn game points; *ii)* enter participation codes (earned throughout participation in social events), codes that

[1] http://socialitv.web.ua.pt/index.php/portfolio/overtv/.

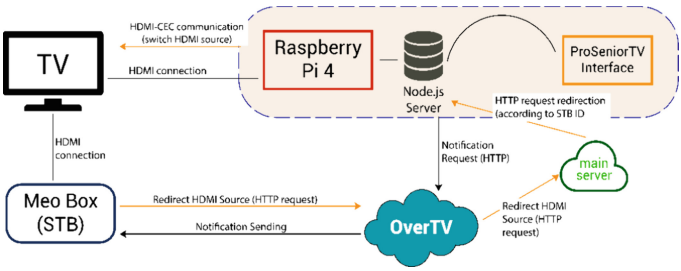

Fig. 1. Architecture of the ProSeniorTV System.

are delivered to the user when he attends a social event for which he has been notified through his television; and *iii)* check his position in the overall user ranking, with his position in the ranking directly depending on the number of times he participates in social events and his game score (earned in mini-games). Regarding the player ranking, it is essential to mention that users in the top 3 positions are awarded gold (1st place), silver (2nd place), and bronze (3rd place) medals to motivate participating in the events suggested through notifications.

Given what has been mentioned, in Fig. 2 (on the left), the types of notifications that the user may receive on his television are presented, corresponding to: *i)* notification motivating the user to access the interface's mini-games; and *ii)* notification informing and suggesting the user about the occurrence of a specific event.

Fig. 2. Types of notifications from the *ProSeniorTV* system (left) and its interface (right).

Regarding the mini-games present in the interface, it was defined that they would be cognitive stimulation games, as they were considered the most beneficial and exciting type of game for seniors. Thus, the mini-games were integrated to stimulate a set of specific cognitive abilities, namely: *i)* stimulation of memory capacity; *ii)* stimulation of attention direction capacity; and *iii)* stimulation of visuospatial capacity.

In the first game (sequence game), whose interface is presented in Fig. 3, the user has the four directional keys on their remote control (up, down, left, and right), which they should use to create sequences. Thus, at the beginning of the game, a specific sequence is presented to the user, which they must mimic. Whenever the user enters the correct sequence, the game generates a new sequence, essentially the same as the previous one but with an added element. For example, if the first sequence is: up, the second could

be: up, left. If the user makes a mistake in the sequence, the game ends, and the player must start again from the beginning.

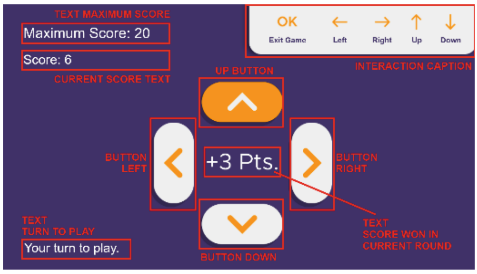

Fig. 3. Graphic interface of mini-game 1 – sequence game (memory test) and identification of the elements that compose it.

The second game (colour game), whose interface is presented in Fig. 4, presents a specific word to the user. This word can be one of the following: "Black"; "Yellow"; "Green"; "Red"; or "Blue". Additionally, this word may be written in one of the following colours: Black; Yellow; Green; Red; Blue. The user's objective is to identify the colour mentioned by the word (meaning) and ignore the colour in which the word is written.

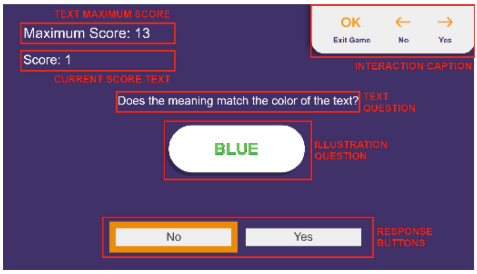

Fig. 4. Graphic interface of mini-game 2 – colour game (attention direction test) and identification of the elements that compose it.

Finally, in the third game (block game), whose interface is presented in Fig. 5, the user must move a parallelepiped across a specific game platform. To do this, they should use the directional keys (up, down, left, and right), and with each click, the parallelepiped rotates to the side corresponding to the pressed key. During the game, the user must be careful not to let the parallelepiped fall out of the playing area. The main objective is to reach the square in the playing area with the same colour as the parallelepiped, with the game character in a vertical position.

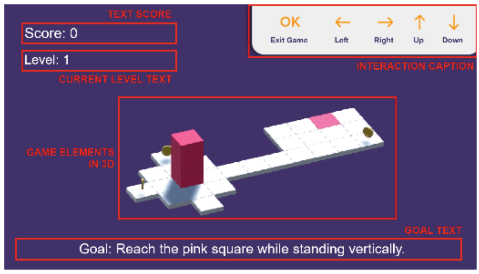

Fig. 5. Graphic interface of mini-game 3 – block game (perception test) and identification of the elements that compose it.

