Real Application of Transformative Approaches for

Teaching and Learning in the 21st Century

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UNIVERSITI MALAYSIA SARAWAK

Special Dedication

This book is dedicated to UNIMAS academicians who work hard in conducting the best teaching and learning experience. This book is hoped to be an inspiration to educators on how to implement the teaching and learning process more effectively.

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Preface

"It's not just learning that's important. It's learning what to do with what you learn and learning why you learn things that matter." -Norton Juster

The Real Application of Transformative Approaches for Teaching and Learning in the 21st Century book was produced to appreciate the transformative work of lecturers in teaching and learning. This book is expected to serve as a guide to other lecturers in helping them to improve their teaching approach, delivery, and assessment of their courses. Lecturers can also use this book to develop their ideas and creativity in designing teaching and learning according to current needs and align with the learning outcomes of the course.

Global changes in the twenty-first century have altered the landscape of teaching and learning, particularly in delivery methods, approaches, and assessments. This is due to the fact that the student body is made up of generation Z, who have different styles of learning than that of the lecturers. Conventional methods used by lecturers are no longer an option for today's students. Therefore, lecturers must transform their teaching and learning in order to be relevant to today's students.

The combination of transformative approaches introduced becomes the strength of this book's content. Authors combine diverse approaches, delivery, and assessment in teaching to ensure the effectiveness of teaching to students. Moreover, the collaborative approach used provides an alternative for lecturers to minimize the burden on students for courses taken. This approach has the potential to have a greater impact, particularly in terms of student understanding of learning.

The element of creativity incorporated is also a strength of this book. Authors explain some terms and concepts using diagrams and figures to help the reader understand. The steps and procedures for carrying out teaching and transformative approaches are stated in a systematic manner to help the reader understand what is being conveyed.

The book also includes writers from various backgrounds. This distinguishes it as a unique and comprehensive manuscript. Readers are guided through conceptual and practical understanding of teaching and learning methods. The author's presentation of basic concepts and applications can help the reader understand knowledge more deeply and broadly.

Crafting a learning environment where students are able to explore and understand how the physical world works, and to connect complex scientific concepts to their daily lives is vital. It also includes building students' confidence in their ability to solve challenging problems and empowering them to build a better future for themselves and others. CTS is one of a better way of learning that will prepare students towards focusing on being very collaborative, self-motivated and self-directed all the time staying true to the lifelong learning values, which are imperative to carve a better future for the students in their field of choice.

The next project is related to the environmental issues relating to solid waste, wastewater, and hazardous waste viewed in the context of their treatments. This course has been implementing service learning (SULAM) as a part of an immersive learning approach since Semester 2, 2017/2018. In the previous years, i.e. 2017/2018, and 2018/2019, the

course assessment included either a final examination (40%, session 2017/2018), or a mid-term examination (30%, session 2018/2019). Although SULAM implementation in this course has generally improved the CLO achievement since 2017/2018, the pen and paper examination has resulted in some students not achieving the intended CLOs. Instructors were not sure on the effectiveness of examination in creating a deep learning experience for students.

Therefore, in semester 2, 2019/2020, mid-term examination was replaced with case-study analysis to (1) encourage higher order thinking skills among students and (2) cultivate the sense of commitment and responsibility among students to find innovative solutions towards waste management issues. In addition, students' e- SULAM projects as well as group discussion and engagement with target community were implemented on online platforms. Students' reflection on their e-SULAM projects was recorded on their e-portfolio. Implementation of immersive learning through blended learning in this course has resulted in improved CLO achievement as compared to the past two years. Students' reflection on their learning experience in this course implied the effectiveness of immersive learning (blended learning) approach in this course.

Besides that, the project involved transforming the typical class lecture into an interactive scientific communication environment. Students were exposed to the real scientific communication via workshop-style delivery, project-oriented problem-based learning (PoPBL) on proposal writing projects, and brainstorming/discussion activities during weekly meetings. The initiative eliminated the traditional lecture and end-of-semester assignment practices.

