



Lin C-S [林清壽], Lin S-J [林曉滇]. *Using Unified Theory of Acceptance and Use of Technology to Explore the Behavioral Intention of Senior Drivers*. *Journal of Gerontechnology and Service Management* 2012;1(1):1-18; doi:10.6283/JOCSSG.2012.1.1.01 Driving a car for seniors is an independent activity and also an important indicator of continuing participation in social life. This study, based on the Unified Theory of Acceptance and Use of Technology, aimed to explore the behavioral intention of senior drivers. The results were forwarded to relevant transportation units in the government and to car manufacturers as a useful reference when planning and designing in the future. The participants in this study were all over age 50, with a valid driving license, and residing in central Taiwan. Descriptive statistical analysis was applied to the completed questionnaires to measure overall reliability and validity, and to assess the validity of the study model as well. The results of this study show that performance expectancy and social influence have significant positive effects on the behavioral intention of senior drivers. Performance expectancy had the highest effect. Physiological function had a significant negative impact; effort expectancy had no significant impact. The explanatory power of behavioral intention in this overall model was 0.58 (2R). In addition, analysis on moderating variables indicated that the factors of physiological function and gender significantly interfered with the behavioral intention of senior drivers: male drivers were more likely to modify their driving behaviors. Age in effort expectancy revealed significant effects: older senior drivers cared more about easy-to-operate cars. The study recommended that car manufacturers should meet the needs of the growing number of older drivers.

**Keywords:** performance expectancy, behavioral intention, UTAUT

Pei C [裴駿], Sun T-L [孫天龍], Huang C-H [黃建華], Chi W-M [紀偉民]. *Employ Virtual Reality Technique to Quantify Motor Control Estimation*. *Journal of Gerontechnology and Service Management* 2012;1(1)19-34; doi:10.6283/JOCSSG.2012.1.1.19 The aim of this study was to assess a subject's motor control ability by means of a virtual reality technique. This technique was used to establish a digital human model (DHM) and posture models. A motion capture (MoCap) system recorded the action of the participant in real-time, enabling the interaction between human posture model and DHM in this virtual environment to be observed. The study also used a standard deviation statistic to analyse lateral-medial (X) and anterior-posterior (Y) directions, and the length of trajectory to quantify trajectory displacement of center of mass (COM) during single leg standing actions. Participants were divided into two age-groups: seven "young" (average age of 24) and ten "senior" (average age of 65). This study used two dimensions and two moving speeds of the posture model to yield four assessment parameters. The posture model was designed with wider width to help keep the DHM within the model during the MoCap experiment. However, with a narrower width of posture model dimension, the resulting DHM would more closely correspond to the human posture model. Two moving speeds, one and five seconds, will be applied to the posture model's moving 3 meters to the DHM in the virtual reality environment. The stability of one leg standing was estimated and studied based on these two age groups and the four assessment parameters. This study produced the following three results: (1) Under both conditions where the widths of the posture model's dimension were either wider or narrower, the two moving speeds of the posture model significantly affected the standard deviation of COM trajectory displacement on x-direction in the "young" group. In addition, the two moving speeds significantly affected both the standard deviation of COM trajectory displacement along the y-direction and the length of trajectory for the "young" group. (2) The two moving speeds of the posture model significantly affected the standard deviation of COM trajectory displacement along the x-direction for the "senior" group only under the condition of wider width of the posture model. However, the two moving speeds had no effect on the standard deviation of COM trajectory displacement along the y-direction and length of trajectory for the "senior" group, under neither the wider nor the narrower width. (3) Irrespective of the moving speeds of the posture model, the two widths of the posture model did not significantly change the standard deviation of COM trajectory displacement along either the x- or y-directions in either the "young" or "senior" groups.

**Keywords:** virtual reality technique, motor control, center of mass (COM)

Liu G-Y [劉冠佑], Wu H-Y [吳信義], Wu S-S [吳錫修], Chen C-L [陳瓊玲], Chiu M-C [邱敏綺], Teng Y-L [鄧雅凌]. *Design of Interactive Sound and Light Eye-Hand Coordination Training System*. *Journal of Gerontechnology and Service Management* 2012;1(1):35-48; doi:10.6283/JOCSSG.2012.1.1.35 Design of Interactive Sound and Light Eye-Hand Coordination Training System. A lack of motor coordination is one of the most prevalent clinical conditions that occupational therapists treat. According to motor learning theories, practice and feedback are crucial for motor relearning. Traditionally, occupational



therapists design therapeutic activities for clients, instruct practice procedures, and give verbal feedback based on performance. Encouraging patients to make successively more controlled and precise movements can improve motor coordination. However, studies have demonstrated conventional rehabilitation to be time-consuming, labor- and resource-intensive, and reliant on patient compliance. In addition, repeat practice decreases patient motivation, and feedback to patients has been shown to be inconsistent. Therefore, new therapeutic devices are urgently needed to maintain and increase patient motivation, ensure efficacious coordination training, and alleviate job pressure on professional therapists. These devices should possess sensors that provide consistent cues and reliable feedback to patients. The main purpose of this study is to design an interactive, sound-and-light, eye-hand coordination training system that operates in real-time, with high accuracy, efficiency, and sensitivity. It will provide eye-hand coordination skills training for patients with autism or cerebral palsy, and upper limb motor function rehabilitation for the physically disabled. These devices can also be used for seniors and dementia patients to keep the body and brain active, hence expanding its purpose to include the general public, instead of just for those with rehabilitation needs.

