DanceMove: Promoting Social Interaction and Healthy Ageing Through Foot-Interaction

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Abstract: Foot interaction, which involves using foot movements to control digital systems, has been explored as an alternative input method in several digital solutions, especially in video games. In particular, dance mats and pressure-sensitive platforms have been used to enable older adults to engage with technology, promoting movement and overall well-being. Despite the new forms of interaction, these technologies are often designed for younger audiences, presenting challenges for older players. To address these challenges, the game DanceMove was developed as part of the SHAPES project (EU Horizon 2020) with a user interface specifically designed to meet the characteristics and needs of older adults. This study presents the design and evaluation of DanceMove's user interface, which integrates customizable choreography, adaptable difficulty levels, and music selection to enhance accessibility and engagement. The interface was tested with older adults using the Think-Aloud Protocol and the Self-Assessment Manikin method to assess usability, engagement, and emotional response. Results indicate that participants found the game enjoyable and motivating, although some required additional support for balance and confidence. The findings highlight the potential of foot-based games to promote physical activity, cognitive stimulation and social interaction among older adults, while also identifying challenges related to usability and resistance to new technologies.

1 INTRODUCTION

In recent years, various digital solutions have adopted foot interaction as an input method, ranging from pressure-sensitive flooring (Sangsuriyachot & Sugimoto, 2012; Schmidt et al., 2015) and augmented reality games for mobile devices (Lv, 2013; Lv et al., 2013, 2014, 2015; Paelke et al., 2004; Yin & Pai, 2003), to accessibility tools for users with hand disabilities, such as arthritis or repetitive strain injury (Carrozza et al., 2007; Springer & Siebes, 1996). For older adults, foot interaction has gained attention as an alternative input device, as it encourages

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movement, engages multiple muscle groups, and increases energy expenditure, promoting active and healthy ageing. This approach is particularly prevalent in exercise video games, which enhance the recreational aspects of physical activity, making the experience more enjoyable and improving user engagement (Warburton et al., 2007).

Among video games, dance games appear as one of the most popular for older adults, widely used in healthcare and care settings as a therapeutic alternative to enhance physical and cognitive functions (Aimonetti, 2009; Hanneton S. & Hanneton, 2009; Lange, Requejo, et al., 2010; Laver et al., 2011). These games require users to interact using a dance mat: as music plays, arrows appear on the screen, and players must step on the corresponding areas of the mat when the arrows reach a designated point, combining rhythm, movement, and coordination.

Dance games require users to pay attention to both moving objects on the screen and the buttons they must press (step) on the dance mat. These coordinated movements promote physical activity through dance with a positive impact on balance, attention, coordination, and cognitive skills (Green & Bavelier, 2003; Hatzitaki et al., 2009; Maloney et al., 2008; Riesenhuber, 2004), in addition to providing entertainment through recreational activities. However, most existing games are tailored for younger audiences, often featuring fast rhythms, complex interfaces, and modern music that may not suit older adults (Smith et al., 2011).

While these games are popular with young audiences, older adults are unable to play them because their specific needs were not considered during development. Older adults often face challenges such as motor difficulties, low literacy levels, and limited familiarity with modern technology (Patsoule & Koutsabasis, 2014) which can generate insecurity in their use (Gregor et al., 2002; da Silva, 2014). These barriers highlight the need for user interfaces to address different aspects of human-computer interaction and consider the varied specificities of these users (Newell et al., 2011).

To address these challenges, the DanceMove game was developed as part of the "Smart & Healthy Ageing through People Engaging in Supportive Systems" (SHAPES, Horizon 2020 Grant Agreement-857159)[10] project with a user interface specifically designed to meet the needs of older adults.

