



# 1<sup>st</sup> International Conference on Global Health and Innovation: "Multiple Burden of Diseases in the Developing Countries"

LOMBOK, JULY 18-19, 2019

visit our website <https://event.unram.ac.id>

IDI & IAI  
ACCREDITATION

WEB OF SCIENCE

Clarivate  
Analytics

VOLUME 8, NUMBER 2, MAY-AUGUST 2019

Print-ISSN: 2089-1180

E-ISSN: 2302-2914

DOI: <http://dx.doi.org/10.15562/bmj.v8i2.1559>

## BALI MEDICAL JOURNAL (BaliMedJ)



Bali  
Medical Journal

[www.balimedicaljournal.org](http://www.balimedicaljournal.org)



PUBLISH BY : SANGLAH GENERAH HOSPITAL  
IN COLLABORATION TO  
INDONESIAN PHYSICIAN FORUM  
AND INDONESIAN COLLEGE OF  
SURGEON, BALI-INDONESIA

## Welcome remark The Chairman of GHI Conference



Dear all participants and invited speakers

It is my privilege and pleasure, on behalf of Dean of Faculty of Medicine and Rector University of Mataram, to welcome you all to the **1st International Conference on Global Health and Innovation**. This conference is held by the Faculty of Medicine Universitas Mataram with the support of Chungnam National University, Indonesian Doctor Association of West Nusa Tenggara, and Indonesia Pharmacist Association. This conference is in conjunction with the 57<sup>th</sup> Dies Natalis of Universitas Mataram and 16<sup>th</sup> Dies Natalis of the Faculty of Medicine Universitas Mataram.

The theme of the conference this year, “**Multiple Burden of Diseases in the Developing Countries**” reflects the current health situation faced by Indonesia and other developing countries, where due to the demographic and socio-economic transition and the increasing trend of non-communicable diseases, more constraints are imposed to our health systems in dealing with the pre-existing burden of communicable diseases. This is a challenge that calls out further action and innovation.

This conference is presenting you with internationally recognized, multidisciplinary expert speakers from Indonesia and abroad to share their knowledge in regards to the current global health concerns of the multiple burdens of diseases in developing countries. We have 100 participants with 53 abstract.

To further disseminate the scientific endeavors of researchers who have submitted their study to be presented in this conference, we are partnering with Bali Medical Journal, an experienced and internationally-indexed journal in Indonesia.

Conferences such as this provide a valuable opportunity for health professionals, researchers and students to share knowledge, ideas, and experiences. It is also a forum for young and senior researcher to connect and explore potential future collaboration.

We would like to thank the provincial government of West Nusa Tenggara, Indonesian Doctor Association, Indonesia Pharmacist Association and all sponsors for the supports.

I am sure you will have fruitful and rewarding exchanges during this conference. I wish you every success with this important conference and I look forward to learning about the outcome. We once again welcome you to Lombok and we hope that you are enjoying this conference. Thank you.

**dr. E. Hagni Wardoyo, Sp.MK**  
**The Chairman of GHI Conference**

## Welcome Remark by the Dean of the Faculty of Medicine Mataram University



We are very delighted to welcome all keynote speakers and participants to the **1st International Conference on Global Health and Innovation** held in Lombok, Indonesia by the Faculty of Medicine Mataram University. This year the theme of this conference is the **"Multiple Burden of Diseases in the Developing Countries"**. Global health encompasses a wide range of diseases including communicable and non-communicable diseases which adds the daunting health challenges already facing many developing countries, including Indonesia.

The aim of this conference is to support a multidisciplinary platform for scientific exchanges on multidimension of global health that we are currently facing. This conference provides a unique multidisciplinary setting for all professionals, researchers and students with a common interest in global health to discuss, debate, inform and educate themselves about this evolving disease landscape.

Our theme, **"Multiple Burden of Diseases in the Developing Countries"** covers a wide range of global health concerns from infectious diseases to cancer and also pharmaceutical aspects associated with global health. We are also thrilled to have keynote speakers from multiple countries and also a wide range of participants. We hope you will enjoy the program and the scientific discussions, and that the knowledge gained and discussed during these days in Lombok will be of our importance. It is also our hope that new and good relationships and networking will be established between the participants.

Lastly, I would like to thank the organizer committee for their effort, the sponsors for their support and all those who have contributed to the success of this conference. This is the first International Conference held by our faculty and we hope many more to come. I wish all presenters and participants a fruitful seminar and I hope that your visit to this event and to Lombok will be a pleasant experience.

Sincerely Yours,

**dr. Hamsu Kadriyan, M.Kes, SpTHT-KL(K)**

## Biography of Keynote Speakers



**Professor Dr. Cissy Kartasmita Sp.A (K)**

**Department of Child Health, School of Medicine, Universitas Padjadjaran, Bandung, Indonesia**

Dr. Kartasmita earned her MD from the Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia (1973), and her MSc (1990) and PhD (1993) in Medical Sciences from the University of Leuven, Belgium. She completed a fellowship in pediatric pulmonology at Keio University, Tokyo, Japan (1988), and participated in a course on Tropical Epidemiology at Mahidol University, Bangkok, Thailand (1988). Research conducted by Dr. Kartasmita includes a study on Epidemiology of Influenza, Human Animal interface during the Outbreak of HPAI, Epidemiology of RSV and other respiratory virusis, Burden of Invasive Pneumococcal Disease in Indonesia, Nasopharyngeal carriage of Pneumococcus, Asthma, Otitis Media and hearing impairment in school children,

Vaccinology and Tuberculosis.

She is now the chairperson of the Vaccination Task Force Group of the Indonesian Pediatrician Society, and the Indonesian Influenza Foundation (IIF). She is also a member of the Asia-Pacific Alliance for Control of Influenza (APACI); Asian Strategic Alliance for Pneumococcal disease Prevention (ASAP); Indonesia Technical Advisory Group on Immunization (ITAGI), Congress of International Pediatric Pulmonary (CIPP) advisory group and Network for Education and Support in Immunisation (NESI). Since June 2017 she became the Director of Center for Colaborative Research on Acute Respiratory Infections (CCR-ARI), SHERA/USAID, Faculty of Medicine, Universitas Padjadjaran, Bandung. She is often invited to speak at various scientific meetings in Indonesia and abroad. She has published a number of journal articles and is involved as contributor for local textbooks on her expertise.



**Prof. Dr. Kobayashi**

**Department of Global Health, School of Health Sciences, University of the Ryukyus, Japan**

Prof. Dr. Kobayashi has more than 20 years' experience in global health and is the author of more than 90 publications in international scientific journals. He has made contribution in strengthening the capacity of infectious disease control and school health in low- and middle-income countries under the Japanese Official Development Assistance (ODA) program with a point of views both of a practitioner and a researcher. He received 3rd merit of labor from the Lao government in 1999 for making contribution in malaria control. From 2000, he had joined the core member of Hashimoto Initiative, mentioning the importance of deworming and other infectious disease program in school. He made numerous contributions in the human resource

development for policy management in Asia and African countries. He has been a chair of Japan consortium for global school health research (JC-GSHR), a think-tank and the focal point of Japan for global promotion of school health, since 2008. He is currently head of Department of Global Health, School of Health Sciences, University of the Ryukyus, and also program leader of Okinawa Global Health Program in this school (founded in October 2015) to promote human resource development contributing in the public health issue in the region.

He has started the research project for combating vector borne diseases and zoonosis as a project leader supported by Okinawa prefecture's government. For his research in school health-based disease control, which helped decreasing malaria incidence in Southeast Asia, he received "the Zero Malaria Award" from No More Malaria Japan in 2016 and "Aikawa Masamichi Award" from Japanese Society of Tropical Medicine in 2017. His contribution in the practice of global health, such as promoting the school health in developing countries and assisting to Myanmar migrant, was granted with the encourage award from Ooyama foundation in 2013.