**Keywords:** occupational therapy, eye-hand coordination training, stimulus / feedback

Chang T-R [張庭瑞], Wang C-S [王中行]. *Innovative Theory and Patent-design-around in Wheelchair Conceptual Design*. *Journal of Gerontechnology and Service Management* 2012;1(1):49-62; doi:10.6283/JOCSSG.2012.1.1.49 Innovation and patent-design-around are thought of as two facets in new product development. Managing both design innovation and patent-design-around is a crucial issue in both industry and research. Theory of Inventive Problem Solving (TRIZ) and Web of Interference System (WOIS) are the most commonly used algorithms in innovative process design. TRIZ uses 39 engineering parameters and 40 inventive algorithms to conduct innovative research. However, TRIZ cannot be used to assign the right time in the right place. The WOIS method is used to build a problem field matrix to improve contradictions seen in the TRIZ method. This research combined both TRIZ and WOIS to solve a problem in wheelchair design. Patent-design-around is also used to check if the design may possibly infringe on others patents. Two different conceptual wheelchair designs are created to show how this research works both in theory and practice.

**Keywords:** innovative algorithm, patent-design-around, problem field matrix, wheelchair design

Chen C-H [陳振華], Jhou S-Y [周順德]. *The Innovation for an Assistive Device of A Hand & Fingers Rehabilitation*. *Journal of Gerontechnology and Service Management* 2012;1(1):63-70; doi:10.6283/JOCSSG.2012.1.1.63 This study proposed an assistive rehabilitation device for hand and fingers. The device contains a glove with pneumatic bags and an installment of a hand rehabilitation, which is controlled to move backwards and forwards by a rodless-cylinder for specified fingers and arms. By pumping and releasing the five bar pneumatic bags, the fingers that are fastened to the glove can be straightened or bent. These pneumatic bags are elastic and either ball-shaped or strip-shaped, and incorporated into the gloves. Placing fingers on top of the gloves then pumping or releasing the pneumatic bags can straighten or bend the fingers. The device can be separated in order to use for only fingers or only hand. This device can assist with the hand and fingers rehabilitation, whether the patient is in hospital or at home. Its small size, simple structure, and easy operation make it very convenient for patients to install, transport, and operate.

**Keywords:** hand rehabilitation, pneumatic control, pneumatic bags

Tuan P-C [段伴虬], Chen T-C [陳聰堅], Lee W-L [李永隆]. *Design a controller for Intelligent Rehabilitation Robot Arm*. *Journal of Gerontechnology and Service Management* 2012;1(1):71-86; doi:10.6283/JOCSSG.2012.1.1.71 With the advent of an aging society, robots will be widely used in the context of care services and the functional requirements of robots as rehabilitation aids will face complex control problems. Therefore, improved smart rehabilitation robot arm controller design is necessary. In this paper, a combination of an intelligent input estimation method and linear quadratic regulator (LQR) control technology is used to design robot arms systems with dynamic load estimation capability and robust performance of the control system to address the need for a rehabilitation robot arm system to maintain high-performance and effective control in the face of unknown variations in the system dynamic load from the outside world. A lower limb rehabilitation robot arm joint control system can be thought of as an example. The intelligent input estimation method can effectively estimate and grasp the dynamic load conditions based on the validation results of the simulation which allows accurate load estimation without torque sensing equipment. LQR control theory is not overly sensitive to changes



in system parameters and exhibits the ability to deal with foreign high-frequency disturbances; this improves the performance of the controller and its ability to maintain adequate control so the patients will become more comfortable during the rehabilitation process.

**Keywords:** rehabilitation robot arm, input estimation method, linear quadratic regulator

*Pai M-C [白明昌]. Development of Remote Medical Monitoring Robot. Journal of Gerontechnology and Service Management 2012;1(1):87-92; doi:10.6283/JOCSSG.2012.1.1.87* The main purpose of this study is to develop a highly efficient and easily maintained remote medical monitoring robot. This robot offers greater flexibility and practicality than traditional applications. It can reduce the burden placed on medical personnel and family members. This would enhance the efficiency of medical institutions and long-term care management centers and would improve the quality of patient and senior care services and management. The framework of the remote medical monitoring robot includes the design of the chassis, the mechanism, the motor, and the drive and the programming of its internet-based remote monitoring capability. Finally, the hardware will be integrated with the software. The experimental results will be used to support the feasibility and efficiency of the proposed remote medical monitoring robot.

