

Antiaging games that keep your body and mind healthy: NYCU works with the gaming industry to solve population aging

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Taiwan officially became an aged society in 2018. The social impact resulting from an aging population is extensive. Reversing the effect of aging and preventing disability and dementia has become a worldwide endeavor, and the concept of healthy aging has received growing attention. Previously, people only sought to extend their expected lifespan; nowadays, people focus on healthy longevity.

Due to Acer founder Stan Shih initiation, National Yang Ming Chiao Tung University (NYCU) began working with International Games System (IGS) and Bonus Winner Online Entertainment in 2019 to jointly launch a multiyear innovative research project entitled "The Efficacy of Digital Gaming Intervention on the Cognitive, Physical and Mental Functions of The Elderly". The aims of the project is to train older adults to exercise their brains, body and mind to reverse the effect of aging and prevent dementia. With a multiple year foundation in the field of gerontology, NYCU initiated a cutting-edge study that integrates the concept of digital games, artificial intelligence, and ageless to provide new solutions for global aging concerns. There are two kinds of digital games in this project which are digital somatosensory dance and digital Mahjong.



The project investigator is Professor Liang-Kung Chen, a scientist of international geriatric medicine who serve as the NYCU Center for Healthy Longevity and Aging Sciences Director, and Taipei Municipal Gan-Dau Hospital Superintendent. Members of the research team comprise Professor Ching-Po Lin (brain imaging expert from the NYCU Institute of Neuroscience), Professor Heng-Hsin Shannon Tung (geriatric care expert from the NYCU Department of Nursing), and Directors Li-Ning Peng and Wei-Ju Lee (geriatric medicine experts in Veterans Hospital).

The unique full-body design of digital somatosensory dance games not only improves the limb flexibility of older adults but also exerts a positive effect on the brain. This enables the cognitive skills of older adults to improve considerably. Notable improvement has also been observed in both the insular region, which is responsible for processing senses, emotions, and attention, and the cerebellum region, which is responsible for motor control, attention, and cognition-related activities.

According to the research results, mahjong digital game training enables older adults to feel gradual improvements to their judgment and responsiveness. Moreover, the mental toughness and daily health scores of the participating older adults have improve considerably. Substantial improvement has also been observed in the function of the temporal fusiform cortex responsible for the brain's advanced visual processing, particularly color recognition, character recognition, and facial recognition.



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Some international studies have also reported that interesting and entertaining health-promoting activities can enhance the retention and persistence of older adults. Dance moves paired with brisk, powerful music rhythm for hand-eye coordination training and mahjong games that require considerable strategic thinking can effectively prevent dementia in older adults. Therefore, antiaging games are worthy of attention and further exploration.

Can you imagine what your later years will look like? Do you picture them being long and disease-ridden or healthy, like those of the late Queen Elizabeth II of the United Kingdom, who remained healthy and almost mobile to the last day of her life. Most people would likely wish that their later years are healthy. However, according to the statistics of the Ministry of Health and Welfare, the average unhealthy life expectancy of Taiwanese people was longer than 8 years in 2020. In addition, many Taiwanese people could not bid farewell to their families before passing or have a fulfilling older adulthood.

Professor Chen says that greater health awareness has prompted more people to understand the importance of healthy aging. To maintain the quality of life at an old age, individuals must continue to exercise their bodies and minds daily. As much of a cliché as it sounds, practical engagement in healthy aging behavior is necessary, and individuals must conduct physical and mental exercise simultaneously. However, developing exercising habits is difficult. Implementing long-term health-promoting activities among older adults without habitual exercise is challenging because older adults may lack motivation, incentives, and interests.

He also says that most postretirement lifestyles are casual with no specific schedules. Activities such as video gaming, which is not affected by time, place, environmental, and climatic restrictions, can entertain and challenge older adults and subsequently provide a sense of accomplishment. Nervous system function, concentration, movement coordination, and the precision of older adults can be enhanced through video games. The present research findings can be applied to new business endeavors that provide continual physical training through various interactive media.



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IGS says that the interactive dance machine, DANZ BASE, is available in many countries and has brought joy to countless people. To contribute to society through games, IGS has worked with NYCU to jointly develop innovative technology for antiaging video games. Clinical experiments have been conducted to explore the effect of somatosensory games on delaying aging. Moreover, experiments have assessed whether older adults—by dancing intuitively with the somatosensory dance machines—could enhance their spatial awareness, improve hand-foot coordination and flexibility, activate eye function, and improve sensory function between the brain and limbs. After 3 years of research and discussion, antiaging games have achieved excellent outcomes, which is a boon for society and encourages more enterprises to invest in social welfare.

In response to the various news media reporting that mahjong can prevent dementia and resolve loneliness among older adults, Bonus Winner Online Entertainment has been developing the "Bonus Winner Mahjong" for years as a contribution to society and as part of the research project on developing innovative technology for antiaging video games. After 3 years of rigorous medical examinations, gradual improvement has been observed in older adults who played mahjong video games in the areas of brain cognition, emotional processing, judgment, and responsiveness. Therefore, the mahjong game can greatly benefit older adults in clinical settings. Visitors welcome to attend the Healthcare Expo at Taipei Nangang Exhibition Center in early December of 2022 and play the game in-person at the NYCU booth.