Another project is MATHX Project, a new project-based learning instrument that allows digital students to work collaboratively, purposely implemented to develop teamwork and student's management skills. Students translated acquired knowledge to applications and STEM projects. The integration of digital technology used in this project helps students create meaningful and enjoyable learning experiences in Mathematics.

The following project is related to the assessment in learning. In order to improve learning via assessment conduct, assessment must be objective, significant, and magnitude. OSPE has/have been adapted and implemented for Biology students in Centre for Pre-University Studies to assess know-what and know-how practical competencies following the objective and structured manner with direct observation of the students' performance. The assessment provides meaningful learning experience to the students as it can assess all three domains (cognitive, affective, and psychomotor).

Furthermore, the enriching immersive learning experience during movement control order (MCO) was possible through blended learning substitution method. Finally, one project is related to social media and animation software offering several attractive features that may overcome the limitations of the existing educational portals. The team introduced the use of YouTube, Instagram, and Doodly as supplementary platforms for teaching Environmental Biotechnology in Semester 2 2019/2020 which resulted in excellent academic performance and positive feedbacks from the students.

Finally, this book discussed also describe the course MDP30609 Community Medicine and Public Health posting, the assessment has been modified by adopting the Alternative Assessment method. The Alternative Assessment is regarded as comprehensive, where it assesses the candidates' ability to integrate writing task and performance, divergent thinking in solving problems and enhancement of meaning skills.

Acknowledgement

First of all, we are very grateful to the Deputy Chancellor Prof Datuk Dr Mohamad Kadim bin Suaidi and Deputy Vice Chancellor (Academic and International) Professor Dr Ahmad Hata bin Rasit for their support and opportunity in producing this book. This gratitude also goes to the Director of CALM, Dr Kartini binti Abd Ghani for her encouragement throughout the journey of realizing this book. We would also like to extend our acknowledgments to the Deputy Directors (Teaching Advancement), (Learning Technology), Coordinators and all administrative staffs in CALM for the support.

Thanks to all award recipients who have contributed to the chapters of the book. They are Associate Professor Dr Cheah Whye Lian, Dr Kuryati binti Kipli, Dr Melody Kimi, Mohamad Faizuan bin Mat, Abdul Halim bin Hashim, Dr Chung Hung Hui, Dr Norazlina binti Bateni, Ahmad Alif bin Kamal, Dr Yvonne Michelle Campbell, Nor Hayati binti Jaya, Dr Rafeah Wahi, Professor Dr Zainab binti Ngaini, Norhunaini binti Mohd Shaifullah, Rohaiza binti Daud, Associate Professor Dr Afzan binti Ahmad Zaini, and Dr Nurashikin binti Suhaili. Not to forget to everyone who have been involved directly or indirectly in producing this book, our deepest appreciation goes to all of you.

Visual representation of students' experience: alternative assessment during COVID-19 Movement Control Order

Cheah Whye Lian, Ayu Akida Abdul Rashid,
Helmy Hazmi, Law Leh Shii

Summary/Synopsis of Project/Initiative

The recent COVID-19 Movement Control Order has driven the need adopt an innovative approach in conducting assessment that exclude face-to-face interaction. For MDP30609 Community Medicine and Public Health posting, the assessment has been modified by adopting the Alternative Assessment method. The Alternative Assessment is regarded as comprehensive, where it assesses the candidates' ability to integrate writing task and performance, divergent thinking in solving problems and enhancement of meaning skills. In addition to presenting a research proposal and drafting a journal manuscript for publication, a group of year three medical students were asked to produce a comic on the prevention of COVID-19 aimed at primary school children in a rural community. Through comic production, the students can use it as a learning tool that foster empathy, cultivate awareness towards social issues and strengthen observational skills – of which, are all relevant skills in medical training. The other main goals are to encourage students to self-reflect, embrace creativity, improve their communication skills through visual storytelling, and more importantly, to shape their professional identity as future medical doctors.