**Keywords:** remote medical monitoring robot, Nursebot, CareBot

*Chi W-M [紀偉民], Huang C-H [黃建華], Hsu C-N [徐仲楠], Haung Z-J [黃振嘉], Pei C [裴駿]. A Novel Walker with Build-in Horizontal Adjustment for Slopes. Journal of Gerontechnology and Service Management 2012;1(1):93-100; doi:10.6283/JOCSSG.2012.1.1.93* Assistive devices-Walkers increase the mobility of a person with lower limb disabilities or poor balance. Users need to have good function in their upper limbs. In Taiwan, 47% of common assistive devices are walkers and canes; but users of these devices have a higher risk of injury or falls than wheelchair users. The regular type of walker used by patients in Taiwan often causes users to lose their balance and fall. The users cannot keep the center line of their body and the line of their body's center of gravity parallel while they walk on slopes with a regular walker; also, walkers and canes do not provide sufficient support points for walking on stairs. We developed and evaluated a new walker with build-in horizontal adjustment that helps the user to overcome slopes and stairs. When the user walks with the new walker, the user simply adjusts the angle of the handles by holding the handle switches to keep the handles horizontal, allowing the user to maintain their balance with a normal walking position on slopes. The major procedures of the test are: (1) comparison of gait of users with the regular walkers and the new walkers using the Vicon motion analysis system (Oxford Metrics, Oxford, England) as well as a biomechanics analysis system; (2) calculation of the supporting moments of upper and lower limbs of persons using the new and the regular walkers. The results show: during ascent, the new walker can provide more support moments for the upper limbs than a regular walker. In descent, the new walker can reduce loading moments. In conclusion, the new walker is more stable, convenient and safer than the regular one. Also, the data analysis results can provide as an important index for continuing efforts to modify the new walker.

**Keywords:** walker, gait analysis, joint moment, built-in horizontal adjustment

*Lin H-Y [林欣儀], Chung S-T [張淑婷], Cheng C-W [鄭喬璋], Chen S-Y [陳毓環]. Relying on the Cardigan Huyao Underwear. Journal of Gerontechnology and Service Management 2012;1(1):101-106; doi:10.6283/JOCSSG.2012.1.1.101* The function of the lumbar region of the back is to support the weight of the human body. The body can stay upright, bend forward and backward, bend laterally, and twist, for daily activities using normal lumbar motions. Also, the lumbar region assists one to withstanding pressures from many actions and is an essential support of bone tissue. As one's age increases, wear and tear in the lumbar region will cause increased pressure on other parts of the body. As a result, elderly people become more prone to suffer from relational diseases than young people. The elderly commonly suffer from various diseases and conditions of the lumbar region, such as, lumbar disc or spinal stenosis, osteoporosis, and intervertebral disc aging. The elderly are prone to feeling uncomfortable because of lumbar pain. Furthermore, lumbar pain influences the level of activity of an elderly person. When increased pain reduces their level of activity, this leads to limited activity of the waist and lumbar area which reduces durability resulting in diminished lumbar spine function. The idea of "mothering parents" is adopted from the book "Kuo-Feng .Chou-Nan. Ko-Tan." The poem in the book expresses the idea of children making the clothes for their parents. The purpose of the description lies in the concept of "Fu-Chih-Wu-Yi" or "mothering parents." The two sentences convey the idea of children of serving their parents and showing filial piety and compare it to wearing comfortable clothes. Therefore, relying on



comfortable pajamas is a good concept for aged parents and the elderly. It's similar to helping parents and the elderly feel their children are always showing tender-loving care for them. The comfortable pajamas become something aged parents and the elder can rely on.

**Keywords:** Cardigan underwear, Waistguard, vertebra

Wang K-H-C [王熙哲], Xu H-L [許惠諭]. *A Study of Discovery the Needs of Travel Service for Senior*. *Journal of Gerontechnology and Service Management* 2012;1(1):107-118; doi:10.6283/JOCSSG.2012.1.1.107 The recently increased standard of living in Taiwan, along with advances in medical care, has gradually increased the longevity of the Taiwanese population. The senior travel market will become an important segment in the future economy. The purpose of this study is to explore the travel service needs of seniors. This study used the service experience engineering (SEE) approach to explore the travel service needs of seniors using contextual inquiry of senior's travel behavior. Fourteen seniors were invited to participate in this research. The result of this study will provide the travel industry with ways to improve travel service in the future.

**Keywords:** contextual inquiry, service experience engineering, travel service, senior

Chen J-Y [陳建佑], Chen J-H [陳建華], Huang K-C [黃庚取], Chen C-M [陳俊明]. *Design of New Electric Stand-up Aid*. *Journal of Gerontechnology and Service Management* 2012;1(1):119-124; doi:10.6283/JOCSSG.2012.1.1.119 With recent advancements in medical technology as well as the rise of the regimen concept, the average life expectancy of a human being continues to increase. This results in an aging society, already observed in many countries. The World Health Organization estimated that there will be nearly 690 million seniors by 2025. The degeneration of joints and muscle strength will affect the ability of self-management and reduce the quality of life for seniors. Therefore, it is necessary to have aids to help seniors to modify body posture such as moving from a sitting position to a standing position or vice versa. This electric stand-up aid is a necessity for seniors with weak knees and muscles; it is even more crucial for clinical groups who have no muscle strength in lower limbs. The electric stand-up aid can keep the lower limbs in a stable position and give extra support for a short walk. Because traditional stand-up aids are not motorized, they cannot meet the needs of those individuals who have no muscle strength in lower limbs. Therefore, the electric stand-up aid certainly has a market. This article introduces the electric stand-up aid designed by the TEH LIN Prosthetic & Orthopaedic, INC.

