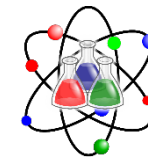

Stimulating Scientific Minds Among Early Secondary Students in Malaysia: A Pilot Study using 'Electronics Made Fun' Module



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iSTEM, USM, 23rd January 2019

Agenda

1) Introduction

objectives

scope

2) Methodology

module

survey

response

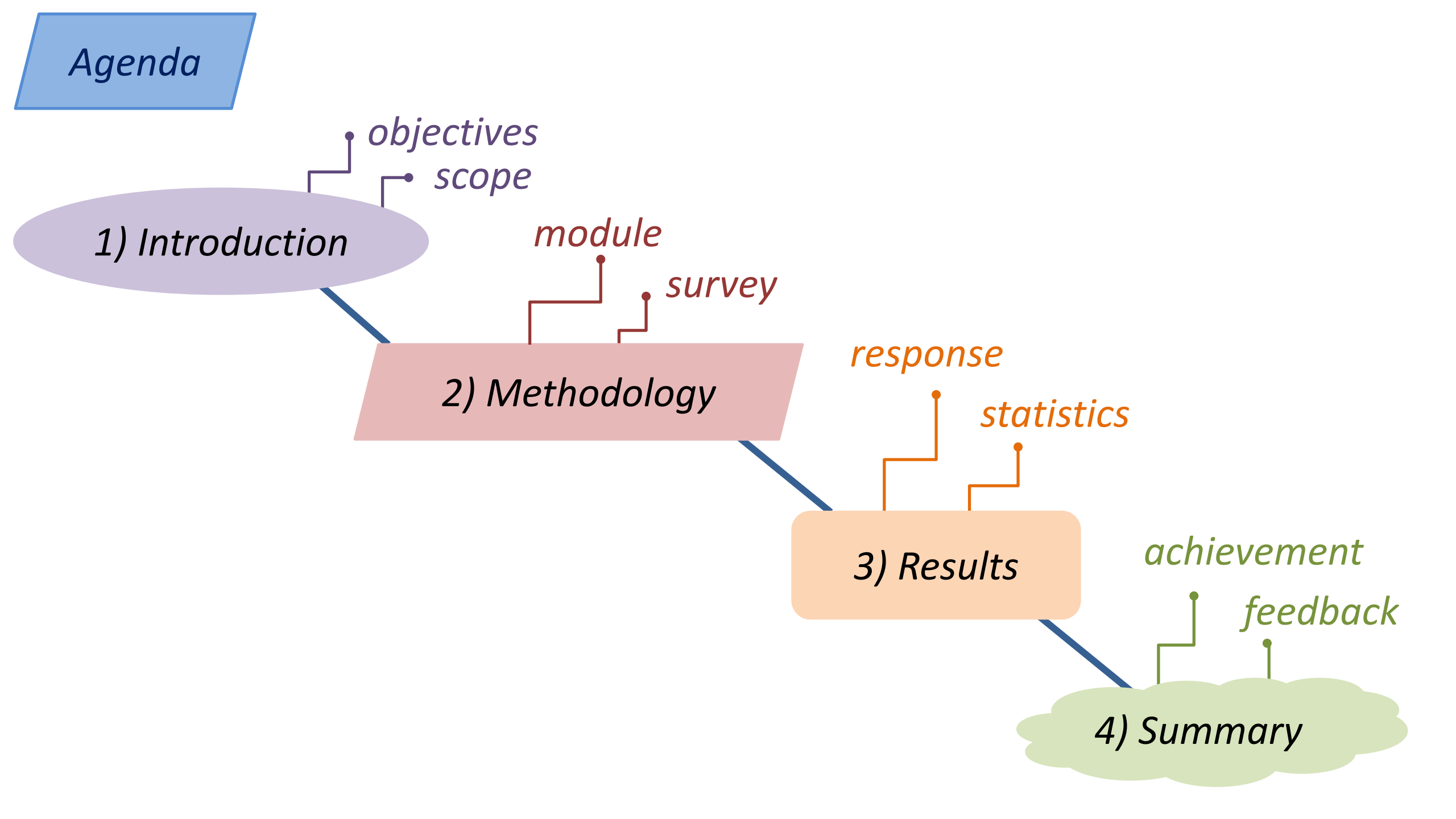
statistics

3) Results

achievement

feedback

4) Summary



Aim



To stimulate scientific thinking at an early stage of student education



To bridge the gap between schools and higher education (UKM)