Introduction

The COVID-19 pandemic has changed the playing field of teaching and learning and the delivery of education globally, particularly in medical education where the turf can be unprecedented, full of uncertainty and arising challenges (Rose, 2020). The concern is not only on patient safety but the personal safety of the students during training as well. In addition, the resultant delay in the timeline to complete university programmes has somewhat affected the students in many ways, including financial capability.

The delivery of medical education has evolved over the past one decade. The pedagogy of teaching and learning has undergone substantial innovative transformation. Besides reduction in the number of lecture sessions, the adoption of technology promotes active, self-directed, individualized and inter-professional education (Macdougall et al., 2020). It is hoped that by replacing physical face to face learning with online equivalents, the latter will help make up to the loss of collaborative learning that medical students experienced during training. It cannot be emphasised more that collaborative learning is detrimental in medical education.

For example, a vital learning activity for a medical student in their clinical years is patient clerkship. Clerking patients require special clinical communication skills to build rapport and trust in doctor - patient relationship. This form of training is not substitutable and it needs to be experienced rather than read through books.

As such, the delivery and the administration of the medical curriculum should be flexible without sacrificing the objectives of the current pedagogical design. The adaptation has incorporated case-based learning, lectures and remote discussion via online platform, which is useful when physical distancing and movement restriction is in place, as seen in the current COVID-19 pandemic. Such practices have been adopted in many medical schools (Wong, 2020; Ferrel & Ryan, 2020). More recently, innovative approaches has been incorporated to support case-based learning or previously didactic sessions, via the use of videoconferencing and YouTube teaching videos.

Background

The medical programme in Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak is a five-year programme that emphasized the importance of producing competent and compassionate graduates to meet the health care needs of the community through educational excellence and research of international standards. One of the major postings is MDP30609 Community Medicine and Public Health (CMPH) where year 3 medical students are placed in the communities for their public health training. Under this component, the course learning objectives requires students to have face-to-face interaction with the communities where they need to develop a research survey, conduct an intervention programme and producing a manuscript in the form of journal article on a current public health issue. This component is part of a formative assessment that constitute 30% of the whole course assessment. However, due to the COVID-19 movement control restriction, the implementation of the formative assessment was not possible. To overcome this barrier, other learning avenue has been explored, where students can learn and at the same time contribute to the community – meeting the philosophies of the CMPH Posting. Through the use of technology, coupled with students' creativity, the medical students were tasked to create community education materials that is useful to influence the community to adopt certain protective behaviour in a positive way.

The teaching and learning philosophy that we adopted is not dissimilar with what has been described by Schon (1983) on Professional Identity Development (PID). Under the PID philosophy, the professional identity of medical students is formed through formal and informal exposure to experiences during training and mentoring within an established medical curriculum. Exposing medical students to life experience during their years of medical training help them to build up their professional identity. This concept fits well with the philosophy of Community Based Education (CBE) learning objective of our Community Medicine and Public Health Posting. In CBE, medical students learn and obtain professional skills and competencies (e.g. basic clinical knowledge and skills, interpersonal skills, lifelong learning skills, communication skills,

leadership and management skills, evidence-based research skills) through their involvement and attachment with the assigned community.

As such, by combining PID and CBE, medical educators prompt students to express themselves through guided reflection using visual representations, such as the visual graphic narratives (comics). According to Green and Myers (2010), medical graphic narratives (comics) could be used as teaching tools to foster empathy, promote observation skills and foster awareness of social and political issue relevant to medicine. Prof Michael Green (2015) taught the first-ever comics course for medical students in Penn State College of Medicine since 2009, using comics as an essential component in medical curriculum to help students to become better doctors by promoting character building, compassion, cognitive skills and manner. The students are required to "think on their feet" while applying their knowledge onto the comics, in the hindsight, thinking about how to deliver the message to the lay.

