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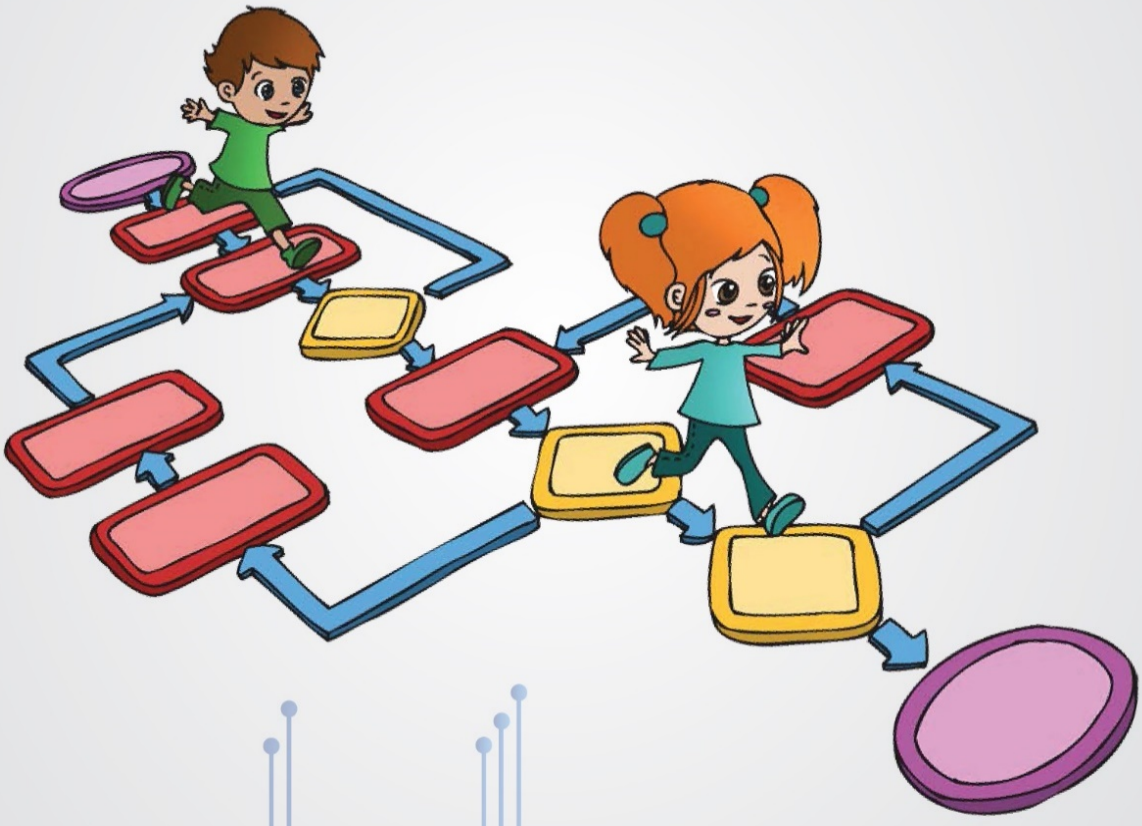
ISTIC
INTERNATIONAL SCIENCE, TECHNOLOGY AND INNOVATION CENTRE FOR SOUTH-SOUTH COOPERATION UNDER THE AUSPICES OF UNESCO

UTM
UNIVERSITI TEKNOLOGI MALAYSIA

TRAINING WORKSHOP ON

COMPUTER SCIENCE EDUCATION

18-22 September 2023
Kuala Lumpur, Malaysia



INTRODUCTION

Science occupies a unique position as a major driver and enabler and in the actions to achieve the UN Sustainable Development Goals (SDGs). Science for example contributes to health and well-being and provides ways to improve livelihood in order to eradicate poverty. Science provides access to new technologies which can improve incomes and therefore increase the level of living conditions and promote socio-economic development. Science also promotes the understanding of natural processes, provides solutions in combating climate change, halts the loss of biodiversity, conserves resources for sustainable development and fosters innovations.

The basis for the critical thinking, creativity and innovativeness that comes with science begins in school. Science education is vital in training the mind, understanding science ideas and the world, making choices, and solving problems. Science teaching must therefore be such that it promotes the development of critical thinking, innovative ideas, positive attitudes, and curiosity towards science, enhances interest and motivation and engaging. Investigation, experimentation and raising relevant questions by the pupils' become the main characteristics of a science lesson.