**Keywords:** aging society, elderly, stand-up aid

Hsu P-E [許博爾], Hsu Y-L [徐業良], Chang C-H [張程皓], Weng Q-X [翁啟軒], Zeng J-H [曾吉宏]. *The Multiple-DOF Seat Adjustment Mechanism Design Based on the 4-axis Stewart Platform*. *Journal of Gerontechnology and Service Management* 2012;1(1):125-132; doi:10.6283/JOCSSG.2012.1.1.125 The wheelchair user makes direct contact with the seat, which serves as the interface between the user and the wheelchair, for much of any given day. Seat adjustment design is of crucial importance in providing proper seating posture and comfort. This paper presents a highly adjustable seat adjustment mechanism, which is designed to increase the independence of the wheelchair user, while maintaining a concise structure, using a light weight design, and providing an intuitive control interface. This four-axis Stewart platform is capable of the dealing with the motions of heaving, pitching, and swaying while providing seat elevation, tilt-in-space options, and sideways movement functions. The geometry and types of joints of this mechanism are carefully arranged so only one actuator needs to be moved at any one time for any particular desired motion, enabling the wheelchair user to adjust the seat by simply pressing a button.

**Keywords:** seat adjustment mechanism, Stewart platform, robotic wheelchair, sideways movement

O. Rivera, F. Sancho, M. Sánchez, A. McCormick, A. van Berlo, Á. Barrios, J. Benito, J. Yanguas, I. San Sebastián. *AAL Summit 2012: The Basque Country Declaration*. *Journal of Gerontechnology and Service management* 2013;1(2):1-4; doi:10.6283/JOCSSG.2013.1.2.01 This is a translation in Chinese of *Gerontechnology* 2013;11(4); doi: 10.4017/gt.2013.11.4.004.00

A.A. Franco, J.L. Fozard, D.G. Bouwhuis, J.E.M.H. van Bronswijk, N. Charness, M. Colombo, Y-L. Hsu, C.C.M. Hummels, W.D. Kearns, H.S.M. Kort, D.F. Mahoney, D. Spierings, A. Tinker, H.W. Wahl, P. Wright. *The Basque Country Declaration: Gerontechnology Comments*. *Journal of Gerontechnology and Service management* 2013;1(2):5-10; doi:10.6283/JOCSSG.2013.1.2.05 This is a translation in Chinese of *Gerontechnology* 2013;11(4); doi:10.4017/gt.2013.11.4.011.00



Tuan P-C [段伴虬], Chen T-C [陳聰堅], Su T-Y [蘇德義]. *The Service Contextual Inquiry Algorithm to the Tele-health Care Service Design*. *Journal of Gerontechnology and Service management* 2013;1(2):11-26; doi:10.6283/JOCSSG.2013.1.2.11 The demographic trend of an aging population with parents having fewer children has become a global phenomenon. Because of the urgent demands of the elderly and a shortage of nursing resources, the "telehealth care" industry is booming, and from a users' point of view a need exists to design and popularize a system of telehealth care. Service science is the basic principle underlying telehealth care, but service is an intangible product which is difficult to define or make uniform. Therefore, this study, which was based on the theory of Service Experience Engineering (SEE) developed by the Innovative Digitech-Enabled Applications & Services Institute (IDEAS) in 2008, was conducted using a contextual inquiry of practical service experience based on observations and interviews designed to document the users' viewpoint. Five consolidated models were used to analyze the potential demands and obstacles to creating a telehealth care system for the elderly. The results, which were designed to match the service demands and timing needs of telehealth care for the elderly as defined by SEE, reveal: 1) an assistant needs to be designated for each elderly client, 2) the efficiency and methods of the system need to be improved and/or expanded, 3) the test environment should be designed using a "home-like" atmosphere, 4) government funding is recommended because the elderly are often unwilling or unable to pay for the service.

**Keywords:** elderly, tele-health care, service science, service experience engineering

Chen C-K [陳啟光], Hsieh M-C [謝明澄], Shie A-J [謝安晉], Yu C-H [于長禧]. *The Use of Value Co-Creation Concept to Develop a Customer-Oriented Service Business Model: Case Study on Home-Health Service*. *Journal of Gerontechnology and Service management* 2013;1(2):27-46; doi:10.6283/JOCSSG.2013.1.2.27 The purpose of this paper is to propose a methodology for the development of a customer-oriented service business model by using the value co-creation concept. The value co-creation recently becomes one of the most important concepts in service industries. However, it is still lack of an appropriate methodology to develop a service business model through the value co-creation process. The study attempts to address this issue. The methodology proposed in this study is a three-stage design: issue preparation, conceptual development and conceptual integration. In order to illustrate how the proposed methodology works in practice, a case study in the subject of a tele-home care service business model development is conducted. The case demonstration can be a good reference for those practitioners who are interested in the customer-oriented service system design.

**Keywords:** customer-oriented service, value co-creation, service business model, service experience engineering, tele-home care

Lu T-H [盧東宏], Lin H-C [林星辰], Chen R-R [陳蓉蓉], Chen Y-L [陳雅苓], Lee Y-H [李岳軒], Tseng Y-H [曾宇弘], Chen H-L [陳雪玲]. *Motion-Sensing Based Exercise Management Tele-System for Multi-User Cardiac Rehabilitation*. *Journal of Gerontechnology and Service management* 2013;1(2):47-56; doi:10.6283/JOCSSG.2013.1.2.47 This paper describes a remote motion-sensing based exercise management system. This multi-user cardiac rehabilitation system includes the use of various aerobic exercises and features an integrated physiological sensing system that provides live coaching feedback. The home-end of the system not only provides instruction and exercise coaching, it also performs motion similarity analysis in real-time while it simultaneously transmits data to a telecare center including the user image, a live streaming image of the exercising person's skeletal positioning, and physiological information. Using the combination of the home-end and the remote-end systems as well as real-time care management by a one-to-multiple personal exercise monitor, this system can provide the user with a variety of personalized exercise prescriptions and real-time cardiac rehabilitation coaching in a relaxed, safe and effective rehabilitation exercise environment. Therefore, by using this telesystem during cardiac rehabilitation the patient can not only be monitored for compliance with the rehabilitation exercise prescription, but also can be monitored for the long-term and evaluated to see if the patient is reaching the predicted goals and intensity of the rehabilitation exercise prescription in a way that improves patient compliance.