Learning Goals and Structure

This is a 9-week course which include online teaching, research and clinical attachment. This paper focuses on the research component, where the objectives are to (i) stimulate an enquiring, analytical and creative approach to solving problems, and (ii) encourage self-study, making critical decision as an individual or group and be aware of sensitive issues while addressing community health needs. The original assessment criteria for research component had remained at 30%, with a supervisor assigned to assist students in preparing the research proposal and manuscript (include the output). Topics are given by the Posting Coordinator based on current public health issues with identified objective, target community and health education tool.

Students attend a series of research methodology classes focusing on how to prepare a research proposal (1st output). Assessment of research proposal will be based on a pre-set rubric and the carry mark is 10%. Another 10% will be gained from the assessment of the health education tool (comic) produced by the students. In the pre-MCO phase,

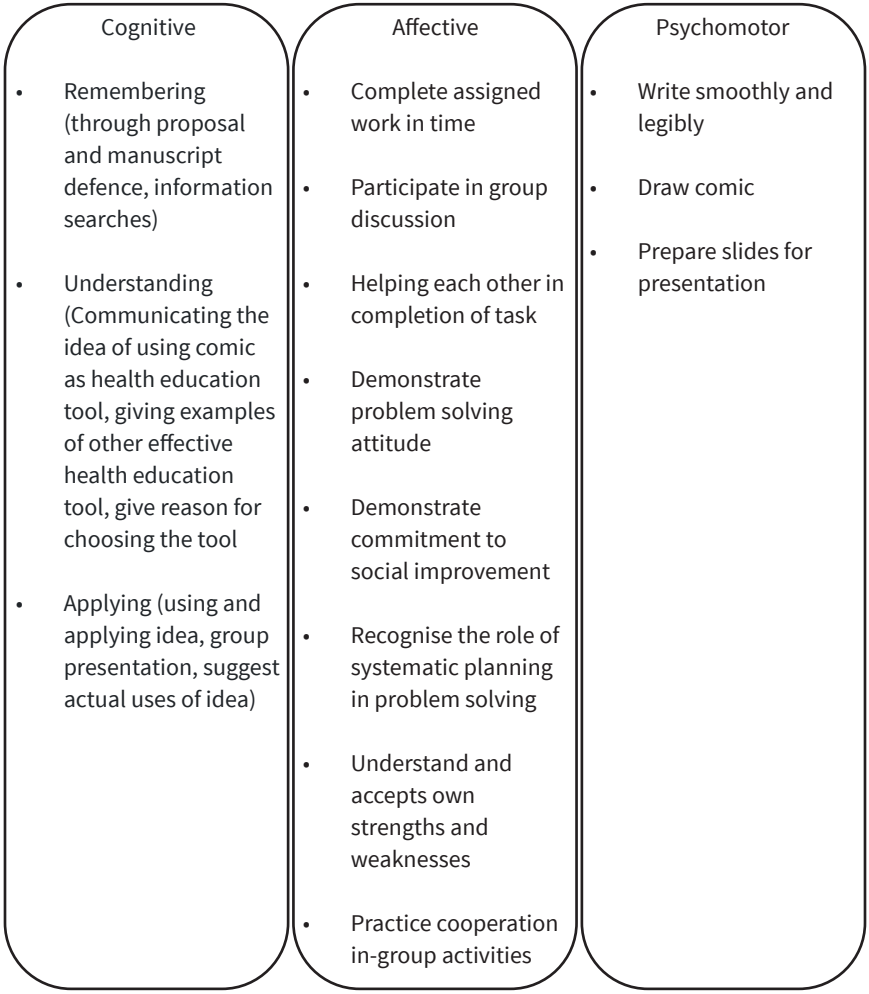
students' intervention activities will be assessed and given feedback by the community themselves. However, this is not possible during the MCO period. Instead, students had posted the comics online using the department's and university's Facebook platform, where peer assessment was carried out. Lastly, students are expected to produce a manuscript draft on the whole process that they underwent. This will be the last 10% of assessment. The manuscript will cover the literature review of the topic, justification of the study, methodology, their experience of carrying out the task (self-reflection) and discussion on the output. A final presentation was carried out orally by the students, where the assessment was based on their presentation style, critical thinking, ability to answer questions and teamwork.