### **Professor (Em) Hisayoshi Mitsuda**

#### **Emeritus Professor, Faculty of Sociology, Bukkyo University, Kyoto, Japan**

MITSUDA is an emeritus professor, Faculty of Sociology, Bukkyo University, Kyoto and acts as a representative of Malaria Front Fund, Kyoto Japan in 2019. Born in 1948, he proceeded to Doctor of Agriculture from Kyoto University in 1987. Since 2006 he has been engaged in the Malaria Control Program at Faculty of Medicine, Mataram University, Lombok, Indonesia. He published the related books, i.e., *MALARIA CONTROL AS A GLOBAL CHALLENGE (2009)* and *SUSTAINABLE LOMBOK: Rich Nature and Rich People in the 21 Century (2005)* by Mataram University Press.

Mitsuda was a pioneer in Japanese Environmental Sociology, and played a particularly important role in bringing Western perspectives to Japanese scholars. He was appointed to the editorial boards of important environmental social science journals such as *Society and Natural Resources* and *Capitalism Nature Socialism*. It was a rare honor in the early days of these journals for an Asian scholar to serve on their editorial boards.

What has made Mitsuda such a unique professor is his commitment to applying his sociological skills to the world outside the university and academia, especially in efforts to help people in grass-roots' struggles against social and environmental problems. Early in his career, for example, he was very active in the battle to protect the Shiretoko Nature Sanctuary in Hokkaido, and thanks to the efforts of Mitsuda and fellow environmentalists the sanctuary is now a UNESCO World Heritage Site. Mitsuda's career is marked by continual efforts to help ordinary people solve problems and improve their quality of life. He has worked in well over a dozen different nations, and these days his focus is on helping fight Malaria in Indonesia. This is clearly a very worthy effort, and one that he will continue after his retirement.

*"In short, Hisayoshi Mitsuda has had an excellent career both as a traditional scholar making important academic contributions as well as a scholar-activist making important contributors in many peoples' lives by helping them solve difficult problems,"* addressed by Riley E. Dunlap, a founder of American Environmental Sociology, and Regents Professor of Sociology and Dresser Professor Emeritus, Oklahoma State University as his complimentary speech at Mitsuda Retirement Lecture, Bukkyo University, January 18, 2019

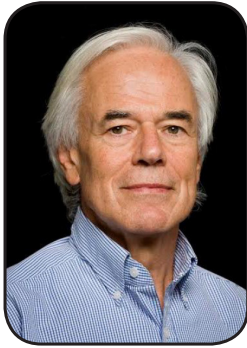


### **Professor Mulyanto**

#### **Faculty of Medicine, Mataram University, Indonesia**

Professor Mulyanto is a Professor at the Faculty of Medicine Mataram University. He has been a lecturer at Mataram University since 1976. Professor Mulyanto served as the Rector of Mataram University in 1997 – 2001 and continued as the Dean of the Faculty of Medicine Mataram University from 2007 until 2015.

Professor Mulyanto is known as a prominent researcher in Indonesia and his main work is on Hepatitis. Amongst many of his innovations in infectious diseases were: development of screening method for Hepatitis B through Reverse-Passive Hemagglutination (1985), anti-HCV Dipstick for diagnosis of Hepatitis C (1996) and also detection kit for Malaria and HIV virus with immunochromatography method (2007 and 2017). Through his work and dedication on Hepatitis in Indonesia he has been given numerous prestigious award including: Habibie Award in the field of Medicine and Biotechnology (2000), Achmad Bakrie Award for under the category for Medicine (2008) and Academic Leader Award by the Indonesian Ministry of Research, Technology and Higher Education of (2017). He has published numerous research articles through out his career and continues his passion in research



**Professor Alexander A.W. Peters, PhD, MD**

**Leiden University Medical Center Department of Gynecology, Netherland**

Professor Alexander A.W. Peters, PhD, is a Professor in Gynecology and specialized in Gynecologic Oncology. He is currently the International Chairman for the Female Cancer Program (FCP). This program supports the the fight against cervical cancer in developing countries. Together with local partners in Surinam, South Africa and Indonesia, the FCP is setting up cost effective screenings, awareness and research programs in low resource areas.

During the last 10 years he has obtained numerous fundings and grants from different scientific, governmental (national and international) and public organizations.

Amongst these fundings and grants are Officer Palm of Honor Medal (President of Surinam, 2008), Hector Treub Medal (NVOG, 1999), Betty Bos/ Olijf Medal (Olijf Foundation, 1996) and Best Teaching Performance clinical phase in Obstetrics and Gynecology (LUMC, 2010).

Professor Alexander A.W. Peters, PhD has held aby significant roles, amongst the many position he has held are Consultant Foundation Medical Helpcare in Third World countries, Member of Dutch Society "Cervix-uteri", Editorial Board Member of the International Journal Psychosomatic Obstetrics & Gynecology, Consultant for Gynecological Oncology in West Netherland (I.K.W.) and Member executive committee Society of Psychosomatic Obstetrics & Gynecology.

He is also a visiting professor in various institutions. To name a few are as visiting professor in Surinam (on a yearly basis), visiting professor in South Africa (on a 3-yearly basis), teacher of the Institute of Tropical Medicine in the "Haven Hospital" Rotterdam until 1998, teacher in transcultural sexual aspects in the Department of Anthropology, University of Leiden. He has also published over 100 articles in scientific journals. He continues to work in tackling the concern of cancer amongst female in the developing world.



**dr. Hamsu Kadriyan, M.Kes, SpTHT-KL (K)**

**Dean of the Faculty of Medicine, Mataram University, Indonesia**

Hamsu Kadriyan, MD, ENT-HN specialist was born in Lombok and graduated his medical doctor from Hasanudin University. He then pursued his specialization in Ear, Nose and Throat and also obtained a Master's degree from Gadjah Mada University. Dr. Hamsu Kadriyan furthered his study as an Oncologist consultant by the Indonesian College of ENT-HNS.

In his early career as a medical doctor he served as a physician in Kopang Community Health Centre from 1998-2001. He then joined the Faculty of Medicine Mataram University as a lecturer since 2001. Dr. Hamsu Kadriyan was the Vice Dean

of Administration and Fund (2009-2015) and currently is the Dean of the Medical Faculty Mataram University. He has published numerous articles in scientific journals as first author or co-author. Published works are specifically related to malignancy associated with nasopharynx which encompasses the epidemiology and also identification novel diagnostic marker and various prognostic factors.



**Professor Guang-Ho Cha, Ph.D**

**Dept. of Infection Biology, College of Medicine, Chungnam National University Daejeon, South Korea**

Professor Guang-Ho Cha is a Professor in the Department of Infection Biology, College of Medicine, Chungnam National University Daejeon, Korea. He currently serves as the Vice Director of the Research Institute of Medical Science, College of Medicine, Chungnam National University and the Editorial board member of "Genes and Genomics". He conducted his Postdoc in Prof. Juan Botas' Lab under the Department of Molecular Human Genetics, Baylor College of Medicine, USA and also another PostDoc

in Prof. Jonglyeong Chung's Lab under the Department of Biological Science, KAIST, Korea. Professor Guang-Ho Cha obtained his PhD in Genetics in 2001 from the School of Biological Science, Seoul National University.

His field of interest is in the Characterization of host signaling pathway manipulation mechanism by microbes (especially for *Toxoplasma gondii*, a protozoan parasite) or by their antigens for evading of host immune defense system. He is also looking in to the *In vivo* and *in vitro* model generation for human diseases including infectious diseases or neurodegenerative diseases (Parkinson's disease and Huntington's disease). He is the author and co-author of numerous research publication.