**Keywords:** motion-sensing rehabilitation exercise system, care service platform, cardiac rehabilitation

Liu P-J [劉品如], Pei C [裴駿], Sun T-L [孫天龍]. *Kinect-based Long-distance Avatar Interaction to Support Distanced Elderly Care*. *Journal of Gerontechnology and Service management* 2013;1(2):57-70; doi:10.6283/JOCSSG.2013.1.2.57 This study augmented Microsoft's Avatar Kinect™ technology to develop a long-distance elderly-care platform. The platform allowed a person at a remote location to motivate an



elderly person to do exercises through avatar interaction. This paper first introduced the development of a long-distance avatar interaction platform using the depth camera Kinect and a game-authoring tool called Unity3D. We discussed Kinect, the integration of Kinect with Unity3D to manipulate a 3D avatar in the game scene, and the connection and synchronization of two Unity 3D scenes at geographically remote sites. A preliminary user experience evaluation experiment was conducted by introducing the developed platform to an elderly day care center in central Taiwan. Volunteer students from nearby universities used Skype and the Kinect avatar interaction platform to motivate the elderly to exercise. The experiment results showed that when only Skype-based long-distance voice and video communication is used, the elderly tended to talk to the students and did not want to exercise. But when Skype is used together with our Kinect-based avatar interaction platform, the elderly will shift their focus to the student's avatar to follow the avatar's movement. As such, the student volunteer can easily motivate the elderly to exercise. This effect is more pronounced for male elderly.

**Keywords:** Kinect, long-distance avatar interaction, elderly care

Huang Y-C [黃于珍], Hsu Y-L [徐業良]. *Building a Personal Home Telehealth System Based on Social Network Journal of Gerontechnology and Service management 2013;1(2):71-80*; doi:10.6283/JOCSSG.2013.1.2.71 Home telehealth systems generally focus on building connections between the home and home health care service providers. The majority of service contents are health caring, and the technical emphasis is on establishing an information channel for health data transmission between homes and home healthcare service providers. Although useful physical data monitoring equipment and information communication technologies (ICT) are readily available and have been used by many researchers and businesses, they have not become as popular as expected. In practical applications, such systems are often too complicated, cost is too high, and potential users (including the elderly and their caregivers) do not have enough motivation. This research, "Building a personal home telehealth system based on social network," developed two Apps based on Web 2.0 and used existing cloud services and personal mobile devices to simplify a home telehealth system and reduce its cost. The system also connected to Facebook, which is the biggest social network in the world. It lets more family members join in and form a small "family social network." The family members can take care of elderly relatives and share life experiences. Most importantly, the system transforms a home telehealth system into a platform of communication and care between the elderly and their families.

**Keywords:** Home tele-health system, Social network, Tablet PC

Cheng C-M [鄭智銘], Hsu M-S [許明信], Huang C-M [黃秋美], Chen L-C [陳麗娟]. *Physical and Mental Support Services Utilizing Telecare Technologies for Pregnancy Women in Taiwan. Journal of Gerontechnology and Service management 2013;1(2):81-88*; doi:10.6283/JOCSSG.2013.1.2.81 Providing physical and mental support services for pregnant women, a national project funded by the Bureau of Health Promotion, Department of Health, R.O.C. (Taiwan), served about 18,000 phone users and 200,000 website visitors in the 12 months beginning April, 2011. The support center integrated information and knowledge from government institutions, medical societies, and a knowledge database to provide telecare services such as on-line consultations, websites, and brochures. According to a customer survey, the number of mobile device users is expected to grow.

**Keywords:** pregnancy, telecare, Bureau of Health Promotion

Wang K-H-C [王熙哲], Lo T-H [羅天翔]. *A Study of Discovery the Needs of Exercise Service for Senior: ERG Theory Perspective. Journal of Gerontechnology and Service management 2013;1(2):89-104*; doi:10.6283/JOCSSG.2013.1.2.89 In this study, we used Alderfer's ERG theory to analyze exercise services provided to seniors. Because most of the available sports equipment, facilities, and environment on the market are designed for younger people, they are often difficult for seniors to use. This tends to discourage seniors from exercising. However, studies indicate that seniors' satisfaction with life can be increased by exercise participation, which suggests that understanding how to improve exercise services could yield tangible benefit. This study conducted interviews through a semi-structured interview skeleton to investigate seniors' exercise services by adopting ERG needs theory. Data were collected through in-depth one-to-one interviews with 12 senior participants who were screened by selecting six types of exercises, three from each of outdoor and indoor exercise categories divided by exercise tissues and functions. ERG needs theory was applied as a basis, and the exercise-related frustrations reported by the participants were



grouped into the following nine types: self-identification, strong, figure, active, environmental safety, living amusement, interpersonal relationship, exercise facility/device design, and professional suggestion.