Objective



To introduce the concept of scientific thinking through learning electronics



To teach electronics using physical activities and projects



To evaluate the effectiveness of 'Electronic Made Fun' module



To improve the module by gaining knowledge of school education

Scope of research



Form 1 students



Conducted at Sekolah Menengah Agama Nilai (SMAN)



Gender divided equally



Contact hours: 34 (after class & weekend)



Limitation: resources, fund, tutors, time, experience



Module

1) Theory

- *minimum*
- *analogy*

2) Practical


- *understanding*
- *skills*

3) Project

- *teamwork*
- *recycling materials*

Activities





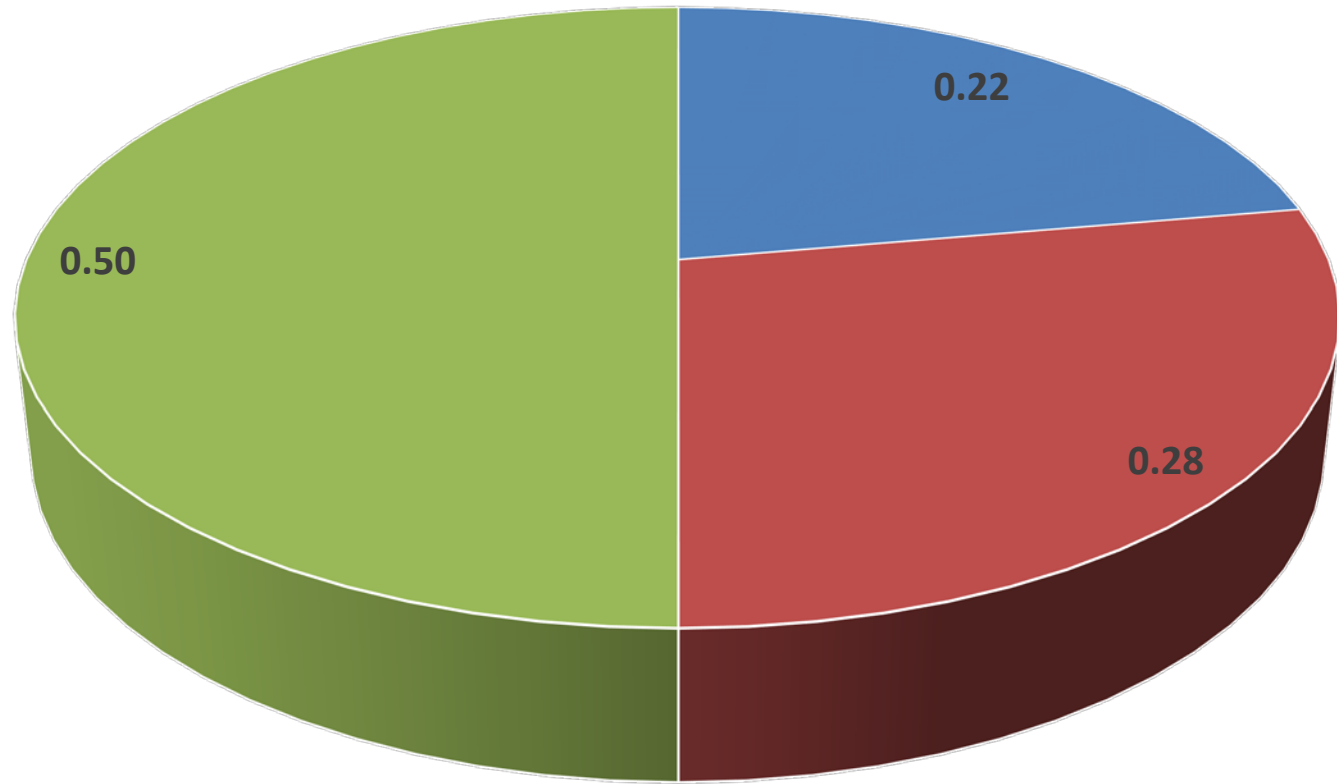
Result

Subject	Pre (%)		Post (%)	
	Male	Female	Male	Female
Defining both Science AND electronics	36.1		94.4	
Learning science is fun and easy	55.6		91.7	
Be able to identify electronic components correctly	2.8		50	
Electronic skills	11.1		83.3	
Electronic kits helps to give better understanding of electronics	27.8		80.6	
Electronic project is fun AND helps to gain more knowledge	0.75		97.2	
Would like to attend the similar program again in the future			94.4	