5 Evaluation of the Prototype in a Laboratory Context

After completing the prototyping process of the proposed system (ProSeniorTV), the next step was planned, namely, a phase to evaluate this prototype with UX professionals. The purpose of this preliminary evaluation phase of the prototype was to detect potential usability problems in advance that could compromise the user experience. Thus, it was expected that through early detection and correction of potential usability issues, the prototype would become robust enough for the subsequent testing phase in a natural context with real users (field tests).

Given what has been mentioned, it was decided that this preliminary evaluation would take place in the UX laboratory[2] of the research and development (R&D) group where the present research process was carried out, namely, the SocialiTV R&D group, which is part of the Center for Research in Digital Media and Interaction - DigiMedia at the Department of Communication and Art of the University of Aveiro. This UX laboratory is presented in the next figure (Fig. 6).

Fig. 6. DigiMedia UX Lab. @ University of Aveiro.

On October 20, 2023, 6 members of the Social iVX group with previous solid UX field experience gathered in this laboratory to test the ProSeniorTV system. Having interacted with the prototype for about 30 min in a context simulating a living room (the

[2] https://socialitv.web.ua.pt/index.php/ux-lab/.

UX laboratory), the six individuals who participated in this preliminary stage of prototype evaluation made some assessments that were subsequently taken into account, and they are as follows:

- One specific participant mentioned that the ProSeniorTV interface should provide the user with a more significant number of mini-games if it were to be released on the market, although they acknowledged that three mini-games might be sufficient for a testing phase;
- Regarding the details of notifications suggesting the user participate in a specific event, all participants understood that it would be necessary to mention (in the title of these details) the type of event being suggested. They even suggested that the title should include the following information: *i)* type of event (e.g., monthly walk); *ii)* event location; *iii)* event date; and *iv)* event time. Additionally, they also suggested, as shown in the following figure, that it might be interesting, for example, to replace the icon in the notification with a thumbnail representing the event's location. Since only local events were suggested, the user could recognise the location shown in the thumbnail and perceive that they received a highly personalised notification based on their profile (Fig. 7);

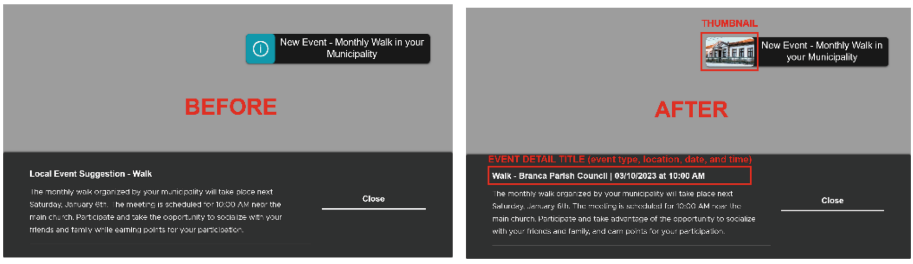

Fig. 7. Event notification before laboratory test (left) and event notification after laboratory test - with thumbnail and detailed title specifying event type, location, date, and time (right).

- Regarding the colour game, all participants felt it should include a countdown timer to increase pressure and make it more engaging. Thus, this timer, represented in the following figure, should start at 5 s, and for each correct interaction by the user, it should reset to its initial value (5 s). Therefore, each game would end not only when the user gave a wrong answer but also when the game time ran out (Fig. 8);

- Another suggested change by one of the elements had to do with the arrangement of elements on the main screen. It was then suggested that the navigation button for the user ranking, which was selected by default at the beginning of the screen (immediately below the navigation button for the multi-profile screen and the exit button), be moved to the bottom of the screen and that the navigation buttons for the mini-games take its place, as shown on the right side of Fig. 9. Everyone involved in this evaluation moment considered that this could be important to give greater prominence to the mini-games offered by the interface.

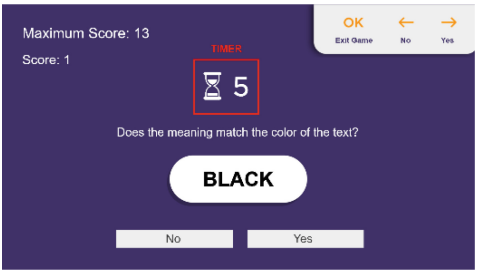

Fig. 8. Timer added to the colour game after discussion with UX experts.