Students are expected to gain the meaningful experience through

- working as a team, maintain group dynamic, and overcome conflict
- learning how to conduct literature search, do a literature review
- identifying study objective, justify the need of the study
- formulating research methodology in answering the research objective
- developing the concept of how to deliver the health education material via comic
- writing proposal and manuscript
- defending their ideas through proposal presentation and manuscript
- stimulating thoughtful reflection and refining their concept through drawing and writing skills
- expressing themselves through self-reflection on aspects of their professional formation

The students engaged in meaningful learning in terms of cognitive, psychomotor and affective abilities based on Figure 1.

Figure 1: Students reflection



For this research topic, students were given the task to produce a Malay language medical visual graphic (comic) on the prevention of COVID-19 aimed at rural school-going children aged 7-12 years. The medical students were reminded of the age group that the comic is intended for and that the comic must be easily understood by children.

At the end of the posting, in addition to the outputs, the students were required to submit a short self-reflection on what they have read and done by relating the lesson learned with their own lives and making meaning out of the material they had used in the process. This self-reflection experience is part of developing the students' professional identity. Through the reflections, we will be able to gauge the students' ability to be responsible in learning for their personal growth, be aware of the importance of internal thinking process, learn to be clear with the motives of their actions, and if the student is able to reap benefits by constantly linking their work with learning processes.

Outcome

At the end of the course, students have produced the following comics as one of the outputs beside a proposal and manuscript on their experience (Figure 2, 3, and 4).

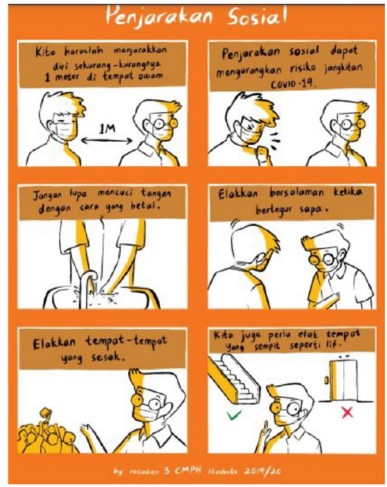


Figure 2: Physical distancing

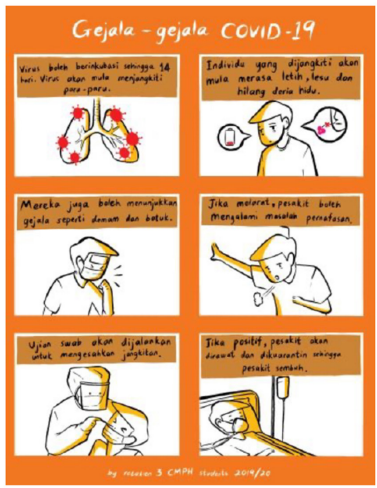


Figure 3: Signs and symptom

Figure 4: Face mask

Students' reflection

Students were also given their feedback descriptively based on Table 1.

Table 1: Students reflection

The experience has helped the students to be better persons	• To understand that different people from different ages have different level of understanding • Help me to gain more understanding and knowledge on the topic and try to convey it in simple way for other people to understand • It caused me to be more aware of the surrounding rather than focusing only what is happening around me. The experience teaches me that there are more people to concern and I tend to always forget the people in the rural areas.
The experience has helped the students professionally	• Giving out information in the easiest ways to people by using layman terms and thru pictures • In explaining to patient • Communication skills and ways to deliver messages non-verbally • It helped me in exploring ways to reach out to people who are almost out of reach • It makes me realized that teamwork is very important to make a certain program to be successful and one can't be on their own to accomplish something that is big.
The most impactful experience	• By creating the comics together with my classmates • Brainstorming the ideas for the comic • The making of the comic • Designing the comics • Producing the comic • Go through the articles for literature review • Writing the manuscript • create the storyline of the comic