**Professor Chang-Hwa Song**

**Deputy Dean for Research Affair, College of Medicine Chungnam National University Daejeon, South Korea**

Professor Chang-Hwa Song is currently the Deputy Dean for Research Affair, College of Medicine, Chungnam National University, Daejeon, South Korea and the Deputy Head, BK21 plus CNU Biomedical Convergence Program, Chungnam National University, Daejeon, South Korea. He also serves as the Professor, Dept. of Microbiology, College of Medicine, Chungnam National University, Daejeon, South Korea. Professor Chang-Hwa Song obtained his PhD from the College of Medicine, Chungnam National University in 2002, he graduated from the College of Natural Science, Chungnam

National University with a M.S in 1993 and a B.S. in 1991. He conducted a Postdoctoral Fellow, Dept. of Pediatrics, Immunology and Rheumatology, University of California, San Francisco, CA from 2007 – 2009.

He has held many significant position throughout his career, amongst the many are as Chair, Dept. of Microbiology, College of Medicine, Chungnam National University, Daejeon, South Korea (2012 – 2016), Deputy Head, Leaders in Industry-university, Cooperation (LINC), Chungnam National University, Daejeon, South Korea (2015) and Head, Dept. of Medical Science, College of Medicine, Chungnam National University, Daejeon, South Korea (2016-2018). He is also the author and co-author of numerous research publications.



**Professor Dr. Umi Athiyah, MS, Apt**  
**Dean of the Faculty of Pharmacy, Airlangga University**

Prof. Dr. Umi Athiyah, MS., Apt was born on Probolinggo, April 7th 1956. Work as a Lecturer at the Faculty of Pharmacy since 1981 until now. Currently serving as Dean of the Faculty of Pharmacy, a member of the National Pharmacy Commission (KFN) and also Head of the Education Development Division at the Association of Higher Education in Pharmacy (APTFI), which focuses on compiling the pharmaceutical education curriculum in Indonesia.

Besides that, several book has written, including (1) Prescription Textbooks: Medication and prescription Volume I, (2) CPD Module: Pharmaceuticals Care in

Hypertension Therapy, and Wrote a translation of (3)Pharmacy Management 2<sup>nd</sup> edition:Essentials for All Practice Settings, which are used to support Student learning. Also a speaker at various National and International academic activities, such as the one just held in Japan 2018, The Joint Conferences Japan HPC and AP-Pen, 2018, Josai International University.

Research activities focuses on the field of community pharmacy which is about Pharmaceutical Care, Pharmaceutical Management as can be seen in several articles published in National and International journals. The last publication is about health insurance entitled The Influence of Participation of the Social Security Agency (BPJS) Health on Therapeutic Success in Hypertension Patients at Community Health Centers



**J Irwan Hidayat**  
**Director of PT Industri Jamu dan Farmasi Sidomuncul, Tbk**

J Irwan Hidayat was born in Yogyakarta. He is the eldest of 5 siblings and has been in the *Jamu* or traditional herbal medicine since 1971. J Irwan Hidayat started his career in PT Industri Jamu dan Farmasi Sidomuncul, Tbk as a commissioner from 1972 to 2013. Then from 2013 until 2016 he was assigned as President Director before becoming the Director of the company since 2016. He is currently the commissioner of several companies including PT Muncul Mekar (since 1994) PT Muncul Putra Offset (since 1994), PT Muncul Armada Raya (since 2002), PT Hotel Candi Baru (since 2013) and PT Mentari Anugerah Sakti (since 2013) and he also serves as the President Director of PT Semarang Herbal Indoplant (since 2009). J Irwan Hidayat was listed as one of

the richest people in Indonesia by Forbes Magazine. He is an entrepreneur that have been consistently focus on charitable works.





Published by DiscoverSys



CrossMark

Bali Medical Journal (*Bali Med J*) 2019, Volume 8, Number 2: 1-21

P-ISSN.2089-1180, E-ISSN.2302-2914

DOI: [10.15562/bmj.v8i2.1559](https://doi.org/10.15562/bmj.v8i2.1559)

## Editorial Board Bali Medical Journal

### Editor-in-Chief

**Prof. Dr. Sri Maliawan, SpBS (K)**

(Scopus ID), (Google scholar)

*srimaliawan@unud.ac.id / maliawans@yahoo.com*

Department of Neuro Surgery, Udayana University

Sanglah General Hospital

Bali - Indonesia

### Associate Editor

**Prof. Dr. Ir. Ida Bagus Putra Manuaba, M.Phil**

(Scopus ID), (Google Scholar)

*putramanuaba@unud.ac.id / putramanuaba28@yahoo.com*

Biomedicine Postgraduate Program, Udayana University

Bali - Indonesia

**Prof. DR. Ketut Suwiyoga, SpOG (K)**

(Scopus ID)

*suwiyoga@unud.ac.id*

Faculty of Medicine, Udayana University, Sanglah Hospital Denpasar, Bali-Indonesia

### Editorial Board for Regional America

**Ankit Sakhuja, M.B.B.S., F.A.C.P., F.A.S.N.**

(Scopus ID)

*asakhuja@med.umich.edu*

Nephrology and Hypertension Cleveland Clinic (United States)

### Editorial Board for Regional Australia

**Prof. John Svigos, MB. BS. DRCOG., FRCOG., RANZCOG**

(Scopus ID)

*jsvigos@iprimus.com.au*

Ashford Hospital & Faculty of Health Sciences, University of Adelaide, Australia

**dr Deasy Ayuningtyas Tandio MPH-MBA.**

(*orcidID*)

*deasytandio@yahoo.com*

*James Cook University Australia Master of Public Health Master Of Business Administration, Indonesia*

**Editorial Board for Regional Europa**

**Prof. Harald Hoekstra**

(*Scopus ID*)

*jsvigos@iprimus.com.au*

*Universitair Medisch Centrum Groningen, Division of Surgical Oncology, Groningen the Netherland*

**Editorial Board for Regional Asia**

**Prof Huang Qin**

(*Scopus ID*)

*qhuang@cqu.edu.cn*

*Chairman Dept. of Neurosurgery, Guangdong 999 Hospital Guangzhou China*

**Prof. Soo Khee Chee**

(*Scopus ID*)

*kheechee.soo@duke-nus.edu.sg*

*SGH (Singapore General Hospital), National University Hospital, Duke Medical Center Singapore*

**Dr. G Sai sailesh Kumar, Ph.D**

(*Scopus ID*)

*saisailesh.kumar@gmail.com*

*Department of Physiology, Little Flower Institute of Medical Sciences and Research, Angamaly, Kerala, India*

**Assoc. Prof. Mohammad Amin Bahrami**

(*Scopus ID*)

*aminbahrami1359@gmail.com*

*Head of healthcare management department, Shahid Sadoughi University of Medical Sciences, Yazd, Iran*

**Dr. Tanveer Beg, PhD**

(*Scopus ID*)

*tbmirza@jazanu.edu.sa*

*Assistant Professor, Department of Biology, Faculty of Science, Jazan University, Jazan, Saudi Arabia.*

**Editorial Board Members****Prof. Andi Asadul Islam**

(Scopus ID), (Google Scholar)

undee@med.unhas.ac.id

Faculty of Medicine Hasanudin University, Makasar-Indonesia

**Prof. Dr. dr. Abdul Hafid Bajamal, Sp.BS**

(Scopus ID)

hfbajamal@gmail.com

Faculty of Medicine Airlangga University, Surabaya-Indonesia

**Dr. dr. I Wayan Sudarsa, Sp.B(K) Onk, FINACS, FICS.**

(Scopus ID), (Google Scholar), (Researchgate)

Department of Surgery, Udayana University,

Sanglah General Hospital

Bali - Indonesia

**dr. I.B. Amertha P. Manuaba, SKed, MBiomed.**

(Scopus ID), (Google Scholar), (Orcid), (Researcher ID) (Researchgate)

AmerthaManuaba@gmail.com / Amertha\_Manuaba@unud.ac.id

Biomedicine Magister Program, Udayana University, Indonesia

**dr. I Putu Yuda Prabawa, S.Ked.**

(Scopus ID), (Google Scholar), (Orcid ID), (Researcher ID), (Researchgate)

Lecturer of Clinical Pathology Department, Faculty of Medicine Udayana University, Indonesia.