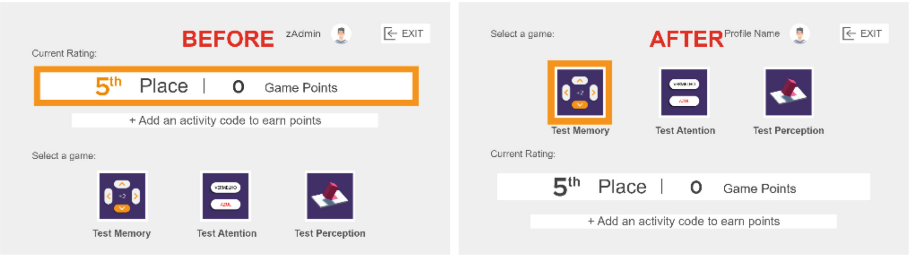

Fig. 9. Before and after the changes made to the main screen of the ProSeniorTV interface.

- Still on the main screen, it was considered that the designation "Games" should be replaced by "Select a Game" so that the user would understand in advance that various mini-games are offered, and they could access any of them;
- Lastly, those involved in this prototype evaluation considered that, in the tutorials for each mini-game, the user should have the option to "skip" the instructions. They felt it would be pretty tedious for an experienced user (who already knows the rules of each game) to view the entire tutorial before accessing the game. Therefore, as shown in Fig. 10, the "skip tutorial" button was added to each tutorial.

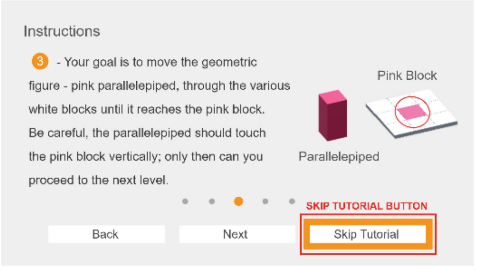

Fig. 10. Tutorial screen with a button to "skip" the tutorial.

Despite the observations presented by UX professionals in this prototype evaluation phase regarding its usability, it was unanimously understood that the participants in

this stage reacted very positively to the concept incorporated by the system and the functionalities offered by the prototype. It is also important to note that after modifying the prototype to address the feedback received in this phase, all participants considered that the developed system had the necessary potential to encourage the elderly audience to participate more regularly in local social activities and events. In general, there was agreement that regular access to this type of event (social events organised in the elderly user's area of residence) could be interesting to promote older adults' interaction with others and, consequently, to promote active and healthy ageing. This implies that systems like *ProSeniorTV* could be essential for people's well-being, especially considering that we live in an increasingly ageing society.

6 Pilot Test

A pilot test was initiated on December 8, 2023, to make the developed prototype as robust as possible. The test involved the participation of a 60-year-old female residing in the municipality of Albergaria-a-Velha (belonging to the Aveiro district – Portugal), who, as intended, used her television daily. This usage spanned two to three hours daily, mainly for accessing content such as soap operas, news, series, movies, and documentaries. The participant also mentioned watching television in the afternoon and after dinner. Regarding social activities, the participant indicated daily contact with family members. However, she engaged relatively infrequently in social activities to connect with friends or acquaintances. Specifically, she mentioned accessing this social activity only once every three months, on average.

Unlike a regular field test, the pilot test was designed to focus almost exclusively on the system's functionality rather than its effectiveness in promoting active and healthy ageing. This approach aimed to detect and address potential bugs, technical issues, and usability problems that may not have been identified yet.

This specific test concluded on December 22, 2023, providing the research team with a 15-day period to address any identified issues.

On the first day of the pilot test (December 8, 2023), the research team set up the necessary equipment for the participant to use the system at home. After setting up the equipment, the research team explained the purpose of the system and its functionalities to the participant. At this moment, the participant interacted with the system for the first time and provided suggestions that, according to him, would improve the user experience and make the purpose of each functionality more straightforward. The suggestions presented by the participant, which were later considered by the research team and reflected in the system interface, were as follows: *i)* Regarding the attention test mini-game, the participant suggested that the game word should be more readable. Therefore, a black outline was added to enhance visibility. The participant also recommended that the game should last a maximum of 1 min, as he found the game became tiresome after that time, only ending when the player made a mistake; *ii)* In the tutorial scenes of each minigame, the participant mentioned that the text was not very legible. Therefore, it was decided to increase the font size, which was later fixed at 90 pixels; and *iii)* At the participant's suggestion, it was also decided that whenever a specific game ended, the modal presented should indicate the user's score. This change aimed to help the user understand whether the score was above or below their record.

By the end of the pilot test, additional technical issues were identified and carefully considered by the research team. One of these issues was related to the remote control used to interact with the interface. To interact with the *ProSeniorTV* interface, the user only needed to use the directional keys and the OK button on the remote control, as shown in the figure below (on the right). However, since the remote control had several other buttons, including a menu button, it was observed that sometimes, inadvertently, the participant would click the menu button. This click on the menu button resulted in the opening of various windows and menus of the RPI's operating system with which the user was interacting, preventing the use of the *ProSeniorTV* interface. The figure below (on the left) illustrates an example of this type (where the user clicks the menu button) (Fig. 11).