Assessing student attitudes and skills

In addition to self-reflection, students also completed an assessment tool that seek their views on how the experience had enhanced their cognitive and behavioural abilities in their medical training. Using the questionnaire adapted from Green (2015), students rated their perception on their attitude and skills after undergoing this experience. A total of 13 questions were asked with response based on Likert scale of 1 to 5 from strongly disagree to strongly agree. Students were asked "Using comic as a health education tool has helped to improve my skills and attitudes in….."

Table 2: Students perception on their attitudes and skills (N=39)

	Rated 4-5
Interpreting information	91.9%
Communication with classmates	89.2%
Non-verbal communication skills	89.1%
Understanding patient's perspective	83.8%
To describe a medical situation	83.8%
Observation skills	78.3%
Empathy	75.6%
Clinical reasoning	74.8%
Writing	72.9%
Communication with patients	70.2%
Drawing skills	64.8%
Verbal communication skills	64.8%
Diagnostic skills	59.4%

*multiple responses

Impact on peers and university communities

The comics were initially posted to the Department of Community Medicine and Public Health's Facebook social media platform. The comics acceptance sentiments were measured by the volume of "likes', shares, comments, reach and engagement for each post. The total number of likes, shares, reach and engagement were 88, 16, 760 and 138 respectively within the first week the posting. The posts gained traction and was subsequently noticed by the university's corporate office's social media manager who then reposted it to the university's other social media platforms.

What is Next?

It is interesting to note that comic, a medium that expresses narratives or ideas using still images and text can play a role in medicine. Graphic fiction is increasingly being taken seriously as a resource for health professionals to relate subjective patient experience, paving a way for a more valuable role in reflecting or changing cultural perceptions of medicine. The pandemic had somehow "accidently" forced us to rethink how we as human can be creative in solving problem. Medical educators

can pay careful attention to the messages expressed in the comics produced by the students that can be meaningful for improving medical education that suits local culture.

Acknowledgement

We would like to thank the Year 3 CMPH rotation 3 students who have participated in this project.

Keywords

Alternative assessment, comic, medical graphic narratives

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List of Contributors

Afzan Binti Ahmad Zaini is a Consultant Quantity Surveyor registered with BQSM and RISM, Professional Technologist, and currently the Deputy Dean for Undergraduate at the Faculty of Built Environment, Universiti Malaysia Sarawak (UNIMAS). She has more than ten years working experience as an academician and practitioner in the construction industry. She is an active writer and researcher and her work has been published in many citation index and refereed journals.

Yvonne Michelle Campbell is a Senior Lecturer in Faculty of Language and Communication, Universiti Malaysia Sarawak.

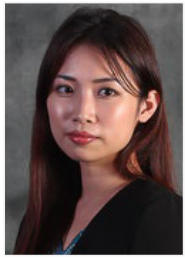
Abdul Halim Bin Hashim was an OSH practitioner in various industries for 15 years before coming into academia. He holds a Master degree in Industrial Safety Management from Universiti Kebangsaan Malaysia (UKM) and a member of the UK-based Institution of Occupational Safety and Health (IOSH).

Abdul Wafi Bin Razali is a Quantity Surveyor Technologist and a green built environment enthusiast. Previously worked as a Quantity Surveyor for Pan Borneo Highway Development and a lecturer for the Building Department in UiTM, he is currently a lecturer in Quantity Surveying Department. His research interests include construction materials and project management.

Rohaiza Binti Daud is a Biology lecturer at Centre for Pre-University Studies, (PPPU), UNIMAS since 2011. Has passion in research and teaching. Main research interests are plant ecology, plant systematics and conservation of plant species. Has won the Teaching Excellent Award (2018/2019) for the Immersive Learning Experience (Face-to-Face) and recently won the Excellent Assessment Practices Award (2019/2020).