**Keywords:** ERG theory, needs theory, types of exercises, senior

*Lin C-S [林清壽], Liang F-J [梁蕪真]. A Study on the Behavioral Intention of Travel for the Middle-aged People and Senior Citizens. Journal of Gerontechnology and Service management 2013;1(2):105-122; doi:10.6283/JOCSG.2013.1.2.105* Leisure activities enhance physical and mental health and quality of life for middle-aged people, implying that they can reduce the need for medical treatment and ultimately the cost of medical expenses. The most important leisure activity is traveling. In order to understand the behavioral intention of participating in domestic travel for senior citizens, the study used the theory of planned behavior and perceived enjoyment construct of flow theory to establish the research framework. A questionnaire was used to investigate the factors affecting behavior intention of domestic travel for people aged over 45 who live in Nantou County. The results showed that the higher the education level, the stronger the attitude, perceived enjoyment, and behavioral intention. Also, the more affluent the participant, the higher the attitude and behavioral intention. Multiple regression analysis found that perceived enjoyment and perceived behavioral control had the greatest effect on behavioral intention. Subjective norm and perceived enjoyment nonetheless had a significantly positive effect on behavioral intention, through the mediating effect of attitude.

**Keywords:** theory of planned behavior, flow theory, perceived behavioral control, subjective norm

*Lim C-K [林楚卿]. Memories: Creative Elderly Product Designs and Memories Evokes Spatial Design for Dementia. Journal of Gerontechnology and Service management 2013;1(2):123-132; doi:10.6283/JOCSG.2013.1.2.123* This study developed innovative designs for dementia care, based on two design directions: (1) interactive design space to recall memory; and (2) comfortable products using natural materials. Interactive technologies are embedded in furniture and building elements, to create an interactive recall spatial design for spiritual healing. In addition, this study attempted to construct an innovative design and fabrication process using CAD/CAM. Consequently, three interactive product designs for dementia are proposed: “memories” interactive wall, “welcome” interactive cabinet, and “fit” interactive chair.

**Keywords:** reminiscence therapy, dementia, interactive design, digital fabrication

*Juan Y-C [阮業春], Wang M-W [王美葳], Sie M-J [謝明臻]. Applying Scenario Approach and Quality Function Deployment to Custom Design of Elder Cane. Journal of Gerontechnology and Service Management 2013;1(3):1-12; doi:10.6283/JOCSG.2013.1.3.01* Aging and diseases often cause problems related to equilibrium disorders and risk of falls for older adults. Canes have been the most frequently used walking assistance devices which the elderly use because they are light and portable. Most existing walking canes are developed using a universal design. In this study questionnaires, surveys, and experimental design have helped identify the common features of canes used by a wide variety of people. However, older adults prefer custom-designed canes rather than canes with only commonly used features; those custom-designed canes better suit the needs of their individual lifestyles and environments. This study was conducted at Chang Gung Health and Culture Village (CGHCV) where researchers initially observed the daily life and cane usage of the older adult residents. Second, scenarios were developed and used to identify the cane requirements of various types of people. Third, the identified requirements for walking canes were transformed into technical specifications by using quality function deployment (QFD) methods. Finally, a prototype of a uniquely designed cane was developed and then evaluated by CGHCV residents.

**Keywords:** elder cane, custom design, scenario design, quality function deployment

*Pei C [裴駿], Lee K-N [李國男], Haung C-H [黃建華], Huang D-S [黃德劭]. Developing and Evaluating a Body Weight Measuring System for Long-term Bedridden Patients. Journal of Gerontechnology and Service Management 2013;1(3):13-22; doi:10.6283/JOCSG.2013.1.3.13* The purpose of this research study is to propose a convenient and time-saving system designed for use as a bed scale designed for weighing bedridden patients. With this novel system, caregivers can reduce the likelihood of occupational injury and work stress. In addition, use of the scale reduces the rate of malnutrition in long-term bedridden patients. The system measures quantity of air exhaust from a hoverbed per unit of time to weigh patients; the quantity is assumed to be positively correlated to body weight. To verify this assumption, a hoverbed was used with a device designed to measure the volume of air flow per unit time; also custom-designed



air control valves were integrated into the unit to measure standard volume-time-weight (VTW) curves of measurements taken for patients with different body weights. The body weight of the patient can be acquired by comparing and analyzing the differences between the standard and the actual subject VTW curves. The experimental results show the bedridden patient weight measuring system can measure a patient's body weight; the system can be integrated to work with different models of hoverbeds. The accuracy of the proposed system still needs improvement; an accuracy of  $\pm 1$  Kg is suitable for application to a clinical setting. Also, the current laboratory prototype is too expensive for mass production. Seeking low cost alternatives and reducing costs are also important issues which need to be addressed to accelerate commercialization of the purposed system.