DanceMove is a dance game developed by the University of Aveiro (UA), Portugal, a partner of the SHAPES project, to promote healthy ageing by improving the physical, social, and cognitive well-being of older adults. It integrates motor exercises with an enjoyable dance experience, using a dance mat as an input device that relies on foot interaction. The game requires users to perform specific movements in a sequence that demands attention and memory. The software allows administrators (in this case, the UA research team) to customize dance choreographies and evaluate users' performance. Players can select the difficulty level and music based on their preferences and abilities. In the game, the user must perform a specific movement in a specific sequence that requires attention and memory. DanceMove is based on the concept of the commercial solution StepMania®, which is a free dance and rhythm game that features 3D graphics, keyboard support, a dance mat, and an editor to create your own steps. Unlike StepMania®, the DanceMove interface has been adapted to meet the needs and expectations of older adults, fostering social interaction and combating loneliness while supporting healthy ageing.

This article presents the development process of DanceMove, highlighting how its user interface design, guided by established guidelines in previous works (Diehl, 2024; Diehl et al., 2022; A. Silva et al., 2019) addresses the needs of older adults. By promoting physical, cognitive, and social well-being, DanceMove is a digital solution that supports active and healthy aging.

2 METHODS

In previous work, 244 user interface design guidelines were identified (Diehl, 2024; Diehl et al., 2022; Silva et al., 2019) to assist the development of various digital solutions for older adults within the SHAPES project. The guidelines were identified through a multi-source review, which included a comprehensive navigation of guidelines published by different authors and direct contributions from experts in the field. The sources consisted of: (i) knowledge from the UA research group, based on publications in the area; (ii) a purposeful search in the SCOPUS® database; and (iii) contributions provided by interface design experts from the SHAPES project. The references identified in these three stages were compiled into an Excel® spreadsheet, resulting in a

[10] SHAPES website <https://shapes2020.eu/>.

total of 1,210 guidelines. During the analysis, very generic guidelines were excluded, guidelines addressing similar content were merged, and each guideline was classified into three non-exclusive categories: web, mobile devices, and emerging technologies. The new dataset was analysed by 10 user interface design experts from the SHAPES project, who added 62 additional guidelines, resulting in 256 guidelines. Further analysis identified 12 duplicate references, which were removed, resulting in a final list of 244 guidelines.

The final list of guidelines was used as guidance for the design of the DanceMove interface, which was developed by the author CD. To ensure a user-friendly and accessible interface for older adults, priority was given to guidelines addressing essential aspects, such as: generic guidelines for different technologies and interaction paradigms, specific guidelines for foot interaction, and guidelines aimed directly at older adults. These guidelines were used to address the motor, cognitive, and sensory limitations common to this population, ensuring a more inclusive and intuitive experience.

Furthermore, to structure the design and functionality of the interface, the author CD followed the set of functional requirements (FR) defined by the UA research team (authors of this article) as part of the SHAPES project. The functional requirements concerned the main screens of the interface and included specifications regarding navigation between them and the expected functionalities:

- Game opening (FR-1): The initial opening screen of the game, which presents the users with the option to enter the game;
- Login to the game (FR-2): A screen that allows the users to login to the game using a 4-digit pin;
- Dance mat tutorial (FR-3): Screen that presents a visual tutorial on how the dance mat should be used and what each of the buttons is for;
- Game options (FR-4): Screen with the game's main menu, which should display: starting the game, tutorials and settings;
- Start the game (FR-4.1): When selecting to start playing, the interface should display the difficulty level screen;
- Choose the difficulty level (FR-4.1.1): A screen that allows the users to choose the difficulty level of the song to be danced: easy, medium, or difficult;
- Choose the song (FR-4.1.2): A screen that allows the users to choose the song to be danced;
- Gameplay (FR-4.1.3): A screen that allows the users to play and displays a music time counter and motivational messages when one of the arrows is right or wrong;
- Game score (FR-4.1.4): A screen that displays the final score of the dance performed, with a motivational message related to the score achieved;
- Game series performance (FR-4.1.5): A screen that displays the average performance score for a series of songs danced by the same player;
- Game tutorials (FR-4.2): A screen that presents video tutorials on how to navigate and play DanceMove;
- Game settings (FR-4.3): A screen that presents the solution configuration options;
- Leave the game (FR-5): All screens must allow the users to exit the game using one of the buttons on the mat.

The interface development also considered user-centred design principles, ensuring that the design choices not only met the established functional requirements but also reflected the real characteristics and needs of older adults.