Chung Hung Hui graduated with a First Class Honors Degree in Biotechnology in year 2018. In the subsequent year, Dr. Chung pursued his Doctorate study in USM in Ipharm. He has since worked for seven years in UNIMAS and managed to accumulate more than 100 teaching hours with numerous publications in indexed journals.

Ahmad Alif Bin Kamal is a lecturer in Centre of Pre-University Studies, UNIMAS, he teaches Mathematics and ICT courses. His research area of interest is mathematical studies, education, augmented reality applications and esports. A licensed HRDF trainer, he won several medals in UNIMAS InTEX 2018 (bronze), UNIMAS IUCEL 2019 (bronze), and eTeLIC of 2020 (silver).



Melody Kimi joined Centre for Pre-University Studies since 2013. In 2016, to acknowledge the importance of integrating scientific interpretation and skills to the foundation student, her team started off with scientific article writing then expanded to mini research (currently known as group project) which was well received by students.

Kuryati Binti Kipli received her Ph.D degree from Deakin University, Australia. Her doctoral studies focused on biomedical image processing and machine learning for disease detection. Her current research interests include pattern recognition, deep learning, biomedical image and signal processing.

Norazlina Binti Bateni is a lecturer at Department of Civil Engineering, Faculty of Engineering. She obtained her Ph.D. in stormwater management from University Malaya, Kuala Lumpur. She has joined the Faculty of Engineering since 2005 as a tutor. She teach hydrology, water resources engineering and involved in laboratory courses.

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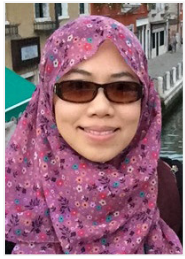
Rafeah Binti Wahi is passionate about transformative course delivery through Service Learning Malaysia – University for Society (SULAM), high impact educational practices (HIEPs) and alternative assessment. She is involved at Ministry of Higher Education (MOHE) level as SULAM Strategic Committee since 2018.



Nurashikin Suhaili is a lecturer at Faculty of Resource Science and Technology (FRST), UNIMAS. Her research expertise lies in Fermentation Technology and Industrial Biotechnology. Being an advocate of science communication, she started Biotechnologists @UNIMAS on Instagram in July 2019 with the aims to promote dissemination of biotechnology related information and to foster a culture of science communication amongst present and future biotechnologists.

Zainab Binti Ngaini is a Professor at UNIMAS. She obtained her PhD in 2002 from University East Anglia in Chemistry. She has taught more than 15 courses in chemistry since 1997. She is a supervisor of 10 PhD and 31 MSc students. She is a certified HRDF and Virtual Training Trainer.

Cheah Whye Lian is an associate professor in the Department of Community Medicine and Public Health, Faculty of Medicine and Health Sciences. She has her degree in Nutrition, Master in Public Health and Ph.D. in Community Nutrition. Her research focused on the issues on assessment of nutritional status from children to adulthood, specialized at the community level. She has knowledge in conducting quantitative, qualitative and mixed-methods research. Her work also involves studies among the indigenous groups of Sarawak, looking at the interaction between cultural and health behaviors. She was the principal investigator of several projects focusing on non-communicable disease among adolescents in Sarawak intervention study on preschool children. She also had completed projects on rural health, children and adolescent health, community-based intervention.

Rosmina Binti Ahmad Bustami is a lecturer at Department of Civil Engineering, Faculty of Engineering. She obtained her Ph.D. in stormwater management from University of South Australia. She teach hydrology, water resources engineering and involved in laboratory courses.

Kasumawati Lias received her Ph.D degree from UiTM, Shah Alam. Her doctoral studies focused on the Biomedical Engineering applications and emphasize on hyperthermia, an alternative procedure for cancer treatment, where the electromagnetic wave is used as the heating technique. Her research interest are more towards biomedical engineering, engineering education and renewable energy applications.

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