**dr. Agha Bhargah, SKed.**

(Scopus ID), (Google Scholar), (Orcid ID), (Researchgate), (Researcher)

Faculty of Medicine Udayana University, Indonesia.

**Editorial inquiries to be addressed to: [editor@balimedicaljournal.org](mailto:editor@balimedicaljournal.org)**



Published by DiscoverSys



CrossMark

TABLE OF CONTENTS

Welcome remark

<b>dr. E. Hagni Wardoyo, Sp.MK</b> <b>The Chairman of GHI Conference .....</b>	ii
<b>dr. Hamsu Kadriyan, M.Kes, SpTHT-KL(K)</b> <b>The Dean of the Faculty of Medicine Mataram University .....</b>	iii

<b>Biography of Keynote Speakers .....</b>	iv
--	----

<b>Editorial Board Bali Medical Journal .....</b>	ix
---	----

<b>Table of Contents .....</b>	xii
--------------------------------	-----

SPEAKERS

<b>ER stress as a host-derived therapy for tuberculosis in future .....</b> Chang-Hwa Song	1
<b>Manipulation of host Akt signaling pathway benefits <i>Toxoplasma gondii</i> growth in ocular system.....</b> Fei-FeiGao, Heui-Gon Choi, Wei Zhou, Jaemin Yuk, Yong-Ha Lee, Guang-Ho Cha	1
<b>Acute respiratory tract infection among children in Indonesia: focusing on challenging and future direction.....</b> Cissy B. Kartasasmita	1
<b>Current diagnosis and therapy of cervical cancer.....</b> Alexander A.W. Peters	2
<b>EBV infection and nasopharyngeal cancer: the role of exosome on diagnosis and treatment .....</b> Hamsu Kadriyan	2
<b>Achieving therapeutic outcome through implementing pharmaceutical care.....</b> Umi Athiyah	3
<b>Development of social technology for malaria control.....</b> Jun Kobayashi	3
<b>Sociological perspectives on global climate change and global health: a socio-epidemiological study on malaria control program in Lombok, Indonesia; 2005-2014 .....</b> Hisayoshi Mitsuda	3
<b>The distribution of hepatitis B virus serotypes/sub-genotypes in Indonesia: implication for language relationship.....</b> Mulyanto	4
<b>Herbal industry based on GMP.....</b> Irwan Hidayat	4

## Oral Presentations

## Pathobiology of Communicable and Non Communicable Diseases

<b>Prostatic acinar adenocarcinoma incidentally found in cystoprostatectomy for bladder carcinoma: a case report and literature review</b> .....	5
I Wayan Juli Sumadi, Hilda Santosa	
<b>Correlation of estrogen receptor expression and mitotic activity in patient with invasive ductal carcinoma of the breast</b> .....	5
Devinta Bardianty, Fathul Djannah, Mohammad Rizki	
<b>The correlation between age and expression of the HER2/neu receptor in patients with invasive ductal type of breast carcinoma in West Nusa Tenggara Province</b> .....	6
Baiq Saka Muara Ardian, Fathul Djannah, Mohammad Rizki	
<b>The effect of telmisartan on collagen volume fraction in the kidney of 8% sodium chloride-treated rats</b> .....	6
Khairil Pahmi, M. Sidratullah	
<b>Viral and non-viral causes of hepatocellular carcinoma patients in Arifin Achmad General Hospital Riau Province during 2013-2017</b> .....	6
Arfianti, Zulfatta Dwi Putra, Ekral Delhaldita, Ligat Pribadi Sembiring, Hendra Asputra	
<b>Review of histopathological finding on nasopharyngeal biopsy in West Nusa Tenggara Province Hospital</b> .....	7
Fathul Djannah, Hamsu Kadriyan, Decky Aditya Z, Ni Ketut Susilawati	
<b>Translation of the C677T methylenetetrahydrofolate reductase gene mutation to the corresponding protein structure</b> .....	7
Enade Perdana Istyastono	

## Disease Control

<b>Identification of potential dengue vector breeding sites in elementary schools in Gunung Sari District, West Lombok</b> .....	8
Ida Bagus Ngurah Adrian Adinugraha, Dewi Suryani, Eva Triani	
<b>Literature review: post – mortem infection</b> .....	8
Bianti H. Machroes, R.P. Uva Utomo	
<b>Case report: management of the corpse with anthrax suspect</b> .....	8
R.P. Uva Utomo, Bianti H. Machroes	
<b>Prevalence and risk factors for high-risk HPV in Mataram</b> .....	9
Yunita Hapsari, Dediando Hidajat, Rika Hastuti Setyorini, Farida Hartati	
<b>Corelation between increasing feritin level and thyroid dysfunction in children with thalassemia major</b> .....	9
Laily Mufidah, Muhammad Faizi, Nur Rochmah, Maria C Shanty, Budiono	
<b>Correlation of fiber intake with defecation patterns in medical students of Universitas Mataram</b> .....	9
Nyoman Pratita Widyasari, Rifana Cholidah, Ida Ayu Eka Widiastuti	
<b>Building a sustainable screening program for refractive error among school children in West Nusa Tenggara</b> .....	10
Isna K. Nintyastuti, Siti Farida ITSW, Zainul Arifin, Wahyu Amri Fauzi, I Gusti Ayu Rai Astarini	
<b>Effect of iodine status on nutritional status of school-age children in artisanal and small scale gold mining area</b> .....	10
Ardiana Ekawanti, Deasy Irawati, Ima Arum Lestarini, Rifana Cholidah	
<b>Correlation between body fat percentage and waist-hip circumference ratio with the physical fitness of medical faculty students of Universitas Mataram</b> .....	10
Ida Ayu Eka Widiastuti, Seto Priyambodo, Gede Wira Buanayuda	
<b>The uniqueness of prenyl flavones from the genus <i>Artocarpus</i></b> .....	11
Aliefman Hakim, Eka Junaidi, Dwi Laksmiwati	

## Ethnomedicine, Small Island Medicine and Maritime Medicine

<b>Study of disaster management policy and evacuation Procedures in Indonesia's Health Sector as an Archipelagic Country</b> .....	11
Dumilah Ayuningtyas, Ni Nyoman Dwi Sutrisnawati	
<b>Effect of phenolic rich extract and fraction from <i>Eleutherine americana</i> on planktonic growth and biofilm formation of <i>Staphylococcus aureus</i></b> .....	11
Dyke Gita Wirasisya, Sudarsono, Susi Irawati	

