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CONMEDIA 2017 TECHNICAL PROGRAM

Wednesday, October 9th, 2019

08.00-08.35	Registration	
08.35-09.00	Welcome Coffee Break	
09.00-09.30	Opening Ceremony	
	Room: Ballroom	
	1	Dr. Friska Natalia (General Chair of The 5th CONMEDIA 2019)
	2	Dr. Ninok Leksono, M.A. (Rector of Universitas Multimedia Nusantara)
	3	Prof. Dr. Eng. Wisnu Jatmiko (Chairman of IEEE Indonesia Section)
09.30-11.30	Keynote Session	
	Room: Ballroom	
	1	Professor CheulWoo Ro Silla University, South Korea Smart city and Living Lab
	2	Professor Zainal A. Hasibuan Universitas Indonesia, Indonesia Software Product Line Approach for Improving The Development of Customizable E-Business System for Small and Medium Enterprises
11.30-13.00	Lunch	
13.00-15.00	Papers Presentation	
	Track: Digital Technology for Creative Industry I	
Room: Ballroom	13.00-13.20	The Potential of Integrating User Experience (UX) and Aesthetic Experience (AX) in Augmented Reality Comic (AR Comic) Mohd Ekram AlHafis bin Hashim, Muhammad Zaffwan Bin Idris, Che Soh Bin Said (Universiti Pendidikan Sultan Idris, Malaysia)
	13.20-13.40	A Virtual Reality Environment for Reading and Listening to Literary Fiction Federico Pianzola (University of Milan-Bicocca & Sogang University, Italy); Luca Deriu (PlaySys, Italy)
	13.40-14.00	Simple Computer Vision Algorithm Production using OpenCV for "Virtual Ecosystem" project Andrew Willis (UMN Picture & Universitas Multimedia Nusantara, Indonesia); Kemal Hasan (Universitas Multimedia Nusantara, Indonesia)
	Track: Animation & Game Development	
Room: Jepun	13.00-13.20	Shot Visualization Illustrating the Behavior Characteristic of Low Visually Impaired Person in a Hybrid Documentary Animation Christine Mersiana Lukmanto (Universitas Multimedia Nusantara, Indonesia)
	13.20-13.40	Puppet Movements in Structure-specific Traditional Paper Cut Out Animation Production Dominika Purwaningsih (Universitas Multimedia Nusantara, Indonesia)
	13.40-14.00	Developing Manik Angkeran Tap Game I Made Marthana Yusa, I Nyoman Agus Suarya Putra, I Dewa Gede Agung Pandawana (STMIK STIKOM Indonesia, Indonesia)
	Track: Strategic Information System	

Room: Pucuk	13.00-13.20	Analysis Factors Influencing the Intention to Transact for Tokopedia Fadriansyah Rahim, Raymond Oetama (Universitas Multimedia Nusantara, Indonesia)
	13.20-13.40	Prioritization Framework of Information Technology Investment at Regional Banks (Case Study: Indonesia) I Gusti Ayu Agung Mas Aristamy (STMIK STIKOM Indonesia, Indonesia); Apol Pribadi Subriadi (Institut Teknologi Sepuluh Nopember, Indonesia)
	13.40-14.00	Mediating Roles of IT Governance Effectiveness in E-Service Quality of Higher Education Sandy Kosasi, Hendra Kurniawan (STMIK Pontianak, Indonesia); Vedyanto (Santu Petrus Junior High School, Indonesia)
Track: Digital Technology for Creative Industry II		
Room: Ballroom	14.00-14.20	Audience Engagement in Digital Visual Arts Exhibition Mohd Fahmi bin Yahaya, Nordiana binti Ahmad Nordin (University Malaysia Sarawak, Malaysia)
	14.20-14.40	Gameplay Design for Waste Sorting Serious Game "Wilah" Ryan Sucipto (Social Designee & Universitas Multimedia Nusantara); Prima Murti Rane Singgih (Universitas Multimedia Nusantara)
	14.40-15.00	Enhancing Quality of Life based on Physical Activity for Indonesian Elderly: A Preliminary Study fo Design Recommendation Elizabeth Wianto (Universitas Kristen Maranatha & National Cheng Kung University, Indonesia); Yun-Han Chen, Chun-Yang Chang, Ying-Yi Tung, Zu-Cheng Sheng, Chi-Jung Chung, Chien-Hsu Chen, Yang-Cheng Lin (National Cheng Kung University, Taiwan R.O.C.); Emil Robert Kaburuan (Bina Nusantara University, Indonesia)
Track: Multimedia Application I		
Room: Jepun	14.00-14.20	Interactive Multimedia Edutainment Development Lia Herna, Leonardo Widya, Desy Sandrayani (Universitas Multimedia Nusantara, Indonesia)
	14.20-14.40	Typeface Ende: The process of digitizing the Lonta Ende script becomes Font Erwin Alfian (Universitas Multimedia Nusantara, Indonesia); Adhreza Brahma (Universitas Multimedia Nusantara & Kompas, Indonesia)
	14.40-15.00	Rasayatra: Interpreting Hindu Aesthetics Nawarasa into Interior Design Using Virtual Reality Mobile Application I Kadek Dwi Noorwatha, I Putu Udiyana Wasista (ISI Denpasar, Indonesia); I Made Marthana Yusa (STMIK STIKOM Indonesia, Indonesia)
Track: Mobile Application		
Room: Pucuk	14.00-14.20	Comparative Study of Push and Pull Techniques in Delivering Mobile Application Notifications Handy Wijaya Prajitno, Marcel Bonar Kristanda, Adhi Kusnadi (Universitas Multimedia Nusantara, Indonesia)
	14.20-14.40	Fitrust: Promoting Healthy Lifestyle Through Gamified Mobile Health Application Alethea Suryadibrata, Samuel Setiawan (Universitas Multimedia