The proposed final interface was tested with a small group of older adults to assess how users interacted with the digital solution and whether the design aspects of the user interface met the needs and characteristics of this age group. The tests were carried out at UA in July 2023, with four older adults from the Senior University of Cacia, in Portugal. In the tests, participants were initially asked to navigate freely through the game, to get to know all its functions, and then dance to at least two songs on any of the difficulty levels. During the testing, the Think-Aloud Protocols were used to collect qualitative data, which encourage participants to “think out loud” while performing a test task. This protocol offers a unique approach to capturing participants’ thoughts as they engage with digital solutions. By applying the protocol, researchers and practitioners can understand the areas in which users have difficulty navigating and/or interacting, and the reasons for these difficulties, as these will be verbally articulated by participants (Olmsted-Hawala et al., 2010).

At the end of the dance session, to collect more data from the participants, the older adults were asked to respond to a written test based on the Self-Assessment Manikin (SAM) method, developed by Lang (1980). This rapid assessment method uses images to quantify subjective emotional states, making it a fundamental tool for evaluating users’ experiences when interacting with the game. SAM was designed to reduce the language requirement of

the scale, enabling children to provide ratings using the same instrument as adults and allowing ratings from different cultures to be compared (Backs et al., 2005). This instrument is particularly advantageous because it is easy to understand for individuals with varying levels of digital literacy or cognitive abilities, as was the case with the older adults participating in the tests. SAM uses a drawing of a human figure to represent the dimensions of valence, arousal, and dominance, with a 5-point scale ranging from positive to negative emotions at each end (Bradley & Lang, 1994). In the valence dimension, emotions were rated on a scale ranging from extremely happy (point 1) to extremely unhappy (point 5). The second, arousal dimension, measures how excited users feel when interacting with the digital solution. This component ranges from extremely excited (point 1) to extremely calm (point 5). Finally, in the dominance dimension, users rated their sense of control over their emotions on a scale ranging from completely in control (point 1) to not in control at all (point 5).

3 RESULTS

3.1 Initial Interface Proposal

The initial interface proposal was developed in January 2021 in the image editing programs Photoshop® and Illustrator®, from Adobe Inc®. The screens were designed based on functional requirements, with textual content presented in Portuguese, as it was a game whose end users were older adults from Portugal. The author CD revisited the list of 244 guidelines to ensure the visual and textual elements were aligned with the identified principles.

The first design decisions involved selecting a colour palette (dark green, light green, and gold) and typography (Montserrat) to maintain consistency with the SHAPES project's visual identity, as it was understood that (Guideline 39) "*The system should adopt colour standards, typography, positioning, page titles, among others, in order to facilitate the user's navigation in the interface* (Nassar, 2012; P. A. Silva et al., 2015)". Additionally, pink and blue were introduced on the gameplay screen (FR-4.1.3) to help users understand the commands that should be executed during the dance, since these were the colours of the arrows on the dance mat, a commercial solution that already had these two colours (Guideline 59 – "*The system's graphical interface design and the organization should help prevent errors. Errors and unclear situations for the user should be avoided by guiding the user to select from meaningful alternatives* (Al-Razgan et al., 2014; Maguire, 2019)".

The game's screen background followed a simple layout, primarily in grey tones and curved lines with neutral colours that referred to the project's logo. The cleaner layout was intended to avoid distracting the user's attention during the game (Guideline 21 – "*The system' screen layout, navigation and terminology should be simple, clear and consistent* (Al-Razgan et al., 2014; Díaz-Bossini & Moreno, 2014; Kurniawan & Zaphiris, 2005)"). The game's opening screen (FR-1) included the SHAPES project logo, the name of the digital solution, and a button to enter the game (Guideline 16 – "*The system should eliminate unnecessary complexity and be based on the target audience's native language* (Abdel-Wahab et al., 2019; Nielsen, 1994; Petersen et al., 2019; Tsai et al., 2016; Zheng, 2020)"). The button displayed the text information "enter" in Portuguese and a person icon; a common image used to log in solutions (Figure 1).