<b>Validity assessment of pedagogic quality for “Med Stud Games” as a serious games</b> .....	12
Azhar Rafiq, Yoga Pamungkas Susani, Pujiarohman	
<b><i>Brucea javanica</i> (L) merr seeds converted high blood glucose to glycogen storage in the liver and muscles of diabetic rats</b> .....	12
Handa Muliasari, Candra Dwipayana Hamdin, Nidaul Aulia, Indah Hariyati, Muhsinul Ihsan, Erin Ryantin Gunawan	
<b>The value of marine aquaculture as complementary livelihoods small fisherman in coastal waters of East Lombok, Indonesia</b> .....	13
Abdul Syukur, Agil Al Idrus	
<b>Patient care in Communicable and Non Communicable Medicine</b>	
<b>Endoscopic third ventriculostomy in tuberculous meningitis with hydrocephalus</b> .....	13
Rohadi Muhammad Rosyidi, Bambang Priyanto	
<b>Adolescence substance use disorder and pregnancy: a case report</b> .....	13
Savitri Yuanita	
<b>Effectiveness of nasal irrigation with saline isotonic against interleukin-8 levels and quality of life in chronic rhinosinusitis patients</b>	14
Eka Arie Yuliyani, Sari Wulan Dwi Sutaneegara, I Made Muliarta	
<b>Vitamin D in HIV infection: the role of vitamin D deficiency in immunity</b> .....	14
Indah Sapta Wardani	
<b>Dilated cardiomyopathy in patient with hypothyroidism</b> .....	14
K.A.A.P. Pramana, Y. Pintaningrum	
<b>Case report: management of uterine atony using a condom catheter</b> .....	15
Muhammad Rizkinov Jumsa, Umar Malinta, Trika Irianta	
<b>Prevalence of infants with jaundice in 2018-2019 at the Regional General Hospital of West Nusa Tenggara Province</b> .....	15
Linda Silvana Sari, Dini Apsari, Ni Wayan Septika	
<b>Choriocarcinoma on the fallopian tube: a case report of gestational trophoblastic neoplasia on unmarried Asian female</b> .....	15
Ahmad Fadhli Busthomi	
<b>Educating Future Health and Non Health Professionals Tackling Multiple Burden of Disease</b>	
<b>Determinants factor of knowledge about mother-to-child-transmission on HIV among women in Indonesia: an analysis of Indonesia Demographic and Health Survey 2012</b> .....	16
Azizah Nurdin, M Rizkinov Jumsa	
<b>Poster Presentations</b>	
<b>The relation between diet and eating pattern with dyspepsia syndrome on boarding students of Madrasah Aliyah Al-Aziziyah Putri, Gunungsari, West Nusa Tenggara</b> .....	17
Ummul Khair Binti Amir, I Gede Yasa Asmara, Rifana Cholidah	
<b>Profile of intestinal helminths in the stool and rectal swab of asymptomatic children from sub-urban Jakarta</b> .....	17
Ronny, Forman Erwin Siagian, Stephanie Caroline, Aussie Aulia Siwi, Urip Susiantoro, Ida Bagus Eka	
<b>Characteristic of extrapulmonary tuberculosis with fine needle aspiration biopsy methods in West Nusa Tenggara Indonesia</b> .....	17
Fathul Djannah	
<b>The profile of diet, daily values and nutritional status of the students of medical faculty, Universitas Mataram, West Nusa Tenggara</b>	18
Rifana Cholidah, Ida Ayu Eka Widiastuti, Lina Nurbaiti, Seto Priyambodo	
<b>Current situation of child marriage</b> .....	18
Wahyu Sulistya Affarah, Nguyen Thi Thuy Hanh	
<b>Recent progress of research on ethnomedical plants used in Lombok</b> .....	18
Yayuk Andayani, Dyke Gita Wirasisya, Iman Surya Pratama, Nisa Isneni Hanifa, Wahida Hajrin, Yohanes Juliantoni, Alifman Hakim, Ardiana Ekawati	
<b>Multiple DNA fragments construction of latency-associated <i>M. Tuberculosis</i> antigen using overlapping PCR method</b> .....	19
Yunita Sabrina, Ima Arum Lestarini, Dewi Suryani	

**Background:** Microbial in nature tends to adhere to the surface, develop communities called biofilm. Biofilm protects microbes from the unfavorable environment by enveloping the communities with an extracellular matrix called exopolysaccharides (EPSs). Biofilm has high resistance against the antibiotic, which makes it hard to eliminate. As for now, the demand of antibiofilm agents is increasing rapidly. Terrestrial plants still consider as the main source of natural therapeutics products. Plants have diverse and interesting molecule for the development of new anti-infective agent. *Eleutherine americana* has been used as traditional remedies in Dayak ethnicity for few purposes including wound care, anti-infective for diarrhea, and antipyretic agent. This study aimed to assess the potency of phenolic rich extract (PRE) and a fraction (PRF) from *Eleutherine americana* against clinical isolated pathogenic *Staphylococcus aureus*, all with hemolytic activity.

**Methods:** Following ethanol extraction, the remaining sample was partitioned with methanol. The planktonic growth inhibition activities tested using in-vitro microdilution while biofilm inhibition carried out using in-vitro microdilution with crystal violet staining.

**Results:** Both samples were found to inhibit planktonic cell growth and biofilm formation of *Staphylococcus aureus*. The PRE minimum inhibitory concentration (MIC) range from 0.5 mg/mL – 1 mg/mL while PRF MIC range from 0.25 – 0.5 mg/mL. PRE and PRF exhibited a capacity to inhibit biofilm formation at a concentration range of 0.06 – 0.5 mg/mL. The higher concentration of PRE and PRF was needed to degrade mature biofilm.

**Conclusion:** This study indicates that *Eleutherine americana* may be used as an alternative anti-infective agent to control biofilm formation. Further analyses are needed to validate the antibiofilm activity from *Eleutherine americana*.

**Keywords:** *Eleutherine americana*, antibiofilm, antibacterial, *Staphylococcus aureus*

## Validity assessment of pedagogic quality for “Med Stud Games” as a serious games

**Azhar Rafiq<sup>1\*</sup>, Yoga Pamungkas Susani<sup>1</sup>, Pujiarohman<sup>1</sup>**

<sup>1</sup>Medical Faculty of Universitas Mataram, Mataram, West Nusa Tenggara, Indonesia

\*Corresponding e-mail: [azhar.rafiq@unram.ac.id](mailto:azhar.rafiq@unram.ac.id)

**Background:** Med Stud Games (MSG) as a serious game for medical students need to be assessed for its validation of pedagogic quality according to 4 pillars of learning.

**Methods:** This research is qualitative research consists of the step of creating description according to Graafland framework and step of Focus Group Discussion (FGD). We use Purposeful Sampling Approach, consist of medical school's lecturer in Immunology and Medical Education, also medical students that haven't taken Immunology block and then randomly choose them according to their last block score divided into group high, middle, and low. The result of an experience in learning and evaluating MSG for three days discussed in FGD. Data was collected from FGD recordings. Data analyzed by dividing categories according to four pillars of learning and compare them with the description that was made earlier in the first step of research.

**Results:** Learnings pillar of Attention is exist in MSG and help the user to understand the concept and give them motivation. Learning pillar of Active learning is existed and engage user interaction interactively. Learning pillar of Feedback is existed and give user information to evaluate the study. Learning pillar of Consolidation is existed and promote the user to repeat the module that they haven't fully understood.

**Conclusion:** MSG was satisfying the four pillars of learning and complied with Graafland framework.

**Keywords:** Serious games, medical education, med stud games

## *Brucea javanica* (L) merr seeds converted high blood glucose to glycogen storage in the liver and muscles of diabetic rats

**Handa Muliarsi<sup>1</sup>, Candra Dwipayana Hamdin<sup>1\*</sup>, Nidaul Aulia<sup>1</sup>, Indah Hariyati<sup>1</sup>, Muhsinul Ihsan<sup>2</sup>, Erin Ryantin Gunawan<sup>3</sup>**

<sup>1</sup>Study Program of Pharmacy, Faculty of Medicine, Universitas Mataram, West Nusa Tenggara, Indonesia

<sup>2</sup>Biology Department, Faculty of Science and Teacher Training, Universitas Islam Negeri Mataram, West Nusa Tenggara, Indonesia

<sup>3</sup>Study Program of Chemistry, Faculty of Natural Science and Mathematics, Universitas Mataram, West Nusa Tenggara, Indonesia

\*Corresponding e-mail: [candradwipayana@unram.ac.id](mailto:candradwipayana@unram.ac.id)

**Background:** The seed of *Brucea javanica* (L) Merr, locally called “Buah Wali”, is a promising antidiabetic agent due to its hypoglycemic activity. The mechanism of action of Buah Wali seed in reducing blood glucose level can be determined by measuring glycogen levels in the liver and muscles. This study aimed to determine the effect of suspension seed of Buah Wali on glycogen level in the liver and muscles of diabetic rats.

**Methods:** This study used five groups, namely positive control of glibenclamide 1.35 mg/kgBW, normal control, negative control of CMC-Na 0.5%, and treatment dose of 25 mg/kg BW and 50 mg/kgBW of suspension seed. All groups (except normal controls) were induced with alloxan 125 mg/kgBW intraperitoneally. The glycogen content of rat liver and muscle in all treatments were analyzed by the anthrone method using a UV-Vis spectrophotometric instrument. The glycogen level of each treatment was statistically analyzed by ANOVA test using SPSS 16.