		Nusantara, Indonesia)
	14.40-15.00	Implementation of Password-based Key Derivation Function for Authentication Scheme in Patrolling System Laurentius Kuncoro Probo Saputra, Willy Sudiarto Raharjo (Universitas Kristen Duta Wacana, Indonesia)
15.00-15.15	Coffee Break	
15.15-17.35	Papers Presentation	
	Track: E- Commerce	
Room: Ballroom	15.15-15.35	E-commerce Design Interaction with Voice User Interface using User-centered Design Approach Rizky Faramita, Dessi Puji Lestari, Ginar Santika Niwanputri (Institut Teknologi Bandung, Indonesia)
	15.35-15.55	Discourse Analysis on Lifestyle News at Tribunews.com Muhamad Aras (Bina Nusantara University, Indonesia)
	15.55-16.15	The Impact of Social Network Marketing on University Students' Purchase Intention and How It Is Affected of Consumer Engagement Hartiwi Prabowo, Rini Kurnia Sari, Stephanie Bangapadang (Bina Nusantara University, Indonesia)
	Track: Multimedia Application II	
Room: Jepun	15.15-15.35	Study of Color Intensity shift in animated film as The Base of Creating "Color Script Generator" Application Christian Aditya (Universitas Multimedia Nusantara)
	15.35-15.55	Magnetic Tactile Board for Blind Animator Bharoto Yekti (Universitas Multimedia Nusantara, Indonesia)
	15.55-16.15	Augmented Reality Flashcard as a Media for Learning Balinese Language I Nyoman Anom Fajaraditya Setiawan, I Nyoman Jayanegara, Putu Wirayudi Aditama (STMIK STIKOM Indonesia, Indonesia)
	Track: Data Mining	
Room: Pucuk	15.15-15.35	Predicting Student Attrition in Higher Education Using Artificial Neural Network Nellie Maysela, Raymond Oetama (Universitas Multimedia Nusantara, Indonesia); Yustinus Eko Soelistio (Universitas Multimedia Nusantara, Indonesia & Tilburg University, The Netherlands)
	15.35-15.55	Prediction of Indonesia Presidential Election Results for the 2019-2024 Period Using Twitter Sentiment Analysis Dinar Ajeng Kristiyanti, Normah (STMIK Nusa Mandiri, Indonesia); Akhmad Hairul Umam (Tanri Abeng University, Indonesia)
	15.55-16.15	Prediction and Visualization of Flood Occurences in Tangerang using K-Medoids, DBScan and X-Means Clustering Algorithms Friska Natalia, Ririn Desanti (Universitas Multimedia Nusantara, Indonesia); Ferry Ferdinand (Universitas Pelita Harapan, Indonesia)
	Track: Interactive Media Design & Mobile Tech.	
Room: Ballroom	16.15-16.35	Beyond Digitalisation: Facial Motion Capture for Mak Yong through the perspective of Aesthetic Experience and Uncanny Valley Naimah Musa, Muhammad Zaffwan Idris (Universiti Pendidikan Sultan Idris, Malaysia)

	16.35-16.55	Leveling up difficulty model based on user experience in education games mobile-based for student kindergartens Wirawan Istiono (Universitas Multimedia Nusantara, Indonesia)
	16.55-17.15	Designing Mobile Application Interaction for School Internal Communication using User-centered Design Alivia Dewi Parahita, Dessi Lestari, Ginar Santika Niwanputri (Institut Teknologi Bandung, Indonesia)
	17.15-17.35	A Mobile Plastic Cups Recycling Application for Behaviour Change Juhri Selamat, Thomas Simpson (Universitas Multimedia Nusantara, Indonesia)
	Track: Software Engineering I	
Room: Jepun	16.15-16.35	Algorithm to Avoid Overlapping Vowel Signs in Latin to Balinese Script Transliteration Method I Gede Andika, Christina Purnama Yanti (STMIK STIKOM Indonesia, Indonesia); Gede Indrawan (Ganesha University of Education, Indonesia)
	16.35-16.55	String Matching based Plagiarism Detection for Indonesian Document Wayan Gede Suka Parwita, I Gusti Ayu Agung Diatri Indradewi (STMIK STIKOM Indonesia, Indonesia); I Nyoman Saputra Wahyu Wijaya (Universitas Pendidikan Ganesha, Indonesia)
	16.55-17.15	A Combined Edge Detection Analysis and Clustering based Approach for Real Time Text Detection Farica Putri, Rakadetyo Putro (Universitas Multimedia Nusantara, Indonesia); Maria Irmina Prasetyowati (Institut Teknologi Bandung, Indonesia)
	17.15-17.35	Generative Adversarial Network Implementation for Batik Motif Synthesis Miqdad Abdurrahman, Nabila Shabrina, Dareen Kusuma Halim (Universitas Multimedia Nusantara, Indonesia)
	Track: Data Management & Visualization	
Room: Pucuk	16.15-16.35	The Determinants of Students' Perceived Learning Outcomes and Satisfaction in BINUS Online Learning Ridho Bramulya Ikhsan, Listya Ayu Saraswati, Brian Muchardie, Vional Futanto, Andrianto Susilo (Bina Nusantara University, Indonesia)
	16.35-16.55	Sentiment Analysis on Official News Accounts of Twitter Media in Predicting Facebook Stock Jessica, Raymond Oetama (Universitas Multimedia Nusantara, Indonesia)
	16.55-17.15	Adaptive Resonance Theory 2 for RFM Based Customer Segmentation Anak Agung Gede Bagus Ariana, Ni Ketut Tri Utami (STMIK STIKOM Indonesia, Indonesia)
	17.15-17.35	Data Visualization of Best Picture Film Nominations in Academy Awards 1993 - 2017 Period and 2018 Prediction Rayhanali Amier, Johan Setiawan (Universitas Multimedia Nusantara, Indonesia)
19.00-20.30	Room: Sands Restaurant	
	Gala Dinner	