**Keywords:** long-term bedridden, Hoverbed, bedridden weight measuring, volume-time-weight curve

Yeh W-Y [葉婉榆]. *An Exploratory Review of Change Trends of Workers' Health and Safety Needs towards an Aging Society: Recent Global Issues and Some Implications for Taiwan*. *Journal of Gerontechnology and Service Management* 2013;1(3):23-34; doi:10.6283/JOCSG.2013.1.3.23 Most societies of the industrialized world have an aging population and as a result are transitioning into service economies; the employment of middle-aged and older workers has become an important labor issue in Europe, the United States, and many industrialized countries in Asia. The main goal of any policy related to the employment of older people is to maintain economic growth and relieve the government of the financial burden unemployed older people create. However, middle-aged workers typically have special requirements based on their individual emotional needs as well as physical and social conditions. The main purpose of such policies should be to assure a reasonable employment policy exists which enables middle-aged workers to work continuously in a safe and healthy environment and be creative, healthy, and productive. However, the rate of employment among middle-aged people in Taiwan is lower than that of many other developed countries. Additionally, few systematic discussions have addressed how Taiwanese middle-aged and older workers interact socially with society and in the workplace or safety/health issues related to the employment of older people. Reviews of both the domestic and international literature and statistical data related to aging workers show that in Taiwan during the last 30 years, the participation rate in age group from 45–49 years in the labor market has increased slightly but such rates have declined in older groups of citizens. The common people of Taiwan have an increased need of employment because of a general improvement in their health as well as their ability to remain fit and healthy; this allows them to work at an older age. Redesigning the workplace environment and analyzing how workplace systems function in the presence of older workers would be critical for appropriate human resource development designed to assist an aging workforce; this will also benefit the future lifestyle and economy of Taiwan and its residents. Recent international literature has indicated the presence of potential and enormous differences in the physical, mental and social changes of individual accompanying the aging process. At the same time, large numbers of aging people will have nearly equal physical and mental capacity. Despite the gradual physical decline which occurs during chronological aging, some mature components of an individual's mental ability and the training they have received during their life experiences give them improved abilities to observe and also give them sound judgment and self-control, which are beneficial for coping with workplace demands. , An analysis of health and well-being would be an essential part of any efforts to improve the quality of both work and the employment of an aging workforce. Enterprises, NGOs, and health/labor/social welfare departments of central/local government agencies should cooperate to improve aging-friendly work environments and work conditions; this will improve the possibilities of maintaining or even enhancing the knowledge, abilities and life experiences of aging workers as well as demonstrate their competence in the workplace.

**Keywords:** middle-aged and older workers; employment promotion; work conditions; Occupational Health and Safety (OHS); needs assessment

Lu Y-H [盧憶慧], Lin C-S [林清壽]. *A Study on the Behavioral Intention of Charitable Donation for Middle-aged and Senior Citizens*. *Journal of Gerontechnology and Service Management* 2013;1(3):35-50; doi:10.6283/JOCSG.2013.1.3.35 Donations provide the main source of funding for charitable organizations. Since 2007, financial donations have declined greatly as a result of the global economic turn down making it increasingly difficult for charities to operate. Encouraging donations from willing parties should be the first priority of charities if charities are going to be able to sustain their work. The purpose of the study is to investigate the behavioral intentions of those making financial donations; the theory used to plan the maintenance of the charity's brand image was used to build a research framework and





to explore the behavioral intention of those making financial donations and the factors influencing those charitable donations. In this study, a questionnaire survey was used to query research subjects who were people at least 45 years old who were living in Nantou County, Taiwan. 370 valid questionnaires were collected. AMOS18.0 software was used to verify and analyze the fit of the research model. The results showed the subjective norm of a patron's donation attitude, perceived behavioral control and brand image have a significant positive impact on the behavioral intention of those making donations. The subjective norm and brand image had the highest and second highest impact on donations, respectively. In addition, the subjective norm and brand image also had a significant positive effect on the attitude of patrons toward making donations. Gender had a moderately significant effect on the brand image of charity and intention of patrons to make or not make donations. Brand image of a charity easily affected male patrons in their intention to donate. The explanatory power of the research model reaches 64% and indicates that this model can effectively predict and explain the behavioral intentions of patrons making charitable donations.

**Keywords:** donations attitude, theory of planned behavior, brand image

Pei C [裴駿], Hsu C-N [徐仲楠], Huang C-H [黃建華], Sun T-L [孫天龍], Huang C-C [黃振嘉]. *Developing a Personalized Home-Based Exergames Tele-System for Elderly Rehabilitation-A Preliminary Study. Journal of Gerontechnology and Service Management 2013;1(3):51-62; doi:10.6283/JOCSSG.2013.1.3.51* Due to the fast-growing of the senior population in Taiwan, the number of the patients who require rehabilitation has also gone up. The key challenge for the rehabilitation professional today is to monitor whether or not the patients truly conduct the routine physical therapy at home. In this paper, a home-based exergame system with the built-in motion-sensor is presented. The scenes of the games in the system can be customized according to the unique health need of each patient. The data from the exergame system the patients created at home were transmitted to the server at the medical institute. Both the rehabilitation professional and the software engineers at the medical institute then analyze the data by adopting the 'Flow Theory' in order to evaluate the motivation of using the exergame system from the patients as well as to provide the counseling and the instructions for the health promotion process. If the result of data analysis indicates a low motivation of using the system, the 'Dynamic Difficulty Adjustment Cycle' also developed in this paper, is for adjusting the parameters in the games to maintain patients' motivation and to gain the maximum health benefits from this home-based exergame system. A clinical pilot test for the system evaluation was conducted. Two volunteered patients participated the pilot test. The patients played with the game system for a month at home, and the Flow Theory was applied to our analysis. The "total daily playing time" was chosen for comparison. It shows that the patients were unfamiliar and anxious with the system in the first two weeks; once they are skillful the play time reduced. The results show that the system not only increases the efficiency of the home-based health promotion and enhanced the ADL of the patients, but also proves the rehabilitation-exercise execution rate at home can be successfully monitored.