**Results:** The results of this study were suspension doses of 25 mg/kgBW, and 50 mg/kgBW were able to increase glycogen storage in the liver and muscles of diabetic rats. The increase in glycogen levels at a dose of 25 mg/kgBW was higher than the dose of 50 mg/kgBW, with an increase of 131.58% in active muscles, 258.6% in passive muscles, and 217.18% in the liver.

**Conclusion:** The results of statistical tests showed that glycogen levels in the suspension group differed significantly ( $p < 0.05$ ) compared to the normal group, positive controls, and negative groups.

**Keywords:** *Brucea javanica* (L) merr, antidiabetes, glycogen storage, liver, muscle

**UJI VALIDITAS TERHADAP KUALITAS PEDAGOGI PADA “MED STUD  
GAMES” SEBAGAI SERIOUS GAMES**

Azhar Rafiq<sup>1</sup>, Yoga Pamungkas Susani<sup>1</sup>, Pujiarohman<sup>1</sup>

Fakultas Kedokteran Universitas Mataram

Email: [azhar@outlook.co.id](mailto:azhar@outlook.co.id)

Diajukan sebagai syarat meraih gelar sarjana pada Fakultas Kedokteran Universitas Mataram

Jumlah tabel : 5

Jumlah gambar : 1



## ABSTRAK

### UJI VALIDITAS TERHADAP KUALITAS PEDAGOGI PADA “MED STUD GAMES” SEBAGAI SERIOUS GAMES

Azhar Rafiq<sup>1</sup>, Yoga Pamungkas Susani<sup>1</sup>, Pujiarohman<sup>1</sup>

Fakultas Kedokteran Universitas Mataram

[azhar@outlook.co.id](mailto:azhar@outlook.co.id)

Introduction: Med Stud Games (MSG) sebagai *serious games* untuk mahasiswa kedokteran butuh diuji kualitas pedagoginya berdasarkan empat pilar pembelajaran.

Metode: Penelitian ini adalah penelitian kualitatif menggunakan *focus group discussion* (FGD). Kami menggunakan *purposeful sampling approach*, terdiri dari dosen kedokteran dan mahasiswa kedokteran. Hasil dari pengalaman menggunakan MSG selama tiga hari didiskusikan di FGD. Data didapat dari rekaman FGD. Data dianalisis dengan dibagi berdasarkan empat pilar pembelajaran

Hasil: 100 kutipan dengan 21 kode dikelompokkan ke dalam empat tema menurut empat pilar pembelajaran. Analisis menunjukkan MSG memiliki fitur yang mendukung keempat pilar pembelajaran.

Kesimpulan: Kualitas pedagogi MSG menunjukkan validitas yang baik dalam memenuhi empat pilar pembelajaran. Beberapa fitur di MSG perlu diperbaiki dan ditingkatkan untuk mencapai efektivitas belajar yang maksimal.

Keywords: Medical Education, Serious Games, Med Stud Games,

## ABSTRACT

### VALIDITY ASSESSMENT OF PEDAGOGIC QUALITY FOR “MED STUD GAMES” AS A SERIOUS GAMES

Azhar Rafiq<sup>1</sup>, Yoga Pamungkas Susani<sup>1</sup>, Pujiarohman<sup>1</sup>

Medical Faculty of Universitas Mataram, Mataram, West Nusa Tenggara, Indonesia

Corresponding author: Azhar Rafiq

Email: azhar@outlook.co.id

#### Abstract

**Introduction:** Med Stud Games (MSG) as a serious game for medical students need to be assessed for its validation of pedagogic quality according to 4 pillars of learning.

**Methods:** This research is a qualitative research using focus group discussion (FGD). We use purposeful sampling approach, consist of medical school’s lecturers and medical students. The result of an experience in learning and evaluating MSG for three days discussed in FGD. Data collected from FGD recordings. Data analyzed by dividing categories according to four pillars of learning.

**Results:** Pedagogic quality of MSG shows good validity in fulfilling the four pillars of learning. Some features of MSG need to be improved and to be added to achieve the maximum learning effectiveness.

**Conclusions:** MSG is satisfying the four pillars of learning.

Keywords: Medical Education, Serious Games, Med Stud Games,

## Introduction

Learning methods in medical education is always advancing from conventional lectures, problem based learning, and using of technologies like serious games<sup>1,2</sup>. Serious games is a digital games with aim to increase knowledge, skill, or behavior of user in real world<sup>3</sup>. Currently there is no serious games research for medical education in Indonesia. Med Stud Games (MSG) is the only serious games that available for medical students in Indonesia<sup>4</sup>. It is used individually by some of medical students for studying and exercising before the exam. However, to be used in medical school, the pedagogy quality of Med Stud Games needs to be assessed. One assessment that can be use to measure pedagogy quality of serious games for medical education is the four pillar of learnings consist of attention, active learning, feedback, and consolidation<sup>5</sup>. This research aims to asses Med Stud Games from the experience of using Med Stud Games from the medical lecturer and medical students' perspectives.

## Methods

This research is a qualitative research using focus group discussion (FGD). We use purposeful sampling approach, consist of medical school's lecturer in immunology and medical education, also medical students that haven't taken immunology module and the randomly choose them according to their last module score divided into group high, middle, and low. The result of an experience in learning and evaluating MSG for three days discussed in FGD. Data collected from FGD recordings. Data analyzed by dividing categories according to four pillars of learning.

## Results

Group of medical students consist of 6 person and only 3 that join the research until FGD, consist of each person from the group with high, middle, and low score. Group of medical lecturers consist of 5 person and only 3 that join the research until FGD, consist of 1 immunology lecturer/medical doctor and 2 medical education/medical doctor (Table 1).

**Table 1.** Respondent codes

Group	Code
Medical student with high score	M1
Medical student with middle score	M2
Medical student with low score	M3

Medical education lecturer	D1, D2
Immunology lecturer	D3

Total of transcript data is 491 lines. FGD result analyzed using Atlas.ti trial version 8.4.2. The analyze result in 100 quotes and 21 codes. The codes grouped again into 4 big themes according 4 pillars of learning (Table 2-5).

**Table 2.** Attention theme.

Group Codes	Quotes
<b>Content Delivery:</b>	
<b><i>Bite-sized</i></b> Small sized content that enable user to learn step by step	<p>“What I like from this app is the bite-sized information. Step by step. Sometimes when we want to reread from that point we do not need to repeat from the beginning. That helps people a lot to studying on the go” D1, 89-91</p> <p>“It is good. I think the advantages of MSG is one by one and we have the ability to choose to continue to the next content or not.” D2, 121</p>
<b>Lay language</b> Make user easy to understand the meaning of the content	<p>“The language used is very easy to understand. It’s more to lay language. In one side, it is positive because make us not afraid to study Immunology.” D1, 92-93</p>
<b>Content Stressing</b> Respondent state the need of content stressing to differentiate between the must to know and the nice to know content	<p>“All the questions have the same colour, and there is no content stressing that this point is important.” D2, 387</p> <p>“If this already use gamification like the level system, user level will be lowered if the important concept still wrong.” D2, 409</p>
<b>Visual Consistency</b>	<p>“..from the beginning it need visual consistency1.”, D3, 100</p>

Respondent suggest the need of visual consistency

**Light app** “But the important point of this app is it is light app. Use small App size is small, so it is memory so it is fast to be used.” D2, 67  
easy to download and install

**Focus:**

**Audio** “Then in the last part of quiz, there is some sounds. It is an Sound or voice element of surprise.” D1, 52

**Visual** “The user interface is too rigid.” M1, 27  
User interface and its “From me, I think it is good, because to make something that relation with attention and serious and fun at the same time is hard.” D3, 35  
learning “Indeed, the interface is plain, but I think it is not a problem.” D1, 48  
“In my opinion, the visualization helps to make user understand abstract concept, especially in immunology.” D2, 65  
“I am not a book person, so I save times when I see pictures. Oh, this one is shaped like this. So I immediately understood.” M2, 111

**Animation** ”There is animations in the app” M2, 110  
Animated object make user “It is not like I though before, surprisingly immunology easier to understand the basically easy to understand from the animations.” M2, 112  
learning content “The animation is good. Maybe the choose of colours and the display can be improved.” D1, 55

**Table 3.** Active learning theme.

Group Codes	Quotes
-------------	--------

**Learning-game relations:**

**Implementation**

Respondent suggest the use of MSG as part of lecture session in campus

“In my opinion if this app is collaborated with learning activity in campus, this game can be used by students before the lectures.” D3, 141

**Interaction**

Interaction involving user actively in learning session. The need of various methods to improve interaction.