Computer science is now considered as a Science, Technology, Engineering and Mathematics (STEM) subject in the broad sense and is being introduced in many countries as a stand-alone subject in the curriculum. This development is spurred by the technological development as we move into the digital age in which nearly everything revolves around software. It is reported that jobs in the future will increasingly require coding skills and that programming jobs are growing at a rapid rate. Both coding and computational skills therefore need to be taught if our youths are to be prepared to compete for the jobs of the future and be successful in a world in which technology is integrated in every part of their lives both personal and professional. Hence there is a need to include learning to write and read codes and programming in the school syllabus.

Inquiry-based Science Education (IBSE) has been internationally recognised as an effective teaching strategy in developing the minds. Students learn how to ask questions and use evidence to answer them. In the process of learning the strategies of scientific inquiry, students learn to conduct an investigation and collect evidence from a variety of sources, develop an explanation from the data, and communicate and defend their conclusions.

Due to the encouraging results of IBSE and the favourable feedback received from previous participants of the series of Training Workshop on Computer Science Education, the International Science, Technology, and Innovation Centre for South-South Cooperation under the auspices of UNESCO (ISTIC), together with UTM Razak Faculty of Technology and Informatics (RFTI), Universiti Teknologi Malaysia, is planning to organise a Training Workshop on Computer Science Education.

This initiative aligns with several United Nations Sustainable Development Goals (SDGs), including SDG 4, which focuses on Quality Education, SDG 8, which aims for Decent Work and Economic Growth, SDG 9, which emphasizes Industry, Innovation, and Infrastructure, and SDG 17, which promotes Partnerships for the Goals.

Thematic Programme "1, 2, 3…Code!"

The current interpretation of 'computer science' includes both the 'un-plugged' component in which the computer is not used at all and the 'plugged' activities which use the computer. This is unlike the usual understanding of 'computer science' which refers to the use of computer to enhance learning, and the knowledge and skills in using software such as word, power-point etc.

The *Foundation La main à la pate* is currently implementing project **"1,2,3…Code!"** which is on "Computer Science" in French classes using the thematic approach covering different themes including history of science and techniques, algorithms, languages, programming etc. and emphasizing project work and pedagogy based on inquiry.

In order to help teachers, the *Foundation La main à la pate* has developed a guidebook which includes resources which have been tested in the classroom on 'unplugged' and 'plugged' activities that allow teachers to focus on algorithm, robotics and programming. The project also has a training plan for teachers and a dedicated website which both teachers and pupils can use for algorithm, programming and information representation. It is the first in France that offers a complete pedagogical sequence on computer science. The preparation of the book took three years to complete involving fifty experts.

The basic software used is *"Scratch"* which can be used by children as young as in kindergarten and can be downloaded for free. Scratch is taught and used in after-school centers, schools, and colleges, as well as other public knowledge institutions. As of 15 February 2023, community statistics on the language's official website show more than 123 million projects shared by over 103 million users, over 804 million total projects ever created (including unshared projects), and more than 95 million monthly website visits.

OBJECTIVE

The main objective of the training workshop is to provide the necessary knowledge and skills to participants on computer science through 'unplugged' and 'plugged' activities and apply these into pedagogical activities.

EXPECTED OUTCOMES

The outcomes of the training workshop are that:

1. Participants will gain the necessary knowledge and hands-on experience on 'unplugged' and 'plugged' activities in computer science using IBSE Approach.
2. Participant will learn programming using different languages/environments (Scratch, Visual Programming Languages (VPL).
3. Participants will discover turnkey pedagogical resources and will be able to develop their own pedagogical projects / activities on computer science.
4. The ultimate outcome is to encourage and inspire students to foster their creativity and innovative thinking by working on their own projects.

MODE OF DELIVERY

The training workshop will be conducted in English and will be very much hands-on. All participants are required to bring their own laptops/notebooks.

PARTICIPANTS

25-30 participants from public, private and international schools are expected to participate in this workshop.

TIME AND VENUE

Venue: UTM Hotel and Residence Kuala Lumpur (TBC)

Date: 18 - 22 September 2023 (Monday – Friday)

Time: 9:00 am – 5:00 pm

APPLICATION

Applicants are urged to use online application. The link of online application form can be accessed from the link below. Please register first, the fee can be settled later.