Thursday, October 10th, 2019

08.00-09.00	Registration	
09.00-09.30	Welcome Coffee Break	
09.30-11.30	Keynote Session	
	Room: Ballroom	
	Dr. Ninok Leksono Universitas Multimedia Nusantara, Indonesia	
	Palapa Ring and answering Indonesian Broadband needs	
	Professor Bogdan Gabrys University of Technology Sydney, Australia	
Automated composition, optimisation and adaptation of complex predictive systems		
11.30-13.00	Lunch	
13.00-15.00	Papers Presentation	
Track: Application & Data Visualization		
Room: Ballroom	13.00-13.20	E-Government Integration of Sidoarjo Regency using Service Oriented Architecture (SOA) Jauari Hasim, Rengga Asmara, Adi Putra Utama (Politeknik Elektronika Negeri Surabaya, Indonesia)
	13.20-13.40	Design of Presentation Services on Master Data Management (MDM) using Open Source Platform: A Case Study Rangga Ardiansyah, Tien Fabrianti Kusumasari, Rachmadita Andreswari (Telkom University, Indonesia)
	13.40-14.00	Data Visualization and Sales Prediction of PD. Asia Agung (Ajinomoto) Pontianak in 2019 Ririn Desanti, Wella, Willy Yunus (Universitas Multimedia Nusantara, Indonesia)
Track: Computational Science and Technology		
Room: Jepun	13.00-13.20	BPMN Approach in Blockchain with Hyperledger Composer And Smart Contract: Reservation-Based Parking System Pujianto Yugopuspito, Frans Panduwinata (Universitas Pelita Harapan, Indonesia)
	13.20-13.40	Digital Watermarking for Color Image Using DHWT and LSB Alvin, Arya Wicaksana (Universitas Multimedia Nusantara, Indonesia); Maria Irmina Prasetiyowati (Bandung Institute of Technology, Indonesia)
	13.40-14.00	LSB Steganography and AES Encryption for Multiple PDF Documents Naldiyanto Sofian, Arya Wicaksana, Seng Hansun (Universitas Multimedia Nusantara, Indonesia)
Track: Computer Network		
Room: Pucuk	13.00-13.20	Packet Loss Prevention Systems for Failover Incident on Network Infrastructure Richard Dharmawan, Samuel Hutagalung (Universitas Multimedia Nusantara, Indonesia)
	13.20-13.40	Virtual Platform for Architecture Exploration of Serial Communication in MPSoC Devices

		Vincentius Kurniawan (Universiti Tunku Abdul Rahman, Malaysia); Arya Wicaksana (Universitas Multimedia Nusantara, Indonesia)
	13.40-14.00	Design of Automatic Drinking Water Supply System for Poultry Cage Alfa Putra, Arnold Aribowo, Geraldi Wiyoto Tjoa (Universitas Pelita Harapan, Indonesia)
	Track: Web Technology and Application I	
Room: Ballroom	14.00-14.20	Intelligent Personalized Chatbot for Service Recommendation of the Hotel Customers in Indonesia Hira Meidia, Farica Putri, Dennis Gunawan (Universitas Multimedia Nusantara, Indonesia)
	14.20-14.40	Nosql Implementation on Single Sign-On Case Study: STMIK STIKOM Indonesia I Made Dwi Putra Asana, Made Leo Radhitya (STIMK STIKOM Indonesia, Indonesia)
	14.40-15.00	You Are What You Sing: Folksong tone pattern feature correlation to geographical distance with Gabor filter and OLS linear regression Jason Kuanca (Universitas Multimedia Nusantara, Indonesia)
	Track: Computing Platform	
Room: Jepun	14.00-14.20	Forecasting Domestic Tourist Arrivals to Bali: H-WEMA Approach Seng Hansun (Universitas Multimedia Nusantara, Indonesia)
	14.20-14.40	Identification of Maize Leaf Diseases Cause by Fungus with Digital Image Processing (Case Study: Bismarak Village Kupang District - East Nusa Tenggara) Marlinda Vasty Overbeek, Fenina Adline Twince Tobing (Universitas Multimedia Nusantara, Indonesia); Yampi Kaesmetan (STIKOM Uyelindo Kupang, Indonesia)
	14.40-15.00	Improved Distributed Formation Control and Trajectory Tracking of Multi Quadrotor in Leader-Follower Formation Billie Pratama, Abdul Muis, Aries Subiantoro (Universitas Indonesia, Indonesia)
	Track: Sensor Network	
Room: Pucuk	14.00-14.20	Arduino-based IDE for Embedded Multi-processor System-on-Chip Dareen Kusuma Halim (Universitas Multimedia Nusantara, Indonesia); Chong Ming Tang, Mow-Song Ng (Universiti Tunku Abdul Rahman, Malaysia); Dicky Hartono (Silterra Malaysia Sdn. Bhd., Malaysia)
	14.20-14.40	Initial RTAB-Map Navigation Analysis for Service Robot I Made Murwantara, Sutrisno Cahya, Marselus Vinsens (Universitas Pelita Harapan, Indonesia)
	14.40-15.00	Step Rate Estimator from Wearable Photoplethysmography Signal Aminuddin Rizal (Universitas Multimedia Nusantara, Indonesia); Taufiqurrachman Taufiq (National Taiwan University of Science and Technology & Indonesian Institute of Sciences, Indonesia)
15.00-15.15	Coffee Break	
15.15-17.35	Papers Presentation	
	Track: Web Technology and Application II	
Room:	15.15-15.35	Drivers of Mobile Payment Application Adoption by Merchants in