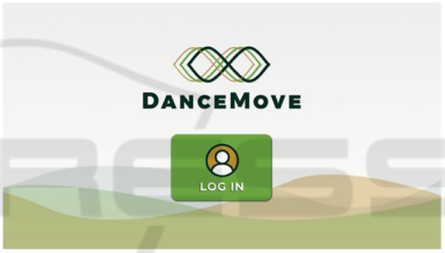


Figure 1: DanceMove initial interface proposal – game opening screen.

The login screen (FR-2) featured form fields for users to enter their username and a 4-digit password. To help users orient themselves, the page name was displayed in the upper left corner (Guideline 7 – "*The system should provide extra and bolder navigation cues, as well as location of the current screen* (Kurniawan & Zaphiris, 2005)"). This information was included on all pages except the gameplay screen (FR-4.1.3). The login screen was unique in that it required the user to use the mouse to select form fields and the keyboard to enter data, while on other screens, the dance mat was used for interaction.

The dance mat tutorial screen (FR-3) was one of the most important screens of the game, as it introduced all the functionalities of the dance mat, the primary input device for DanceMove. Given that the game was foot-based and designed for older adults, it was essential to ensure users could easily and correctly operate the mat (Guideline 107 – "*The information provided in the system should be simple, concise and to the point, facilitating its*

understanding, and should not display irrelevant or unnecessary information, because this can reduce the user's focus on important information (Adamides et al., 2015; Díaz-Bossini & Moreno, 2014; Hartson & Pyla, 2019; Kurniawan & Zaphiris, 2005; Nassar, 2012; Nielsen, 1994; Petersen et al., 2019; Weinschenk & Barker, 2000; Zheng, 2020)"). This screen included an image representation of the mat, explanations of each button's function, the rest area, and textual instructions on how to proceed to the next stage of the game (Figure 2).

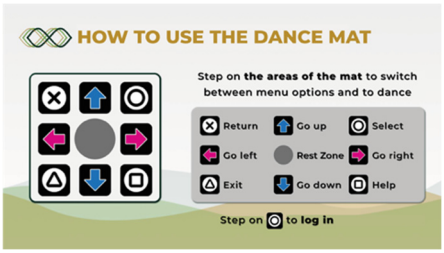


Figure 2: DanceMove initial interface proposal – dance mat tutorial screen.

The game options screen (FR-4) featured the main menu with three buttons: 'start', 'tutorials', and 'settings' (Figure 3). Each button had both textual and visual elements to guide the user: (i) the start button had an icon of two people with movements similar to dance steps, suggesting to the user that by selecting this button he would advance to a page where he would start playing (dancing); (ii) the tutorial button had an icon of a film reel, indicating that the educational tools were in video format; and (iii) the settings button used a gear icon, a common symbol for settings. Additionally, the screen introduced a help bar, which would be available on all game screens, offering guidance on key commands and features of the dance mat (Guideline 130 – "*The system should provide help that is easily located, specific to the task at hand and worded to guide through the necessary steps towards a solution* (Wong, 2016)"). The help bar displayed the main buttons that should be used on the page like 'select' and 'go back', as well as permanent options like 'help' and 'exit' (Guideline 34 – "*The system should include functions allowing the user to easily leave an unwanted state or interaction (support easy undo and redo* (Babich, 2016)").

Figure 3: DanceMove initial interface proposal – game options screen.

By pressing the 'start' button, the user was directed to the difficulty level selection screen (FR-4-1.1). Similar to the previous screen (Guideline 98 – "*The system should place items and information consistently to improve the user's efficiency of use* (NCCD, 2020)"), in this three-button menu the player could choose between easy, medium and difficult levels (Figure 4), according to their degree of familiarity and confidence with the game and physical ability (Guideline 148 – "*In feet interaction, provide temporal variation in movements by offering adaptive changes in the game speed* (Suhm, 2008)"). The number of arrows and the speed at which they would appear on the screen gradually increased according to the level chosen.