“I think the app already involving user.” D2, 197  
“If involving actively, yes.” D3, 201  
“Because I rarely learn from an app like this, maybe I already did in an online courses, but not as interactive like this one.” D1, 53-54  
“It can use multiple choice question or fill in the blank.” D2, 294  
“We can invite friends and play versus them.” D1, 307

**Gamification:**

**Time**

Limited time to do the quiz. If the times runs out, the quiz will end even though user haven't finished yet.

“For the quiz, I see there is a limited time. A set of problems need to be solved in a certain time.” D1, 165

**Score & point system**

Respondent suggest to improve gamification system to increase user motivation.

“It will be better if we can use the point to purchase answer explanations.” M1, 342  
“Gamification can be improved stronger.” D3, 70

**Difficulty level**

Respondent suggest for the difficulty level system

“In my mind, the next level will be about more advance topics in medicine.” D2, 69

according to the advancement of learning content.

**Content Management:**

**Content from users** “However, if possible, we can have a feature that allow user Respondent suggest a feature to create their own content..” D3, 202 that allow user to contribute by creating their own learning content to MSG.

**Table 4.** Feedback theme.

Group Codes	Quotes
<p><b>Score</b> Score that given to user after quiz interaction.</p>	<p>“Furthermore, other than score, maybe it is better having a feature to see score by groups categorized by class year.” D3, 319  “Oh I can do better, after I got my total score, I also need to know in which level or ranking in specific area of immunology I am.” D3, 323</p>
<p><b>High Score Board</b> A set of highest score from all.</p>	<p>“And then there is names of the winners. Their scores are higher than me.” M2, 352</p>
<p><b>Point</b> Point given to user after completing learning or quiz content.</p>	<p>“I got point, but I don’t know for what?” D1, 97</p>
<p><b>Punishment</b></p>	<p>“So one more chance.” D1, 315</p>

When completing the quiz user only have 4 wrong chances, after that the quiz will be finished even though user haven't finished yet.

**Answer & Explanation** “..when we answer the problem immediately there is a Notification given to user feedback of which is the correct answer.” D1, 51  
 about right or wrong of their answer including the explanation why. “Moreover when I see the explanations it makes me easier to understand.” M2, 110

**Table 5.** Consolidation theme.

Group Score	Quotes
<p><b>Repeating</b> Encourage user to repeat the learning content.</p>	<p>“How can I defeat those higher score. I repeat it again and again. I try as long as my score still lower than them. I read the content again. I need to be the highest.” M3, 418-420</p>
<p><b>Identification of learning needs</b> Help user to identify their weaknees in learning subjects and trigger user to relearn the learning content.</p>	<p>“Motivate me to read textbook.” M2, 432          “Now we know which area that we are falling behind so we can repeat that learning content.” D3, 375</p>

Attention theme is finding the ability of MSG in making user to keep focus inside the game. In this theme there is two codes: content delivery and focus. Content delivery is the ability of MSG to show or deliver the content. Focus is about things that make user focus using the app and not thinking or doing anything outside of the app (Table 2).

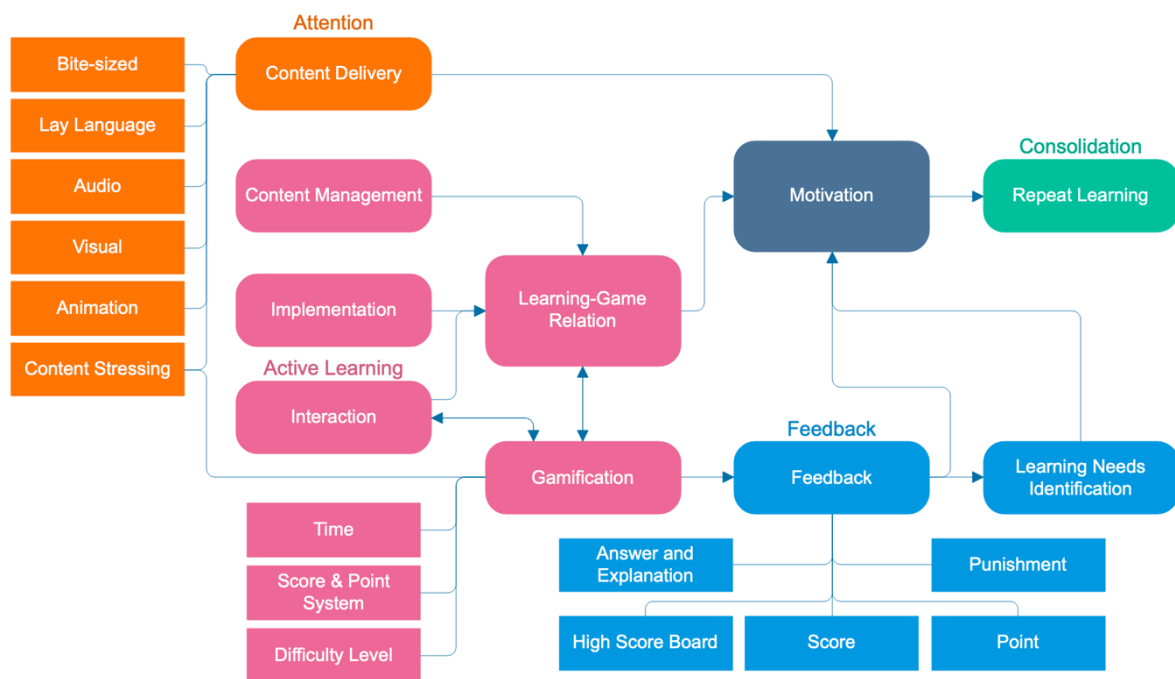


Active learning theme is finding the ability of MSG in involving users actively in learning activity or games in the app. There are codes: learning-game relation with user, gamification, and content management. Learning-game relation with user is a relation shape that found in suggested for MSG and can affects the learning activity. Gamification is a design technique and a game mechanism to influence user. Content management is how MSG in managing user-based content (Table 3).

Feedback theme is finding the ability of MSG in giving things to users (Table 4).

Consolidation theme is finding the ability of MSG in allowing users to repeat the activity or mastering the important concept of learning content (Table 5).

From all of the four themes, we create connections between them that results in diagram of codes relationship (Picture 1).



Picture 1. Diagram of codes relationship from FGD. The line shows the code belong to. The arrow shows its effect to.

## Discussion

Reading content from MSG is different from reading an e-book. By using bite-sized content, MSG is easier to be consumed. Current medical student prefer the use of technology and bite-sized teaching while studying medicine<sup>6,7</sup>. Better content delivery, by reducing the

size of learning content will improve memory retention and focus of the students. This shows that MSG suit for the learning for current medical students.

Neurology scientist said that there is three attention networks, awareness, orientation, and executive<sup>8</sup>. MSG support awareness network by using animation, audio, feedback, and motivation. Animation have a good benefit in medical study, because it can deliver complex concept like immunology into simple representation that easier to understand and have a good long memory retention<sup>9,10</sup>. Even though MSG animation is helping the user to understand the concept, MSG still do not have visual consistency that confuse the user when reading from one part of content to another content. Another attention aspect of simplification in MSG is the use of lay language. In line with current research that said simplification of medical learning content liked by medical students<sup>11</sup>.