Ballroom		Jakarta Hartiwi Prabowo, Enny Noegraheni, Yuniarty (BINUS University, Indonesia)
	15.35-15.55	iBudaya: Indonesian Culture Portal based on Software as a Service (SaaS) PM Winarno, Wella (Universitas Multimedia Nusantara, Indonesia); Rudy Pramono (Pelita Harapan University, Indonesia)
	15.55-16.15	"DynaBot: Dynamic Dota 2 bot. Implementation of Dynamic Scripting on AI for Three Dota 2 Characters" Wanaldi, Yustinus Eko Soelistio, Johan Setiawan (Universitas Multimedia Nusantara, Indonesia)
	Track: Mobile Apps & Web Technology	
Room: Jepun	15.15-15.35	Simple Additive Weighting Algorithm Helping Recruitment System for Waterpark Meirina, Ririn Desanti, Wella (Universitas Multimedia Nusantara, Indonesia)
	15.35-15.55	An Algorithm for Auto-Correction in PaTik Bali Using Pasang Pageh Aksara Wianjana Ida Bagus Ary Indra Iswara, Putu Praba Santika (STMIK STIKOM Indonesia, Indonesia); I Nyoman Saputra Wahyu Wijaya (Pendidikan Ganesha University, Indonesia)
	15.55-16.15	Parabolix: Educational Simulation Game on Classical Mechanics Based on Virtual Reality and Perlin Noise Algorithm Dennis Gunawan, Edwin Handoko (Universitas Multimedia Nusantara, Indonesia)
	Track: Game Development & Applications	
Room: Pucuk	15.15-15.35	Mandarin Vocabulary Memorization Using Drill Sandwich Method on Android Platform Ni Made Satvika Iswari (Universitas Multimedia Nusantara, Indonesia)
	15.35-15.55	Serious Game for Blockchain Education Purposes (using Proof-of-Work consensus of Bitcoin) Yustus Oktian (Dongseo University, Korea); Ivan Kristianto Singgih (Pohang University of Science and Technology, Korea); Friska Natalia (Universitas Multimedia Nusantara, Indonesia)
	15.55-16.15	Mathematical Modeling Education Using An Online Serious Game Ivan Kristianto Singgih (Pohang University of Science and Technology, Korea); Friska Natalia (Universitas Multimedia Nusantara, Indonesia)
	Track: Web Technology & Application III	
Room: Ballroom	16.15-16.35	Business Process Analysis of Academic Information System Application using Process Mining (Case Study: Final Project Module) Ilham Fitriansyah, Rachmadita Andreswari, Muhammad Hasibuan (Telkom University, Indonesia)
	16.35-16.55	Design of Decision Support System with C4.5 Algorithm Methods in Determining Results Vaname Shrimp Cultivation Fenina Adline Twince Tobing, Marlinda Vasty Overbeek (Universitas Multimedia Nusantara, Indonesia)
	16.55-17.15	Towards a Gamified Support Tool for Requirements Gathering in

		Bahasa Indonesia Martha Saphira, Andre Rusli (Universitas Multimedia Nusantara, Indonesia)
	17.15-17.35	Predicting Indonesia Large Capital Stocks Using H-WEMA on Phatsa Web Application Ivan Jeremy, Seng Hansun, Marcel Bonar Kristanda (Universitas Multimedia Nusantara, Indonesia)
Track: Software Engineering II		
Room: Jepun	16.15-16.35	Segmentation of Balinese Script on Lontar Manuscripts using Projection Profile I Wayan Agus Surya Darma (STMIK STIKOM Indonesia, Indonesia); Ni Putu Sutramiani (Udayana University, Indonesia)
	16.35-16.55	Using Naïve Bayes Classifier for Application Feedback Classification and Management in Bahasa Indonesia Ivan Ferdino, Andre Rusli (Universitas Multimedia Nusantara, Indonesia)
	16.55-17.15	Sentiment Analysis of Application User Feedback in Bahasa Indonesia Using Multinomial Naïve Bayes Gabriella Putri Wiratama, Andre Rusli (Universitas Multimedia Nusantara, Indonesia)
	17.15-17.35	Word Recognition For Color Classification Using Convolutional Neural Network Dyah Ayu Tuasikal, M. Bima Nugraha, Emilio Yudhatama, Ahmad Syahril Muharom, Megantara Pura (Universitas Multimedia Nusantara, Indonesia)
Track: Infrastructure Technology		
Room: Pucuk	16.15-16.35	A Study on the Suitability of Applying Active Contour Evolution Models in Segmenting and Delineating Boundaries in Medical Images Nunik Afriliana, Julio Young, Friska Natalia, Hira Meidia (Universitas Multimedia Nusantara, Indonesia); Sudirman (Liverpool John Moores University, United Kingdom (Great Britain))
	16.35-16.55	Removing DCT High Frequency on Feature Detector Repeatability Quality Adhi Kusnadi, Wella, Rangga Winantyo, Ivransa Pane (Universitas Multimedia Nusantara, Indonesia)
	16.55-17.15	The Control System of Kulkul Bali Based on Microcontroller I Gusti Made Ngurah Desnanjaya, I Gede Sudipa (STMIK STIKOM Indonesia, Indonesia)
	17.15-17.35	Performance Evaluation of RAM-based Caching Solution at Hypervisor and Storage Level for Network-Attached Storage on VMware Platform Marcel Yap (Krida Wacana Christian University, Indonesia)

Friday, October 11th, 2019

08.00-17.00	Tour de Bali
	Meeting Point at THE ANVAYA BEACH RESORT BALI's Lobby

Enhancing Quality of Life based on Physical Activity for Indonesian Elderly: A Preliminary Study for Design Recommendation

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Abstract

The changing term from active aging concept to healthy aging expressed by the World Health Organization (WHO) proves that this population is the priorities now. Since 2015, Indonesia has already been in the state of Aging Population with falling fertility rates and rising life expectancy. Considering the increasing number of the elderly population in Indonesia, then the study in this area becomes essential. This preliminary study tries to determine the relationship between physical activities and quality of life in order to explore the specific type of physical activities done by the elderly.