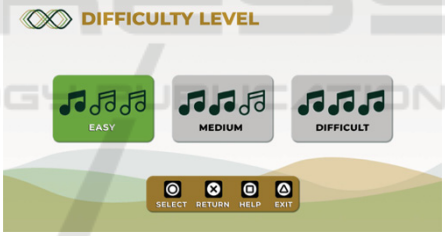


Figure 4: DanceMove initial interface proposal – choose the difficulty level screen.

After selecting the difficulty level, the user was directed to the music selection screen (FR-4.1.2). A carousel displaying three songs was centred on the screen (Figure 5), with indications that stepping right or left on the dance mat would reveal more options. Each song was presented with a related image, its title, and the singer's name, with different options available for each difficulty level. To align with the preferences of older Portuguese adults, the game featured popular songs from Portugal, Brazil, and international artists who were known during their youth (Guideline 231 – "*The system should consider contents that report to the users' social and cultural contexts* (Engelbrecht, 2016)").

Figure 5: DanceMove initial interface proposal – choose the song screen.

After selecting the difficulty level and song, the user would proceed to the gameplay screen itself (FR-4.1.3). On this screen, as the song progressed, left/right/up/down arrows would randomly appear from bottom to top (Figure 6). When the arrows reached the top, aligned with stationary arrows, the player had to step on the corresponding arrow on the dance mat. The aim was to design an interface that would make it as easy as possible for users to understand the game, while minimizing distractions and helping users focus on stepping on the correct arrows at the right time. When players stepped on the stationary arrows at the right time, congratulatory messages (e.g., 'perfect', 'very good') would appear at the top of the screen to motivate users (Guideline 200 – "*The system should consider emotional design elements to trigger and retain positive emotional responses* (Hu, 2018)"), while incorrect steps prompted supportive messages (e.g., 'try again') to encourage continued play. The screen also featured a counter that counted the elapsed time of the song, so that players could know how much longer they had to dance and thus avoid getting tired (Guideline 175 – "*The design should be used efficiently and comfortably and with a minimum of fatigue in case of physical activities for older persons* (Vanderheiden, 1997)").

Figure 6: DanceMove initial interface proposal – gameplay screen.

After finishing a dance match, the user was taken to the score screen (FR-4.1.4), which displayed the percentage of correct steps (Figure 7). This informed older adults of how often they had stepped on the correct arrows at the right time. Based on their performance, motivational messages were provided to the players, such as: (i) less than 50% correct – "Keep dancing"; (ii) between 50% and 70% correct – "Good dance moves"; and (iii) more than 70% correct – "Congratulations! Great dance moves" (Guideline 225 – "*The system should adopt gamification techniques, such as creating milestones or providing rewards, to signal positive achievements* (Khomych, 2019)"). The screen also included two buttons, allowing users to review their performance and start a new game (Guideline 110 – "*The system should provide clearly visible and unambiguous means of navigating to other content* (Wong, 2020)").

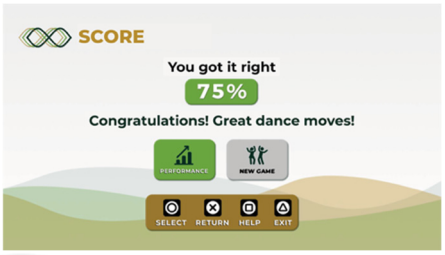


Figure 7: DanceMove initial interface proposal – game score screen.

After viewing their score, users who selected the 'performance' option button (FR-4.1.5) were taken to a screen displaying their overall score for the series of dances performed during the session (Figure 8). While no time limit was enforced, a maximum session duration was recommended (Guideline 185) "*In foot interaction, 60 minutes of continual foot interaction, with occasional breaks, is feasible for users to do with only minor discomfort* (Saunders & Vogel, 2015)". From this screen, users could return to the previous screen and start a new dance match or exit the game.

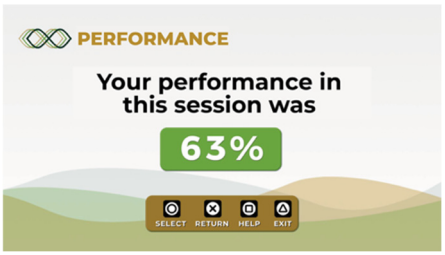


Figure 8: DanceMove initial interface proposal – game series performance screen.