**Keywords:** motion-sensing technology, flow theory, rehabilitation, tele-system

Tsai Y-J [蔡詠觀], Kao J-L [郭睿駢], Chang Y-H [章宇涵], Chiang C-H [江貞紅], Huang H-L [黃惠玲]. *The Design of an Innovative Oral Cleaner with Integrated Illumination, Suction, and Brushing. Journal of Gerontechnology and Service Management 2013;1(3):63-70; doi:10.6283/JOCSSG.2013.1.3.63* Elderly people with disabilities often have difficulties maintaining oral hygiene, because of their inability to take care of themselves. These elderly people often require the assistance of caregivers to maintain oral hygiene. But it is often difficult to perform oral maintenance for these people. The difficulties include patient resistance which may lead to biting and choking situations. These situations often prevent caregivers from performing complete oral care, which can lead to the development of oral diseases and other serious complications. Our research and development team has begun to develop a new type of toothbrush to assist caregivers in providing oral care for the elderly. Through our efforts, we have combined the toothbrush with a suction apparatus, an illumination source, and a mouth guard. The innovative toothbrush is also integrated with exchangeable brush heads and suction tips which provide a user friendly oral cleaner. This new design can provide a safe and simple method in providing oral care for the elderly. The illumination source can provide a clear view of the brush position inside the oral cavity to ensure better brush placement. Using this innovative oral cleaner, the cleaning process can be made easier, more accurate, and more effective. Furthermore, this oral cleaner is easy to operate, effective in performing oral cleansing, and its construction is also very durable. The device is also very



practical, because installation and disassembly is simple and fast. We hope that in the future, this device can be mass produced and widely implemented in the care of elderly people with disabilities. By simplifying the oral maintenance procedures for the caregivers, the device will reduce the occurrence of oral disease and other oral disease-related complications in the elderly.

**Keywords:** elderly, oral health, oral disease, oral cleaning device

Huang C-Y [黃琴雅], Hung C-H [洪靖慧], Wu Y-C [吳宜靜], Zhong Y-J [鍾羽潔]. *Flashy Moment, Memories for Lifelong Company-The Design of Animated Memoir for the Elderly*. *Journal of Gerontechnology and Service Management* 2013;1(3):71-78; doi:10.6283/JOCSSG.2013.1.3.71 As a population ages, aging affects both physical and mental conditions, and often impairs a person's memory; nevertheless, every elderly person has their own brilliant moments during the journey of life. When those experiences begin to blur with a withered memory, they feel like that a part of their life has been snatched away. To sharpen those memories again, we studied elderly individuals and became acquainted with the important memories of their lives through interviews. We also collected photos related to their memories and made personal animated memoirs by conducting interviews and rearranging notes. With follow-up interviews, we studied the differences in patient mood and patient interaction with family members can made a comparison between those who had been tested with the animations and those who had not. According to concepts related to reminiscence therapy, this method should certainly be helpful in assisting elderly people to retain or relive their memories. This study was based on both initial and follow-up interviews. The feedback received from the elderly indicated that animations did help them deepen their impressions, let them express their emotions while recollecting, and then achieve the best effect of this study.

**Keywords:** seniors, memories, animation, reminiscence therapy

Lee J-D [李政道], Huang S-X [黃世賢], Liu M-Z [劉旻哲], Lu Z-Y [盧政宇], Zhuang J-W [莊靖煒], Li Y-C [李翌誠]. *Cloud real-time monitor and control system design for soft carrier*. *Journal of Gerontechnology and Service Management* 2013;1(3):79-86; doi:10.6283/JOCSSG.2013.1.3.79 The aging of society is progressing despite increased access to medical resources and in part because of decreasing fertility rates in recent years. Most young people have jobs and other duties which keep them busy most of the time and they feel they cannot provide effective care of elderly family members, yet the elderly are often no longer able to live completely independently. For this reason, a novel care system has been developed for use in home medical care. This design can help caregivers by alerting them when a patient leaves a chair's seat cushion without help; the novel "pressure controlled switch" will sound an alarm to alert the caregivers immediately. The type of alarm can be chosen based on the needs of the user, e.g. a local alarm device or a device which alerts another mobile device such as a cell phone. Also, the device can include temperature and humidity sensors which are used for environmental control to help the user keep and remain comfortable. This novel care system can be extended to other kinds of caregivers.

**Keywords:** aging society, real-time monitor and control, care, embedded system.

Liang J-C [梁榮進], Liang Z-W [梁子璋]. *An Innovative Design of Medical Treatment Recorder for Older Adults*. *Journal of Gerontechnology and Service Management* 2013;1(3):87-98; doi:10.6283/JOCSSG.2013.1.3.87 In today's society, the children of elders are difficult to understand parents' medical condition because of bustling work. The elder can't remember much accountable matter during medical treatment. Therefore, their children also can't acquire a comprehensive understanding of the real situation for elder's parents through inquiry and result in many medical misconceptions. This paper tries to design a medical auxiliary product for elders based on this phenomenon. Firstly, this study use observation method gathering elderly information during a medical treatment and find the key problem, then go deep investigation of focusing problem through preprocessing, understanding and analysis. Finally, this research uses methodology of 635 to design a medical treatment recorder for elder.

**Keywords:** elderly person, observation method, 635 procedure, medical treatment recorder

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