Descriptive statistics were done in the form of mean, standard deviation and percentages to summarize the sample based on characteristics, PASE (Physical Activities Score for Elderly) and OPQOL-Brief (Older People Quality of Life - Brief). The findings of this study showed that the elderly in Indonesia was less active in moderate, strenuous sport, and muscle activities, thus possibly increasing the risk of Sarcopenia. Considering the existing condition and broader range of Sarcopenia's prevalence, there are three design recommendations in the form of a modified free weight device to change the elderly's sedentary to become a more active lifestyle. Each option represents different consideration as follows: nurture association, gamification, social network, time of use, and progress detection.

Keywords: Aging Society, Physical Activities, Strength Training

1 Introduction

The aging population is a significant issue, become challenging for the global society and also implicate to multidisciplinary research. Referring to the World Health Organization's (WHO) healthy aging concept, it is important to keep and manage functional ability as long as it is possible. Since 2015, Indonesia is entering Aging Population, with the population of the elderly more than 7% [1]. WHO has calculated that the development of the geriatric population in Indonesia in 2020 will be 11.34% (+/- 28.8 million) [2, 3].

This phenomenon is becoming increasingly important, because Indonesia's falling fertility rates and rising life expectancy, put this country into the group of middle-income Asian countries that facing the prospect of an aging population without having an adequate social security system and infrastructure [4].

The purpose of this preliminary study was to determine whether a relationship existed between physical activities and quality of life in the elderly by correlating score of the physical activities to the variables construct of quality of life. The second goal of this study was to explore a specific type of physical activities should be done by the elderly to create physical activities balance and support the healthy aging concept. The direct insight into the actual condition is expected to become a stepping stone for developing a technological-based design suitable for the elderly population in Indonesia.

2 Literature Review

In research about aging, physical activities often correlated with health-related quality of life, which become the umbrella

term to describe the level of satisfaction in the lives of the elderly. The ability to perform the functional ability become one of the main factors to gain life satisfaction [5, 6]. Thus, the association between physical activities to the quality of life cannot be separated [7]. Previous studies targeting community-dwelling and or institutional care population showed that the higher level of physical activities in one or more kind of activities was beneficial to the higher quality of life. Therefore, the effort and awareness have long been dedicated to encouraging the active lifestyle [6, 8, 9].

While the developed countries continuously research using the respondents from their society, Indonesian elderly's characteristics have its own uniqueness. In general, elderly age in many countries start from 65 years old [10], but the law in Indonesia stated that the elderly or older adults is someone who has reached the age of 60 or over [11, 12]. Regardless of age restrictions, habit, customs, and traditional views also influence the decision to act in society.

3 Method

The physical activity was measured using PASE, while the quality of life was measured using OPQOL-Brief. The main targets are the healthy elderly in Indonesia using purposive sampling, living in Bandung city as the suited socio-demographic. All participants considered eligible when they met the inclusion criteria of being independent walking and with age 60 years or more. The inclusion criteria added with the elderly who lives in elderly care but still maintain the ability to do basic activities of daily living (BADLS), including bathing, dressing, and eating [13].

All subjects with severe disease or cannot do the basic daily activities excluded from this study. Each participant was informed about the objectives and procedure before the investigation began. Descriptive statistics were done in the form of mean, standard deviation, and percentages, to summarize the sample based on characteristics, PASE, and OPQOL-Brief. Spearman's correlation coefficient was used to measure the strength and direction of the relationship between the PASE- Score and the mean of OPQOL-Brief. The analysis was done using IBM SPSS version 25, with statistical significance at p-value 0.05. In order to support understanding of the daily lives of the elderly, direct observation was done during the study.

A. Measuring Instruments

This study using two inventory instruments: PASE and OPQOL-Brief.

1. Physical Activities Score for the Elderly (PASE)

PASE is a subjective or self-administered scale to evaluate the physical activity of the elderly without serious physical or mental impairments. The scoring algorithm collected from physical activity measured by movement counts from an electronic-physical activity monitor, activity diaries, and self-assessed activity levels [14-16]. PASE administration and scoring instruction manual recommend the score rounded to

the nearest integer and will range from zero to 400 or more. This scale was tested base on the memory of the respondents over the past seven days [17, 18]. This technique was relying on people to be able to look back accurately on how they've been done over the week. The reliability coefficient for this instrument was 0.75 (95% CI = 0.69-0.80) with the mean score was 102.9 (SD = 64.1, Median= 90), tested to a general population of older adults [14, 16]. Mean score for different community reportedly different, as research conduct to Japan population has the mean of 114,9 (men 110,0, and women 118.2) and 155 (men 172 and women 139) to Canadian population [17, 18].

2. OPQOL-Brief (Older People Quality of Life – Brief)

People Quality of Life - Brief (OPQOL-Brief) is a self-administered questionnaire to measure the quality of life for the elderly. OPQOL-Brief was modified from OPQOL with the same author and copyright owner. The 13 questionnaires measured single item on global quality of life using 5 points, Likert-type scale meaning higher score represented a higher quality of life. Each question was measuring the following premises: (1) I enjoy my life overall; (2) I look forward to things; (3) I am healthy enough to get out and about; (4) My family, friends or neighbors would help me if needed; (5) I have social or leisure activities/ hobby that I enjoy doing; (6) I try to stay involved with things; (7) I am healthy enough to have. My independence; (8) I can please myself what I do; (9) I feel safe where I live; (10) I get pleasure from my home; (11) I take life as it comes and makes the best of things; (12) I feel lucky compared to most people, and (13) I have enough money to pay for household bills. This questionnaire has already proven to become highly reliable and valid for the short measure of the quality of life for the elderly, validation to an ethnically diverse population, and the applicability to cognitive normal to moderate dementia [19].

B. Participants

Between January and March 2019, 250 elderly people (83 men, 167 women; 50 reside in elderly care, 200 in community-dwelling) were recruited in this study. Previously the independent elderly care was asked and permitted for the researcher to do the study. From two hundred fifty participants volunteered and participated of the study, 13 of the respondents was excluded for being frail (indicated by 0 points in PASE score) and do not reach the age of 60 even though resides in the elderly care. Two hundred and thirty-seven (N=237) elderly (80 men, 157 women; 41 resides in elderly care and 196 in community-dwelling) were inputted the PASE and OPQOL questionnaire with interviewer-administered to simplify the process of collecting data for the back-forward translation questionnaire perform from English to Bahasa Indonesia.