For the initial proposal, the tutorial (FR-4.2) and configuration (FR-4.3) screens were not developed due to uncertainties about how to present the help content effectively and concerns that configuration

options might confuse users. For the tutorials, the initial idea was to provide help information in video format, explaining how to use the dance mat and how to play the game. However, since DanceMove was developed within the SHAPES project, using videos in Portuguese would make it difficult the digital solution's replication in other countries, requiring the production of new videos in different languages or the translation of existing ones. Regarding the configuration screen, although it is understood that customisation options are generally valuable in digital solutions (Guideline 93 – "*The system should allow users to customize specific functions, based on their differing needs* (Centre for Excellence in Universal Design, 2020)"; Guideline 223 – "*The system should allow the user to choose themes, font sizes, colours and the activation of specific options* (Kearney, 2020)"), the objective of DanceMove was to create a user-friendly interface for older adults. The interface already featured large buttons, icons, menus, and text to accommodate users with visual impairments. Additionally, configuring the game would require users to learn and navigate multiple steps, potentially complicating the experience and delaying access to the core activity: dancing (Guideline 77 – "*The system should reduce the demand on working memory by supporting recognition rather than recall and providing fewer choices to the user. Recognition is important since errors degrade usability and lead to user frustration* (Interaction Design Foundation, 2019)").

3.2 Final Interface Proposal

The initial interface design proposal was presented and discussed with the UA team of experts from the SHAPES project in several online meetings. During these discussions, changes were made to enhance the game's aesthetics, particularly in the colour palette and typography. Although the initial proposal was to follow SHAPES' visual identity to maintain consistency between the project's digital solutions, it became clear that warmer colours were needed to emphasize the game's playful nature and maintain user engagement (Guideline 197 – "*The system should use visual elements (colour, typography, layout, images, graphics, personified icons) to trigger the user's emotions* (Hu, 2018)"). Additionally, the initial colours did not visually match the dance mat, which could lead to confusion for older adults.

To minimize errors and facilitate the recognition of the elements in the interface (Guideline 138 – "*The system should have an age-appropriate interface for the target user, and be adaptable according to the users' physical and cognitive abilities, and their disability, if any, as well as their level of knowledge in technological interfaces* (Astell et al., 2018; Hartson & Pyla, 2019; Petersen et al., 2019)"), the new colour palette was aligned with the dance mat's colours: pink, dark blue, dark grey, and light grey (Guideline 117 – "*The system should use colours in a conservatively way, limiting the maximum number of colours in use to four* (Díaz-Bossini & Moreno, 2014; Kurniawan & Zaphiris, 2005; P. A. Silva et al., 2015)"). The main typography remained a modern sans-serif font for readability but was changed to the Mulish typeface. For the game's name, a new font, Hunters, was selected for its cursive style, conveying a sense of movement and fun (Figure 9).

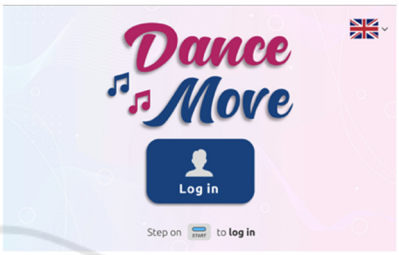


Figure 9: DanceMove final interface proposal – game opening screen.

Textual information was chosen over video tutorials to allow for easier and faster updates or translations if needed. The content was structured as 10 Q&A sections covering topics such as DanceMove's purpose, menu navigation, safety precautions related to the dance mat, and gameplay. To improve comprehension, answers included screenshots from the game (Guideline 129 – "*The system should give specific and clear instructions, make help and documentation available, focused on the user' task, list concrete steps to take, be brief and include all accessibility features* (Nielsen, 1994; Petersen et al., 2019). *Help and documentation available should be easy to search. Remember that it is better to prevent an error than to recover from it* (Henry, 2005; Nielsen, 1994; Petersen et al., 2019; Silva et al., 2015)").