Online application form
https://forms.gle/HuR2PirCXSNmniwG7

FEE

Each participant will be charged **RM500** for the workshop, inclusive of printed materials and meals. Each school can send more than one participant. A 40% discount is applicable for registration of more than one participant. Registration before **15 August 2023** is entitled for an extra 10% early bird discount.

Bank: Bank Islam Malaysia Berhad (BIMB)
Account number: 14-014-01-008336-1
Swift Code: BIMBMYKL

CLOSING DATE OF APPLICATIONS

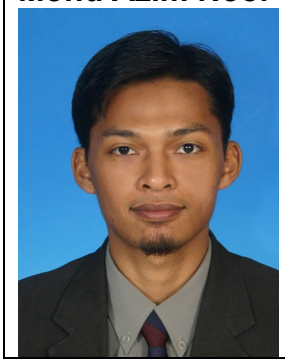
All applications should be submitted to ISTIC secretariat **before 31 August 2023**.
ISTIC will inform the confirmation of participation no later than **4 September 2023**.

SECRETARIAT & ENQUIRIES

For further information, please contact ISTIC Secretariat:
Mr. Mohd Azim bin Noor
International Science, Technology and Innovation Centre
for South-South Cooperation under the auspices of UNESCO (ISTIC)
902-4, Jalan Tun Ismail, 50480 Kuala Lumpur.
E-mail: azimnoor@istic-unesco.org

SPEAKER/TRAINER

Dato' Dr Sharifah Maimunah Syed Zin 	Dato' Dr. Sharifah Maimunah bt. Syed Zin (B.A. Hons, Dip. Ed, University of Malaya, M. A (Education), University of Sussex, UK , Ph.D University of East Anglia, UK) is former Permanent Delegate of Malaysia to UNESCO Paris and former director of the Curriculum Development Centre (now Curriculum Development Division) of the Ministry of Education. She has more than 30 years' experience in education. During her career In the Ministry of Education, she was directly involved in several major curricular innovations.She was consultant to the Ministry of Education Brunei Darussalam on a study on science education policy of the country. Her interests include science education, curriculum development and women development both nationally and in the developing countries and has presented papers on these subjects. She also has experience in developing capacity building programmes for science managers, women and science educators under the South- South Cooperation. Her last position was Director of the International Science, Technology and Innovation Centre for South-South Cooperation under the auspices of UNESCO (ISTIC). Although retired she continues to be involved in improving science education in schools.
Associate Professor Dr Maslin Masrom 	Dr Maslin Masrom is an Associate Professor, Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia Kuala Lumpur. She was the Head of Human Capital and Knowledge Management Research Group at Razak Faculty. She teaches Information Technology Strategy, Management Information Systems, ICT Ethics and Society, Advanced Decision Modelling, Knowledge Management and Technology, and Research Methodology. She has published many technical papers in journals, books and conferences. Her main research interests are in IT/IS Management, Online Social Networking, Women and Technologies, Cloud Computing in Healthcare System, Knowledge Management, Information Security, Ethics in Computing, Operations Research / Decision Modelling, and Structural Equation Modelling.
Associate Professor Dr Wan Normeza 	Dr Wan Normeza Wan Zakaria is an Associate Professor, and researcher at Science, Management and Design Department, Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia, Kuala Lumpur. She started her career in UTM as a lecturer at Program Pengajian Diploma in 1999, then was promoted to senior lecturer and transferred to Razak School of Engineering and Technology upon her completion of PhD in 2011. During UTM transformation in 2018, Razak School has merged with other school and centre in UTMKL to form a faculty which is currently known as Razak Faculty of Technology and Informatics. Dr Wan Normeza Wan Zakaria has multidisciplinary academic background comprises of Economics, Business administration and Education. With these multidisciplinary areas, her teaching, supervision and research ranging around all these disciplines.