C. Direct Observation

Between January 21-23rd 2019 and January 28-29th, direct observation done to the elderly care in Bandung. Both of the elderly care operating under Christian church management and the supervision of the Social Service of Indonesia Social

Ministry. The first elderly care is taking care of 65 elderly (49 women, 16 men). This elderly care managed by three caretakers and get help by 34 people (19 of them also living in the dorm beside the elderly care) doing laundry, cooking, and house cleaning. The second elderly care is taking care of 29 elderly people (23 healthy, and six frail elderly). This elderly care managed by six supervisor divides into nursing, menu and nutrition, safety, garden, transportation, and spiritual built division. There are 15 people who help the elderly with the chores; all of them are living in the dormitory near the elderly care. Each elderly care has uniqueness and designs differently based on their previous and existing condition of the building. As time goes by, both of the elderly care using their unoccupied space to increase the capacity for taken care of the elderly with the ward for the frail or sick people. In situ observation described in the Analysis and Result sections.

4 Analysis and Result

Analysis and result divide into two sections: (A) Descriptive Findings and (B) Direct Observation.

A. Descriptive Findings

The mean age of the participants was 72.41 (+/- 7.457) years, (range= 60-94 years), with most being women (66.25%). The mean age of the participants who live in elderly care was 77.90 (+/-7.141), older than who lives in community-dwelling 71.27 (+/-7.012). Mean weight was 59.71 (+/- 11.116) kilograms, (range= 29-87 kilograms). Mean height was 158.72 (+/- 10.219) centimeters, (range= 130-180 centimeters), mean body mass index 23.60 (+/- 3.315), range= 14.3-36.7. In average, participant's five senses scale 1 to 5, 1 for being very poor and 5 for being very good is in good condition, with the highest score mean in touch senses 3.73 (+/- 0.737), and least in sight 3.46 (+/- 0.890). Body Mass Index in this study divide into four scales: underweight for BMI less than 18.5, normal for 18.1<BMI<25, overweight for 25.1<BMI<30 and obese with BMI more than 30.1. Accordingly, to the BMI group 1 for being underweight and 4 for being obese, the mean of PASE score was 43.2 (+/- 24.682), 86.63 (+/- 52.168), 95.39 (+/- 65.103) and 63.60 (+/- 43.358) respectively. The characteristics of the participants presented in Table 1.

PASE-Score consists of 12 components, grouping into three groups based on activity types as the following: leisure activities, household activities, and work-related activities. Highest mean score within household activities to the least mean were: light housework 16.88 (+/- 11.733), heavy housework 14.03 (+/- 12.432), outdoor gardening 6.92 (+/- 9.534), lawn work activities. 5.32 (+/- 12.799), and home repair 4.30 (+/- 10.538).

Within leisure activities the highest to the least mean were: walking 17.05 (+/- 20.706), light-sport 8.84 (+/- 14.031), moderate sport, 3.83 (+/- 10.789), strenuous sport 1.41 (+/- 7.701), and muscle strength activities 0.93 (+/- 4.260). Total PASE-Score mean was 85.99 (+/- 55.95), range 327 (min 2, max 329) with the mean score of the women and men were

86.76 and 84.48, respectively. The score was 25,16% and 45.16% lower than the Japanese and Canadian population [17, 18]. The detailed result of PASE-Score breakdown is presented in Table 2. Mean of OPQOL-Brief for the elderly who lives in elderly care was lower (3.73, +/- 0.478) than the elderly who lives in community-dwelling (4.06, +/- 0.555). PASE-Score's mean also lower (57.38 to 91.98). The comparative table of PASE-Score between community-dwelling and elderly care presented in Table 3.

Table 1 Characteristics of the participants

	MEAN	STD. DEVIATION
AGE (YEARS)	72.41	7.45
WEIGHT (KGS)	59.71	11.11
BMI	23.60	3.31
OVERAL SENSE	3.73	0.67
VISION	3.46	0.89
HEARING	3.62	0.85
SMELL	3.82	0.78
TASTE	3.85	0.76
TOUCH	3.92	0.73
PASE SCORE	85.99	55.95
UNDERWEIGHT	43.20	24.68
NORMAL	86.63	52.16
OVER WEIGHT	95.39	65.10
OBESE	63.60	43.35

Table 2 Descriptive results of PASE-Score

	MEAN	STD. DEVIATION
PASE_SCORE	85.99	55.95
WALKING	17.05	20.70
LIGHT SPORT	8.84	14.03
MODERATE SPORT	3.83	10.78
STRENUOUS SPORT	1.41	7.70
MUSCLE STRENGTH SPORT	0.93	4.26
LIGHT HOUSEWORK	16.88	11.73
HEAVY HOUSEWORK	14.03	12.43
HOME REPAIR	4.30	10.53
LAWN WORK	5.32	12.79
GARDENING	6.92	9.53
CARE OTHER	6.35	13.51
VOLUNTEER	0.15	0.38

Table 3 Community-Dwelling and Elderly Care PASE-Score

	MEAN_	PASE_
	OPQOL	SCORE
ELDERLY CARE	MEAN	3.73
	STD. DEVIATION	0.478
COMMUNITY	MEAN	4.06
DWELLING	STD. DEVIATION	0.555
TOTAL	MEAN	4.01
	STD. DEVIATION	0.556
		57.38
		34.808
		91.98
		57.723
		85.99
		55.95

Comparing the mean of the general quality of life to the mean of OPQOL-Brief, the general quality of life was slightly

higher, with the result 4.02 (+/- 0.654) to 4.01 (+/- 0.556) respectively, with the same median, mode point, and maximum point. The differences only in range and minimum point. The general quality of life has four range point with one as the minimum answer, the OPQOL-Brief mean only has three range point with two as the minimum answer. The comparing result of the general quality of life and the mean of OPQOL-Brief presented in Table 4.