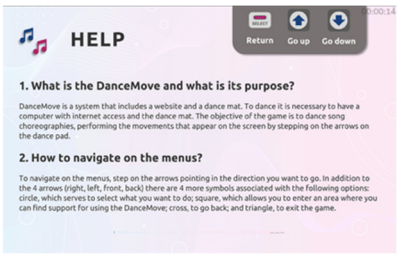


Figure 10: DanceMove final interface proposal – game help screen.

Below are additional screenshots of the game (Martins et al., 2025), illustrating key interface elements and design choices made to enhance the user experience. These visuals highlight the evolution of the game's aesthetic, including updates to the colour palette, typography, and interactive components.

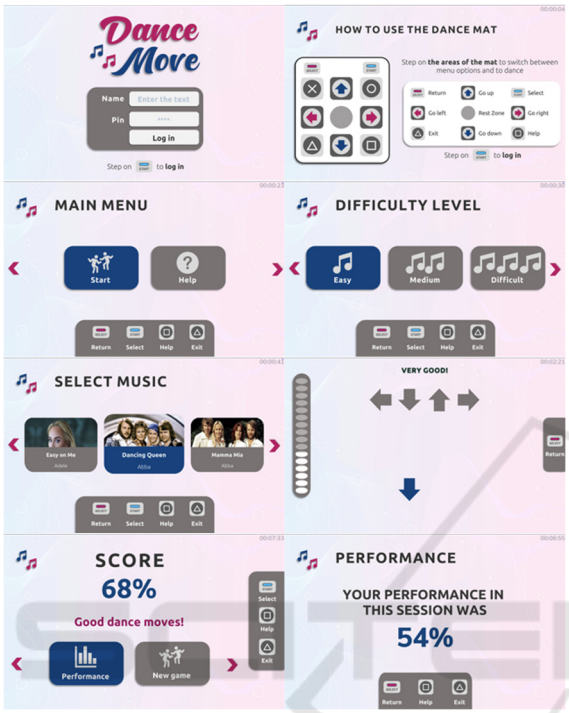


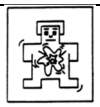
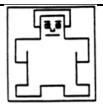
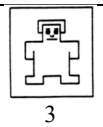
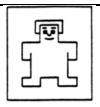
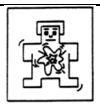
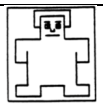
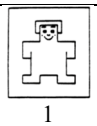
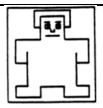
Figure 11: DanceMove final interface proposal screens.

3.3 Evaluation Tests with Older Adults

The evaluation tests of the final interface proposal were carried out with four women with an average age of 71.25 (SD 6.7) years. The individual meetings took place during the month of July 2023 at UA, with an average duration of 11 minutes and 30 seconds (SD 0.001) each. During the tests, each participant was asked to first navigate the solution and then play a DanceMove session with at least two different songs of any difficulty level. Regarding the SAM instrument, participants' responses to the valence, arousal, and dominance dimensions are presented in Table 1.

Overall, the participants' responses to the valence dimension were highly positive, with three participants (75%) reporting that they felt extremely happy while playing DanceMove, and one participant (25%) feeling happy. This positive emotion was reinforced by comments made by participants during the test and identified from the Think-Aloud protocol (e.g., OA3 – "*This is cool! This is cool! It's funny!*

Table 1: SAM questionnaire results.

Participant ID	Valence	Arousal	Dominance
OA1	 1	 2	 4
OA2	 1	 2	 3
OA3	 2	 2	 4
OA4	 1	 1	 4

This is good for your cognitive skills and for moving around. […] It's a good exercise for moving around, and cognition is maintenance for the brain").

Regarding the arousal dimension, three participants (75%) reported feeling excited, while one (25%) felt extremely excited during the activity. Although the overall response was positive, observations by the author CD during the tests revealed that participants experienced some difficulty in fully engaging with the game. This was evident in several situations: (i) the need to use a chair for support while playing (e.g., OA4 – "*I want to use the chair, can you leave the chair, please? This way I can balance myself better*"); (ii) initial doubts about their ability to play, as they assumed DanceMove might be too challenging (e.g., OA1 – "*I had to be younger... […] It wasn't very difficult to understand. A little at first, but then you'll learn*"); and (iii) fear of being judged for their dance performance (e.g., OA2 – "*It's easy, but I'm nervous, and I felt a little off balance because I was a little nervous*").

