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Acceptance of Different Design Exergames in Elders Version 3

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Abstract

For promoting the successful aging of elderly residents of Chang Gung Silver Village in Taiwan, five interactive exergames were developed to promote the well-being of the elderly. The exergames included both physical games and cognitive games and were implemented using various computer-based technologies in the Chang Gung Silver Village. The exergames were trialed by 39 elderly residents (15 male, 24 female; mean age 79.5 ± 17.5 years) of Chang Gung Silver Village. Following the trials, the participants were requested to complete a Technology Acceptance Model 2 (TAM2) questionnaire. The results showed that the perceived playfulness and perceived usefulness of the exergames were significantly related to the users' usage behavior and intention to use for both the physical games and the cognitive games. However, a relationship between the output quality of the game and the usage behavior was apparent only in the case of the cognitive exergames. Finally, the impact of social influence on the intention to use and the usage behavior was more pronounced for the physical exergames. Overall, the results revealed that the acceptance of exergames by the elderly depends not so much on the awareness of fun in using the game, but the perceived usefulness of the related physical and cognitive abilities.

Guidelines

Participates have enrolled from Chang Gung Silver Village participated in this study. All of them are walking and living independently without physical or cognitive impairment. Those with the neuromuscular or musculoskeletal disease, permanent impairment of cardiopulmonary function, poor balance, frailty, and poor vision people were excluded in this study.

Before start

They signed the inform-concern to know that they could discontinue the tests if discomfort developed including dizziness. We provided an assistant for each elder to protect and prevent injury.

Protocol

Step 1.

This exergame is designed to increase the physical activity of the arms and body of the elderly and allow them to recall their life memories through photographs. Using the KINECT wireless sensor, the elders stand in front of a wall projection, waving their arms to select and watch the photos of their previous activities. It involves a space interactive learning device and community learning, that is, elders can participate together to recollect life memories with movements of limbs and body.

(A)   (B)   (C)

(D)   (E)   (F)

Interactive Floor Kick and Play

Step 2.

Interactive floor kick and play is focused on lower limb movement, with or without upper limb movement, in response to the projection of a floor game. There are three games in this system in different levels of speed. The challenge in this exergame is immediate body movement in response to changes in a portion of the game area. The objective is to enhance elders' physical activity and exercise response capabilities.
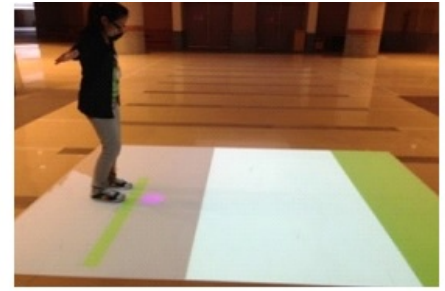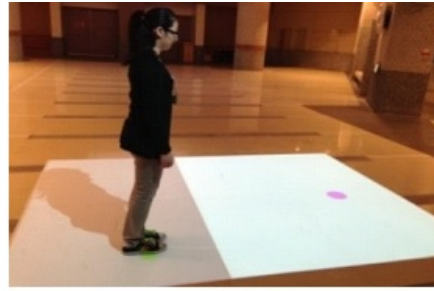
(A)

(B)

(C)

Ten Pretty Pass of the Bull

Step 3.

This is a set of 10 challenges on a TV wall for a cowboy with a bull. It is a touchscreen-based interactive game for training elders in eye-hand coordination on the road under different conditions to elicit quick responses such as dodging a mango falling from a tree or avoiding smoke from a kiln. There are three selectable difficulty levels for each station, namely, simple, ordinary, and hard. When a player responds quickly through one checkpoint, they can skip that set to move to another challenge. At the end of the game, participants can send messages to others via an app. This interactive game is set on an uphill incline to increase the physical exertion of participants. Moreover, the inbuilt messaging functionality can increase connections among the elders in the village ~~and those between the elders~~ and their family members and friends in faraway towns.

Interactive Table with Musical Pots

Step 4.

This interactive table housing five pots having songs inside is designed for controlling metabolic syndrome among elders. After RFID identity authentication, each elder can read the screen to know their standing in terms of the own situation of the ~~five~~ criteria of metabolic syndrome, namely, hypertension, hyperglycemia (diabetes mellitus), dyslipidemia (elevated triglyceride, decreased high density lipoprotein (HDL)), and obesity (increased abdominal circumference). How many pots they can enjoy the songs will encourage them to control the physical condition and receive regular physiological test of these five indicators of metabolic syndrome and install the data into the device. These recreational activities can also remind them to take care of their own health situation. The potteries on the table play more songs for more favorable health status of the elders.

(A)   (B)   (C)

Fun Cube

Step 5.

This exergame involves a touch-screen computer linked with six fun cubes to show different picture, figures, or words for games. Many different types of games and their demonstrations can be selected from the screen (home page) for different purposes, such as memory, sorting, pairing, and arithmetic.

After each game is completed, the screen displays all the reference points and scores for self-comparison or for comparison with others. These mental training computer games are very lifelike, interactive, and creative to help elders decelerate memory loss and promote cognitive practices in a user-friendly way.

Warnings

They could discontinue the tests if discomfort developed including dizziness. We provided an assistant for each elder to protect and prevent injury.