Audio as a feedback for learning activity can improve awareness and immersion of the player. Respondent specifically said that the sound in MSG become an element of surprise. This excitement is happened because of the attractiveness of the media content that give a good emotional response<sup>12</sup>. Another example of the use of excitement in MSG is paper sound that played when user navigating throughout the content.

The second part of attention network is orientation to filter important information. MSG is not yet helping relevant information. There is not enough content stressing to help student to differ from must to know and nice to know content. In Indonesian standard of medical doctor competency, medical student have list of diseases and practical clinical skill ranging from level 1 to 4<sup>13</sup>. Stressing content in serous games will be necessary to help student while studying to become medical doctor. This way student may choose which content that they need to master therefore may need to repeat a lot.

The third attention network is executive that allow user to concentrate on the task given without thinking about any distraction from their environment. In serious games, this concentration can be called as immersion. Immersion is a sensation of taking all the attention of player in serious games<sup>14</sup>. The immersion level Is equal to the learning effectiveness in serious games<sup>5</sup>. MSG immersion comes from motivation. Motivation in MSG is created when user know the answer of the problem and see the high score board. This way user have an emotional involvements that higher the immersion therefore better learning effectiveness<sup>14</sup>. This could happen because the connection in amygdala proved to do interaction between emotion and cognition, which means the emotion involvements can trigger the creation and recovery of episodic memory<sup>15</sup>.

Active learning as the second pillars of learning in MSG is quite good. Respondent praise the MSG is more interactive compared to online courses. As part of active learning, gamification like score and point system play a big role in improving interactivity. This system can improve motivation to do more interaction. However, there are a lot of room to be improved<sup>5,16</sup>. Respondent suggest new features like difficulty level, ability for user to create their own content, and the implementation of MSG in lectures or classroom activity. This integration of serious games in learning activity can enhance and achieve the maximum potential of serious games<sup>17</sup>. There is also the need for the clarity of what and how to use the benefit of having points in MSG. One of important aspect in gamification is the difficulty level that allow user to choose to play from the start or the advance topic according to their needs. The challenges in level will help them to achieve better understanding and skills when solving various problems in the future<sup>18</sup>. Lastly, the content stressing can also be applied in gamification system. For example when user solving important clinical cases, which is the highest needed competency, they will get higher point and score compared to lower level competency cases.

Serious games can have various feedbacks like process bar, scoring, achievements, experience point, and virtual currency<sup>5</sup>. MSG have answer and explanation, score, high score board, punishment, and experience point for doing activities. MSG also have process bar that related to time when do quizzes. Answer and explanation of the problems can improve students confidence from the knowledge that they received<sup>16</sup>. Scoring in MSG is given at the end of the games. This is the better option compared to score that given while playing that may distract learner from their main job to study<sup>19</sup>. Lastly, the respondent still do not know how to use the point feedbacks.

Consolidation is the enhancement of using aware memories at the first time learning to become using unaware memories. If repetition of this switch is continuously trained, it can be a long term memories that is faster when doing switches<sup>20</sup>. Repetition will be more effective if using various learning methods. Research shows that serious games is better to be used as supplement for lecture, discussion, tutorial, and any other method that need instructor to maximize its learning potential<sup>17</sup>. MSG do not have any features that remind user to do repetition explicitly. However, MSG does give users motivation to reread the learning content and repeat interactions. In theory, repetition that influenced by motivation has the same effect with to create long term memories<sup>20</sup>. Therefore, it has a good learning quality.

In summary, the attention, active learning, and feedbacks in MSG linked together to create motivation that will improve consolidation. User learning in MSG from the attention

aspect and then do active learning. The MSG then give the feedbacks and allow users to identify learning needs that create motivation. At the end of the process, the motivation give user the urge to repeat the learning contents.

## Conclusion

MSG is satisfying the four pillars of learning.

## References

1. Swanwick T. Understanding Medical Education. 1st ed. Wiley-Blackwell; 2010.
2. Wood DF. ABC of Learning and Teaching in Medicine. BMJ [Internet]. 2003;326(1):328–30. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1125189/pdf/328.pdf>
3. Graafland M, Dankbaar M, Mert A, Lagro J, De Wit-Zuurendonk L, Schuit S, et al. How to systematically assess serious games applied to health care. JMIR serious games [Internet]. 2014 Nov 11 [cited 2018 Nov 16];2(2):e11. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25654163>
4. Genom Studio. Med Stud Games [Internet]. Google Play Store; 2019. Available from: <https://play.google.com/store/apps/details?id=id.genomstudio.msg>
5. Drummond D, Hadchouel A, Tesnière A. Serious games for health: three steps forwards. Adv Simul [Internet]. 2017;2(1):3. Available from: <http://advancesinsimulation.biomedcentral.com/articles/10.1186/s41077-017-0036-3>
6. Eckleberry-Hunt J, Tucciarone J. The Challenges and Opportunities of Teaching “Generation Y.” 2011;(December).
7. Schwartz AC, Cotes RO, Kim J, Ward MC, Manning KD. Bite-Sized Teaching: Engaging the Modern Learner in Psychiatry. Acad Psychiatry. 2019;43(3):315–8.
8. Petersen SE, Posner MI. The attention system of the human brain: 20 years after. Annu Rev Neurosci [Internet]. 2012 [cited 2018 Oct 6];35:73–89. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22524787>
9. Stith BJ. Use of animation in teaching cell biology. Cell Biol Educ. 2004;3(3):181–8.
10. Klymkowsky MW, Reiness G. Point of View : Textbooks — Essential or Superfluous ? Teaching without a Textbook : Strategies to Focus Learning on Fundamental Concepts and Scientific Process. CBE--Life Sci Educ. 2007;6:190–3.
11. Kazzazi F, Bartlett J. Condensing embryology teaching for medical students: can it be taught in 2 hours? Adv Med Educ Pract. 2017;Volume 8:797–806.

12. Ivory JD, Kalyanaraman S. The effects of technological advancement and violent content in video games on players' feelings of presence, involvement, physiological arousal, and aggression. *J Commun.* 2007;57(3):532–55.
13. Konsil Kedokteran Indonesia. Standar Kompetensi Dokter Indonesia. 2012. 1–90 p.
14. Jennett C, Cox AL, Cairns P, Dhoparee S, Epps A, Tijs T, et al. Measuring and Defining the Experience of Immersion in Games [Internet]. 2008 [cited 2018 Oct 6]. Available from:  
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.157.4129&rep=rep1&type=pdf>
15. Murray BD, Holland AC, Kensinger EA. Episodic Memory and Emotion. In: *Handbook of Cognition and Emotion*. London: Guilford Press; 2013. p. 156–75.
16. Yunyongying P. Gamification: Implications for Curricular Design. *J Grad Med Educ* [Internet]. 2014;6(3):410–2. Available from:  
<http://www.jgme.org/doi/abs/10.4300/JGME-D-13-00406.1>
17. Sitzmann T. A META-ANALYTIC EXAMINATION OF THE INSTRUCTIONAL EFFECTIVENESS OF COMPUTER-BASED SIMULATION GAMES. *Pers Psychol* [Internet]. 2011 Jun 1 [cited 2019 Jul 23];64(2):489–528. Available from:  
<http://doi.wiley.com/10.1111/j.1744-6570.2011.01190.x>
18. Cheng MT, She HC, Annetta LA. Game immersion experience: Its hierarchical structure and impact on game-based science learning. *J Comput Assist Learn.* 2015;31(3):232–53.
19. Katz B, Jaeggi S, Buschkuhl M, Stegman A, Shah P. Differential effect of motivational features on training improvements in school-based cognitive training. *Front Hum Neurosci* [Internet]. 2014 [cited 2018 Oct 6];8:242. Available from:  
<http://www.ncbi.nlm.nih.gov/pubmed/24795603>
20. Wouters P, van Nimwegen C, van Oostendorp H, van Der Spek ED. A meta-analysis of the cognitive and motivational effects of serious games. *J Educ Psychol.* 2013;105(2):249–65.