In relation to the dominance dimension, the questionnaire responses revealed that three participants (75%) felt in control of their emotions while playing, while one participant (25%) reported a neutral level of emotional control. These results can again be attributed to the general insecurity older adults often feel when using digital solutions. None of the participants reported feeling completely in control of their emotions, likely due to their unfamiliarity with the game and lack of prior experience with foot interaction digital solution. The lowest score (neutral) came from participant OA2,

who had previously mentioned that her nervousness while playing DanceMove affected her balance on the dance mat and her overall performance in the game (e.g., OA2 – *"[about difficulties playing DanceMove] Only sometimes the front or back... that's it, it causes a little more confusion, it's the front and the back. The laterals are done more naturally, let's say. The other is more difficult because I always think that it is the front that is the easiest, but we see the grey [stationary arrow] and we don't look at the arrow [which is going up]*").

4 DISCUSSION

This study aimed to present the user interface design process of DanceMove, a dance game that promotes healthy aging through physical and cognitive activity and social interaction among older adults. The game was developed within the framework of the SHAPES project, with a focus on creating an inclusive and user-friendly experience, adapted to the needs of older users. Evaluation tests, conducted with a small group of older adults, suggested that DanceMove provided a fun and engaging experience. Participants reported feeling extremely happy and motivated while playing, which aligns with the playful nature of dance games and the potential to encourage users to play more frequently (Lange, Flynn, et al., 2010; Warburton et al., 2007).

During the evaluation tests, participants also made comments related to their interest in continuing to play, especially in the context of their daily activities at the University of Cacia. According to the participants, the University offers computer and dance classes, which would be positive for using the game, since it combines both areas. This interest in continuing to play and using the game in other contexts suggests that DanceMove has the potential to serve as a source of interaction and socialization among colleagues, friends, and family. The game's design, which integrates choreography, adaptive difficulty levels and familiar music, not only makes it accessible, but also encourages users to engage in physical activity, which is essential for working on balance, coordination and cognitive skills (Green & Bavelier, 2003; Hatzitaki et al., 2009; Maloney et al., 2008; Riesenhuber, 2004). By combining these elements, DanceMove supports active aging and might help combat loneliness and isolation, common problems among older adults.

Some challenges related to the game were also identified during testing. Resistance to the use of new technologies is already a common barrier among older adults (Gregor et al., 2002; Silva, 2014) and was evident during testing in the initial hesitation when playing and the need for additional support, such as using a chair for balance. In future work, these issues should be addressed by, for example, adding more comprehensive tutorials, on-screen guidance, and audio versions of textual information, which would allow users to listen to the cues while looking at the dance mat. These additions to the game would reinforce the explanation and encourage users to try the mat while listening, helping users feel more confident. In addition, future versions of the game could also include multiplayer modes, which would allow users to dance together with friends and family, promoting social interaction between users. Incorporating an intergenerational component, where older adults, adults, and children can play together, could also be a way to encourage family involvement and playful interaction. These changes would be an opportunity to make the game more enjoyable and encourage older adults to incorporate the game into their daily routines, contributing to a more active and healthier lifestyle. It is also important that further testing be conducted on a larger scale with a more diverse group of older adults to validate the effectiveness of the game and identify other areas for improvement.

5 CONCLUSIONS

The user interface design process led to the creation of a dance game targeted at older adults that promotes healthy aging through physical activity. DanceMove considers the characteristics and needs of users and has the potential to have a significant impact on physical, cognitive, and social well-being. Although initial results are promising, improvements are needed, particularly in addressing older adults' technological insecurities and enhancing the game's social features. Future research and development efforts should focus on expanding the game's features, improving its accessibility, and assessing its effectiveness through large-scale studies.

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