Result

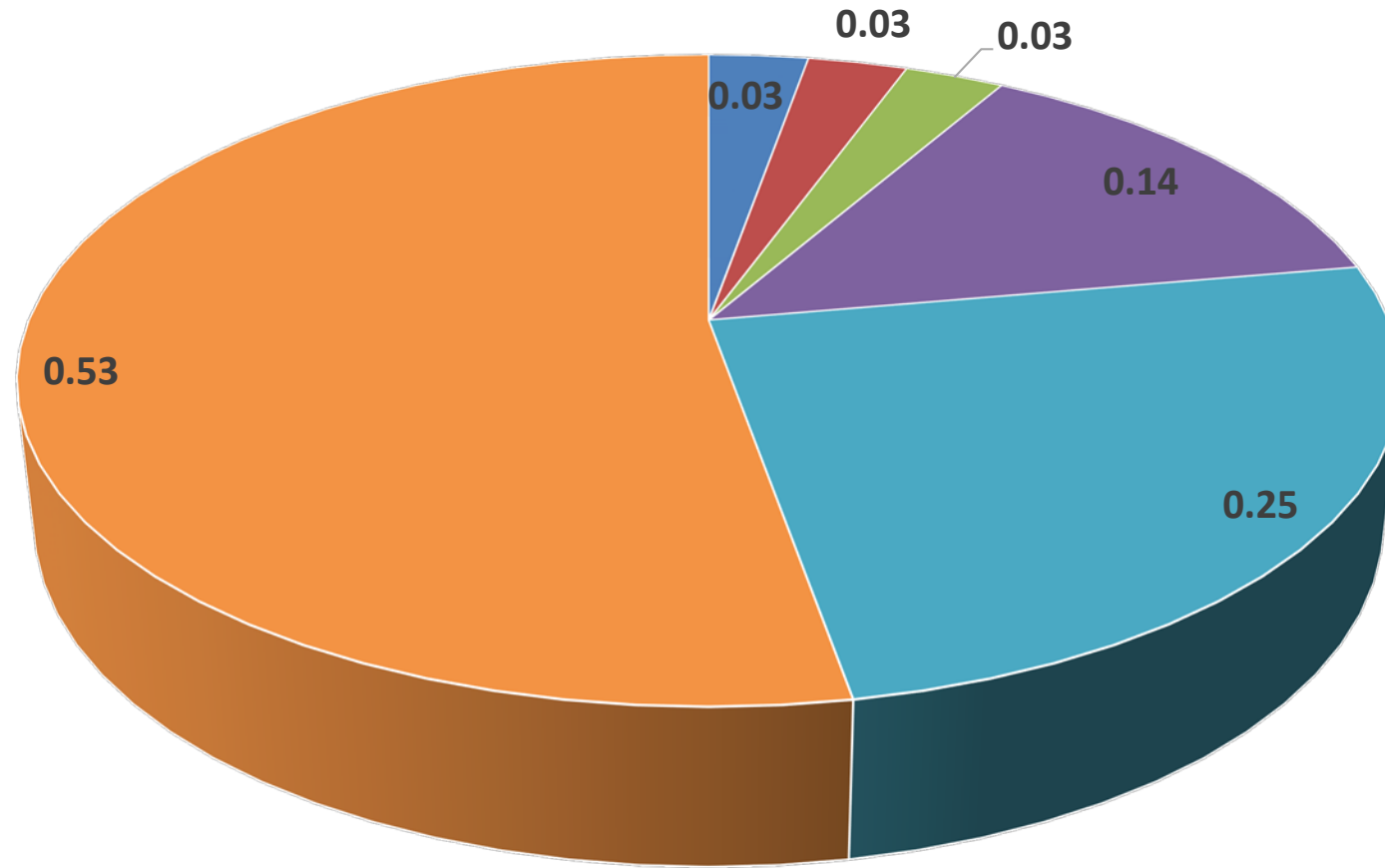
Subject	Pre (%)		Post (%)	
	Male	Female	Male	Female
Defining both Science AND electronics	55.6	16.7	94.4	94.4
Learning science is fun and easy	66.7	44.4	83.3	100
Be able to identify electronic components correctly	5.6	0	16.7	83.3
Electronic skills	5.6	16.7	72.2	94.4
Electronic kits helps to give better understanding of electronics	33.3	22.2	66.7	94.4
Electronic project is fun AND helps to gain more knowledge	88.9	61.1	94.4	100
Would like to attend the similar program again in the future			94.4	94.4