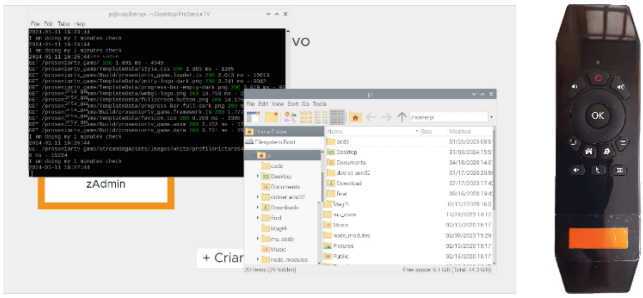

Fig. 11. Example of unintentional menu button click (left) and *ProSeniorTV* Remote Control (right).

Considering that the *ProSeniorTV* interface was presented through the RPI's browser (Chromium browser), it was decided to activate Chromium Kiosk Mode. This mode restricts the user from accessing the operating system settings, confining navigation solely to the browser.

Another issue that raised concerns for the participant during the tests was related to the automatic pause function on the MEO box whenever they navigated to the ProSeniorTV interface. When the participant returned to the MEO box, they often did not understand that it was in pause mode and were unsure about the actions to take. In this case, however, no changes were made to the system. As the test progressed, the participant found this helpful feature once understood.

Finally, it is also important to mention that, with the pilot test, the research team realised the need to implement strategies for remote management of the system installed in each participant's home during the field tests. This remote management would allow for a more agile resolution of potential issues and avoid the research team having to physically travel to the participant's home to resolve these issues. In this context, it was established that each RPI would be associated with a Secure Socket Shell (SSH) connection, enabling the research team to transfer documents to the RPI remotely via the command line. It was also decided to install the AnyDesk program on each RPI. This would facilitate a remote connection to the RPI, but, in this specific case, it would be

used only to manipulate the Graphical User Interface (GUI) associated with each RPI if necessary.

7 Conclusion

In the present article, we presented the results of a lab test and a pilot test that were conducted to improve the usability and user experience (UX) of the ProSeniorTV system.

Taking this into account, the lab test was conducted with 6 UX specialists for 30 min in an environment simulating a living room. It was found that the developed prototype generally had a good level of usability and offered a good UX. However, the UX specialists raised some issues, namely: *i)* the system should, in a post-test phase, offer a greater variety of games; *ii)* event notifications should specify the type of event, location, date, and time in the title, as well as an easily identifiable thumbnail (e.g., a photo of the event location); *iii)* the attention test minigame should have a time limit (e.g., 60 s); and *iv)* the game tutorial screens should allow the user to skip the tutorial at any given time.

Regarding the pilot test conducted with a 60-year-old female participant over 2 weeks in her home, it can be said that this was an extremely crucial phase in the research process, as it is considered to have successfully led to the desired outcome – a significantly more robust version of the developed prototype. This is because, with the participant's help, it was possible to detect problems such as: *i)* font sizes being too small; *ii)* the user inadvertently accessing the system menus (Raspberry Pi), leading to the decision that the system should be made available in *Chromium Kiosk Mode* to avoid this problem; and *iii)* the inability to remotely manage the system to resolve potential issues if the system stopped functioning. To address this, it was decided to use AnyDesk and an SSH connection for remote system manipulation.

Additionally, regarding the pilot test, the participant suggested that at the end of each game, the users should be informed of their score and congratulated when they surpassed a personal record, as this would greatly enhance the gaming experience.

8 Future Work

Given the aforementioned work, we recognise that a lab test and a pilot test, even if conducted with a participant from the target audience, are not sufficient to prove that the proposed system meets the central objective of promoting social interactions among the senior population and motivating them to participate in social activities/events organised in their area of residence. With regard to this matter, it is our intention that, following the implementation of the recommendations put forth by the pilot test participant, the developed prototype should be subjected to testing in a natural context with a number of individuals who belong to the target audience (seniors aged 60 or older who regularly watch television content on their TVs).

To conduct the tests, twenty participants with the mentioned characteristics will be recruited. Subsequently, after recruiting participants, the developed system will be installed in each participant's home, which should remain for approximately one month. This approach will allow testing the system in a real everyday context to understand whether it helps seniors feel more motivated to participate in events or social activities

in their residential area. It is important to note that, to comprehend whether the system fulfils its purpose, before and after the tests a brief semi-structured interview will be conducted with the participants to gather similar information at these two moments, precisely information related to their social interaction habits. Thus, by comparing the results collected before and after the tests, it will be possible to ascertain whether a service of this kind is practical and beneficial for older adults.

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