Table 4 Comparing OPQOL-Brief and general QOL

		OPQOL	QOL
ELDERLY CARE	MEAN	3.73	3.85
	STD. DEVIATION	0.478	0.654
COMMUNITY DWELLING	MEAN	4.06	4.06
	STD. DEVIATION	0.555	0.65
TOTAL	MEAN	4.01	4.02
	STD. DEVIATION	0.556	0.654

The highest to the lowest mean in OPQOL-Brief outcome divided into two categories: 3.01- 4.00 for agree, 4.01-5.00 for strongly agree. Agree categories consist of 7 items: (1) I look forward to things, (2) I am healthy enough to get out and about, (3) I have social or leisure activities that I enjoy doing, (4) I try to stay involved with things, (5) I am healthy enough to have my independence, (6) I can please myself what I do, and (7) I have enough money to pay for household bills. Strongly agree categories consist of 6 items: (1) I enjoy my life overall, (2) My family, friends or neighbors would help me if needed, (3) I feel safe where I live, (4) I get pleasure from my home, (5) I take life as it comes and make the best of thing, and (6) I feel lucky compared to most people.

Spearman correlation uses to measure the strength and direction of the relationship between the total score of PASE to mean score of OPQOL-Brief. Although many items significantly positively correlated between items in PASE and items in OPQOL-Brief, all of the correlation is weak (0.190). Result of the Spearman correlation presented in Table 5.

Table 5 Spearman correlation of PASE-Score to mean OPQOL-Brief

		MEAN OPQOL
PASE-SCORE	CORRELATION COEFFICIENT	.190**
	SIG. (2-TAILED)	0.003
N		237

** Correlation is significant at the 0.01 level (2-tailed).

B. Direct Observation

Direct observation found that there was some similar condition applied to both elderly cares. The first, common room designed for sitting activities with chair and desk as the basic equipment; the second, there is no specific open space

wide enough for the elderly to do exercise altogether due to small space problem; and the third, the sedentary lifestyle tends to be preferred by the elderly. Figure 1 and 2 capturing the living situation in the elderly care.



Figure 1 Living situation in the elderly care (1)



Figure 2 Living situation in the elderly care (2)

5 Discussion

This cross-sectional study explores an association between physical activity and quality of life for the elderly in Indonesia, based on the elderly resides in Bandung. Although the correlation is weak, this result still agree with the previous study which stated that the elderly have higher level of physical activity will score higher level health-related quality of life than the group in low physical activities for all dimension, including physical activities of daily living in Saudi Arabia, Malaysia, United States of America and Indonesia [6, 9, 20, 21].

Lower result of PASE-Score in this study indicating that the elderly in Indonesia haven't exercise regularly. In the current study, both scores of physical activities and quality of life for the elderly who lives in elderly care were lower than the one who lives in community-dwelling (less by 37.61%). The lower score of PASE was signifying that everyday activities in the elderly care generate more sedentary lifestyle. As expected, the less physical activities also occur the elderly who has underweight and obesity, comparing to the normal and overweight. This expectation also occurs in the group of the older elderly. As the elderly get older, physical activities tend to get lower.

The low score in household activities and work-related activities also indicate that most of the elderly did not

regularly do the house repairing (especially for women elderly), neither lawn work activities. This condition suggest that they have helped by others or do not own lawn on their house, while the low score on work-related activities might indicating their retirement status for the elderly more than 65 years old or working in sitting position for the elderly younger than 65 years old. This condition related to the regulation from the government regarding pension age at the age of 56 years old in 2015, 57 years old in 2019 and gradually increase to 65 years old in 2043 [22].

The facts that the elderly in Indonesia was less active in moderate-strenuous sports and muscle activities and the increasing life expectancy in Indonesia [23], will increase the risk of Sarcopenia. Using the new operational definition, sarcopenia is defined as a progressive and generalized skeletal muscle disease or failure with low muscle strength that previously common only to adults of older age, now can also occur earlier in life [24]. Considering a broader range of Sarcopenia's prevalence, then the urgencies to create a design to change the habit of sedentary lifestyle is increasing.

6 Preliminary Design Recommendation

Based on the fit perceived sensory ability of the elderly, it is also possible to activate the haptic interface instead of typical visual display. In this research, we proposed three design recommendations, with all of the design recommendation focus on muscle strengthening through strength and resistance training using the shape of free weight device like a dumbbell with features, based on consideration factors as follows:

A. Smart Dumbbell with gamification and interaction features

The first proposed design is focusing on how to motivate the elderly. As the behavior of the elderly comprised by many modifiable factors [25], then the first alternatives of design promoting socialization and create a network through commonalities as well as their ability to associate interest in nurture, care and creating enjoyment arguably effective by the previous research [26-28].

The first alternative was to design the training, embed with gamification, interaction, and nurturing principles. With the proposed design, the elderly can use the device in their home and detecting their movement by using a television monitor. In order to increase engagement during the training time, a simple virtual pet will accompany and raise with the progression of the elderly's strength and resistance.

The idea of this first alternative is to enhance the dumbbell with the movement sensor to detect the elderly's performance and synchronize them to a visual display using Bluetooth. In order to signify the progress, the result in the form of points will appear in the visual display after the session over, and the virtual pet will appear and encourage the elderly while doing the exercise. Sketch for the first recommendation presented in Figure 3.