Survey: Like



■ Food ■ Organizer ■ Practical

Survey: Dislike



- Program too short
- Safety (soldering)
- Program too long
- Theory/Lecture
- Time
- Do not comment

Summary

 *The module can be useful in teaching electronics and stimulating scientific thinking*

 *The students prefer more practical classes, more project*

 *The program can be improved by finding suitable time for the students*

 *The students show interest in solving real problem, guide them properly*

 *Scientific thinking is important in solving many real-life problem, across many disciplines*

Thank You



Pusat Pengajian Ilmu Pendidikan
School of Educational Studies

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Date: 26 December 2018.

Dr. Mohd Zulhakimi Ab Razak
Institute of Microengineering and Nanoelectronics (IMEN)
Level 4, Research Complex,
Universiti Kebangsaan Malaysia
43600 Bangi,
Selangor.

Dear Dr. Mohd Zulhakimi AB Razak,

ACCEPTANCE NOTIFICATION AND INVITATION LETTER

Paper Title : Stimulating Scientific Minds Among Early Secondary Students In Malaysia: A Pilot Study Using 'Engineering And Electronics Made Fun' Approach

We are pleased to inform that your abstract has been accepted in our **1st International Conference on STEM Education-(iSTEM 2019)**, to be held at Universiti Sains Malaysia, Penang, Malaysia from **22 to 24 January 2019**.

You are cordially invited to share your academic research and findings with the participants in this event. As a presenter, you are requested to furnish a 20-minute power point presentation including question and answer session (15 + 5 minutes Q&A).

Please refer to the conference website at <https://istem.usm.my> for further information.

In case if your paper is multi-authored, and more than one authors will attend the conference, each attending author needs to register and pay the registration fee separately for the conference for registration fee of **RM600.00**.

Please submit your full paper before or by **31 December 2018** if you are interested in publishing your paper after the conference. Any enquires please e-mail us at istem2019@gmail.com. We look forward to seeing you at the conference.

Welcome to Penang in advance from iSTEM 2019 team!

Your Sincerely,

Associate Professor Dr. Mohd. Ali Samsudin
Conference Chair

Stimulating Scientific Minds Among Early Secondary Students in Malaysia: A Pilot Study using ‘Engineering and Electronics Made Fun’ Approach

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Abstract

This paper discusses the development of scientific thinking at an early stage of secondary education in Malaysia. Since the engineering aspects were introduced using ‘Electronics Made Fun’ approach, this pilot study was targeted at the first stage of secondary education. This is because at this stage, the students show signs of maturity in thinking and would be able to understand the concept of science and engineering at a greater extent. This study was conducted on 36 Form 1 students from Sekolah Menengah Agama Nilai, which the genders were divided equally. The aims of the study are to introduce electronics engineering in a fun and easy-to-understand concept, and to bridge the gap between universities and schools in Malaysia. This study was conducted in three stages: 1) Educating the students using information and notes, 2) Practical aspects of the study, where the students were given hands-on experiences using electronics kits and components, and 3) Implementation of knowledge and skills through group projects. Before the study was conducted, only 16.7% of the students can define proper concept of science and engineering, whereas only 19.4% of them were familiar with electronics components. After five weeks of regular meetings and activities with 34 contact hours, almost 94.4% of the students responded well in defining science and engineering. Interestingly, as much as 91.7% of them would like to attend such programme again in the future. This pilot study has

paved the path towards empowering STEM and developing scientific minds at early stage of education in Malaysia.

Keywords: Science education, Electronics Made Fun, Engineering, Scientific minds (3-5 keywords)

Keynote Addresses

Venue: Dewan Budaya, USM

Day 1: 23 January 2019 (Wednesday)

Time: 9.30am-10.30am

Rethinking Integrated STEM Education: Past, Present and Future

Prof. Dr. Lindsey Conner

Dean

People & Resources

College of Education, Psychology and Social Work

Flinders University, Australia

Day 2: 24 January 2019 (Thursday)

Time: 9.30am-10.30am

The Canvas Linking of STEM Education from School to University

Professor Datuk Dr. Asma Ismail FASc

Vice Chancellor

Universiti Sains Malaysia

Penang, Malaysia

Invited Speaker Special Sessions

Day 1: 23 January 2019 (Wednesday)

Session 1: 2.30pm-3.30pm

Venue: EUREKA, USM

Level Ground Floor: Auditorium 1

STEM Education in Malaysia: Why, What and How

Prof. Dr. Lilia Halim

*Professor in Science Education
Faculty of Education
Universiti Kebangsaan Malaysia*

Level Ground Floor: Auditorium 2

Best Practises in STEM Teaching and Learning - Initiative by Ministry of Education Malaysia

Dr. Ihsan Ismail

*Head of National STEM Centre
Educational Planning And Research Division
Ministry Of Education Malaysia*

Level Ground Floor: Auditorium 3

STEM Education in the Philippines: A Vital Approach to Sustainable Development

Associate Professor Dr. Jasper L. Pastrano

*Associate Professor -Iloilo Science and Technology University
President, ASMAC Philippines
Iloilo City, Philippines*

Level 1: PIPPA Seminar Room

Manufacturing in Science Education in Japan

Associate Professor Dr. Ryugo Oshima

*Faculty of Education
Chiba University, Japan*

Invited Speaker Special Sessions

Day 2: 24 January 2019 (Thursday)

Session 2: 2.30pm-3.30pm

Venue: EUREKA, USM

Level Ground Floor: Auditorium 1

What Teachers Should Know in the 21st Century: How the Normal Developing Brain Learns- A Functional Neuroscience Perspective

Professor Dato' Dr. Hj Jafri Malin Datuk Hj Abdullah

Director

Brain Behaviour Cluster, School of Medical Sciences, Universiti Sains Kubang Kerian, Kota Bharu, Kelantan, Malaysia

Level Ground Floor: Auditorium 2

Higher Order Thinking or Computational Thinking: Which One is More Important in STEM Learning?

Professor Kamisah Osman

Professor in Science Education

Faculty of Education

Universiti Kebangsaan Malaysia

Level Ground Floor: Auditorium 3

Bridging the STEM Skills' Gap That Involves Education and Industrial Commitments

Taufek Muhamad

Deputy Director Administration

SEAMEO RECSAM, Penang, Malaysia

Level 1: PIPPA Seminar Room

Master of Cognitive Neurosciences: A New Postgraduate Course for Teachers

Associate Professor Dr. Aswati Hamzah

Lecturer in Educational Psychology

Universiti Sains Malaysia

Penang, Malaysia

Day 1: 23 January 2019 (Wednesday)

Parallel Session 2: 3.30pm-5.00pm

Venue: EUREKA, USM

Level Ground Floor: Auditorium 3

The Development of Pro-STEM Module in Inculcating Students' Higher Order Thinking Skills

Nurul Huda Kasim & Che Nizam Che Ahmad

Kahoot! in Biology Classroom to Enhance Pre-University Students' Active Learning

Nor Asniza Ishak

Stimulating Scientific Minds among Early Secondary Students in Malaysia: A Pilot Study Using 'Engineering And Electronics Made Fun' Approach

Mohd Zulkhikimi Ab Razak, Fazia Adyani Ahmad Fuad, Azlina Abdullah, & Mansor Mohd Noor

Modelling the Determinants of Icts Application in Internship in Technical and Vocational Education for Nigerian Higher Institutions

Babawuro Shuaibu & Andi Mallanti

Stimulating Scientific Minds Among Early Secondary Students in Malaysia: A Pilot Study using ‘Engineering and Electronics Made Fun’ Approach

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