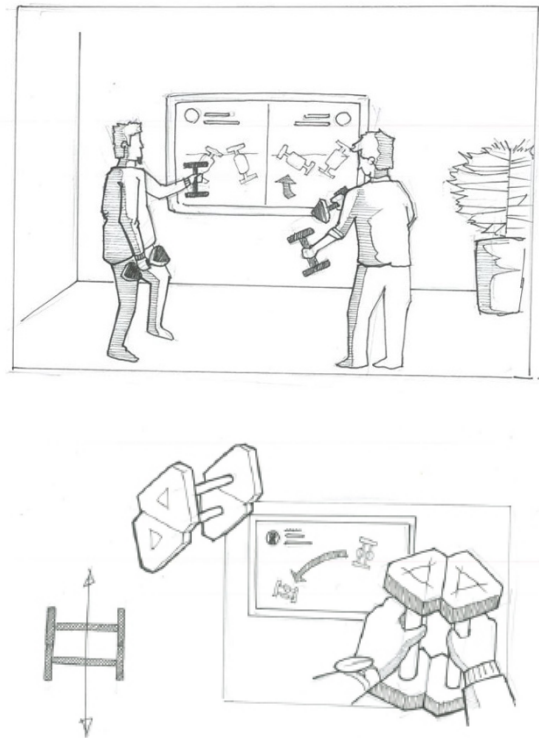


Figure 3 Illustration of smart dumbbell with gamification and interaction features

B. Smart Dumbbell with master/ slave technology principle

The second alternative is considering the availability of existing occupational therapist or coach or trainer in the elderly care and the potential problems faced by the elderly. Research has shown, those potential problems for the elderly of an aging society are loneliness and social isolation. Both of these two latent problems will affect the health and quality of life [29-32]. Therefore, these alternatives designed to open the opportunity for the elderly to maintain a social network between their peers and reduce social isolation.

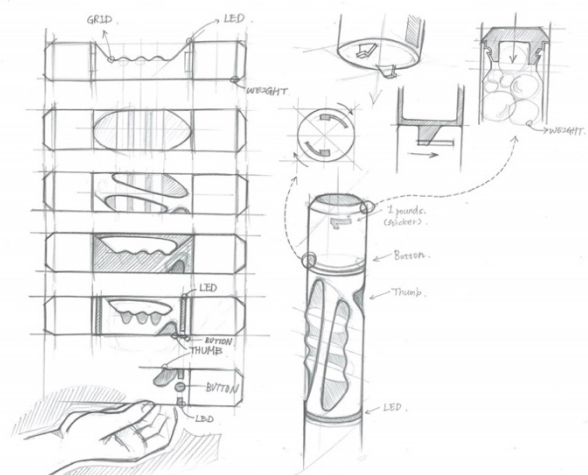


Figure 4 Illustration of smart dumbbell with master/slave technology principle



Figure 4 Prototype of smart dumbbell with master/slave technology principle

The idea of this alternative is to create two types of the dumbbell. Using master/slave as the communication model provide one device will be the unidirectional control over one or more device, then this alternatives will serve the first type (type I) as the ‘master’ while the second type (type II) will act in a role of the ‘slave’. The type I will use by the trainer/ coach/ occupational therapist, and the type II will use by the elderly.

The type I will detect the movement performed by the coach, and the type II should imitate the movement. Right or wrong movement will detect differently by the dumbbell in the form of LED lights. The red light will turn on if the movement is wrong, and the green light will turn on if the movement is right. Illustration and sketch for the second recommendation and the prototype presented in Figure 4 and 5.

C. Smart Dumbbell with self-measure detection

The third alternative is to accommodate the potential rapid muscle strengthening after several weeks. Therefore, to maintain effective training, the muscle force needs increasing acquisition, frequency, and synchronization with the help of higher to a maximum weight [33, 34].

With the rapid increase in strength of the elderly during the first few weeks start from the baseline level [35]. This third recommendation is considering the time usage of the device and identifying the progress of muscle strength progression. This condition will consequence in increasing the weight of the free weight device due to the neural adaptation mechanism of the elderly. Therefore, the third alternatives design is to adjust its weight and the features of a self-measure detection. The idea of this self-measure detection is using digital pressure sensor, similar with Hand Dynamometer which count as a reliable tool to measure hand grip strength [36]. In this

case, the self detection mode could become the signifier for the elderly of their progressing hand strength as the positive result of the training. The sketch of the third recommendation presented in Figure 5.

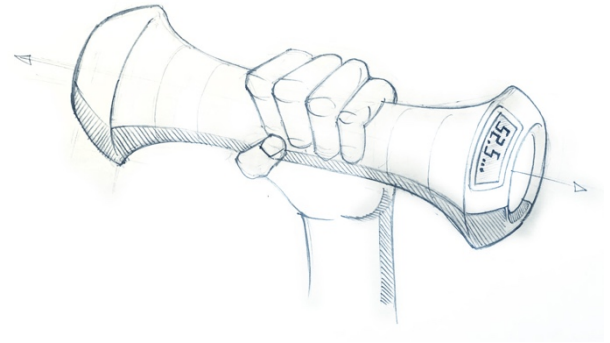


Figure 5 Illustration of smart dumbbell with self-measure detection

7 Conclusion

Dumbbell weight will help muscles to work against its weight or force. All of the recommendation design intended to support the strength and resistance training with lightweight free weight, considering the elderly as the beginner or just starting again their physical activities after a long hiatus. This method arguably effective and feasible by several previous research, although the result significance, weight use, and training period may vary [33-35, 37-39].

All of the proposed design focusing on the muscle strength training which showed very less performed by the elderly in Indonesia with several different enhancement points as the following: nurture association, gamification, social network, time of use, and precise detection for progression. The matrix of all three proposed design, presented in Table 6.

Table 6 Matrix of proposed designs

Proposed Design	nurture assc	Gamifi cation	social network	Time of use	progress detection
Dumbbell A	✓	✓	✓		✓
Dumbbell B			✓	✓	✓
Dumbbell C				✓	✓

The additional concern regarding the specific target to use in Indonesia are the feasibility regarding technology implementation and the user-friendly device. For further studies, this research will be developing the most suitable type of design for the designated targets, the elderly motivation, the elderly institution ability to support and provide, and the possibilities to explore training for smaller muscle groups to maintain the development of fine motor skills.

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