Dr Norshaliza Kamarudin 	Dr Norshaliza Kamarudin is a senior lecturer and researcher at Science, Management and Design Department, Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia, Kuala Lumpur. She started her career in UTM as a lecturer at Program Pengajian Diploma in 1999, then was promoted to senior lecturer and transferred to Razak School of Engineering and Technology upon her completion of PhD in 2011. During UTM transformation in 2018, Razak School has merged with other school and centre in UTMKL to form a faculty which is currently known as Razak Faculty of Technology and Informatics. Dr Wan Normeza Wan Zakaria has multidisciplinary academic background comprises of Economics, Business administration and Education. With these multidisciplinary areas, her teaching, supervision and research ranging around all these disciplines.
Dr Azizul Azizan 	Dr Azizul Azizan is currently with the Advanced Informatics Department, Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia (UTM). His research areas include Wireless Communications, Cyber-physical Systems - Blockchain IoT, and Applied Machine Learning - Embedded Machine Learning. He is currently focusing on embedded ML (TinyML) and applied Deep Reinforcement Learning. Azizul is also involved in several STEM education advocacy specifically in Computing Literacy as organizers, trainers and facilitators. He obtained his B.Eng. (Hons.) Electronics Engineering (Telecommunications) degree from Multimedia University. He received his PhD qualification in 2009, from University of Surrey in the area of 3.5G physical layer adaptation for satellite systems. He was with the Malaysian Communication and Multimedia Commission for more than 6 years overseeing spectrum and numbering policies, and telecommunications resource management administration before joining UTM.
Mohd Azim Noor 	Mohd Azim is a Technologist and Project Officer at ISTIC. He holds a Degree in Information Systems Management and a Master of Science in Information Technology, both from Universiti Teknologi MARA. His Master's thesis focused on the field of computing education. His work areas revolve around various domains, including big data, artificial intelligence, robotics education, climate change education, technopreneurship, and science, technology, and innovation (STI) policy. He is an IT professional with a broad background in overseeing information technology infrastructure, delivering technical support and advice, leading capacity development programs, and lead and overseeing project implementation.

TENTATIVE PROGRAMME

<table>
<tr><th></th><th>Monday
18 September 2023</th><th>Tuesday
19 September 2023</th><th>Wednesday
20 September 2023</th><th>Thursday
21 September 2023</th><th>Friday
22 September 2023</th></tr>
<tr><td>9:00am – 11:00am</td><td>Registration / Opening Session</td><td>Unplugged activities I – Algorithm & Language
(Recipes)</td><td>Coding I – Fundamental Concept of Programming</td><td rowspan="3">Robotics I – Introduction to Robotics</td><td>AI Literacy/ Innovation Challenge
(Coding & Robotics)
(TBC)</td></tr>
<tr><td rowspan="2">11:00am – 12:30pm</td><td rowspan="2">IBSE & Computer Science Education</td><td rowspan="2">Unplugged activities II – Information
(Binary)</td><td rowspan="2">Coding II – A project for beginners
(Simple multimedia with Scratch)</td><td>Wrap Up</td></tr>
<tr><td>Discussion</td></tr>
<tr><td>12:30pm – 2:00pm</td><td colspan="4">Lunch</td><td>Closing
End of Workshop</td></tr>
<tr><td>2:00pm – 3:30pm</td><td rowspan="2">Conceptual scenario about computer sciences + Computational Thinking</td><td>Unplugged activities III – Cryptography</td><td rowspan="2">Coding III – Advance Project
(animation/game)</td><td rowspan="2">Robotics II (Virtual to Physical) & Robotics III (Mission to Mars) -</td><td></td></tr>
<tr><td>3:30pm – 5:00pm</td><td>Unplugged activities IV - Route
(Rover and travelling salesman)</td><td></td></tr>
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ORGANISER

INTERNATIONAL SCIENCE, TECHNOLOGY AND INNOVATION CENTRE (ISTIC)

The creation of the International Science, Technology and Innovation Centre for South-South Cooperation under the auspices of UNESCO (ISTIC) is a follow up of the Doha Plan of Action which has been adopted by the head of States and Government of the Group of 77 and China, during the meeting in Doha, Qatar, from 12-16 June 2005 on the occasion of the Second South Summit of the Group of 77. The Summit urged UNESCO to develop and implement a programme for South-South Cooperation in Science and Technology with the objective of facilitating the integration of a developmental approach into national science, technology and innovation policies, capacity building in science and technology through providing policy advice and exchange of experience and best practices, and creating a problem solving network of Centres of Excellence in developing countries as well as supporting the exchange of students, researchers, scientists and technologists among developing countries. ISTIC will act as an international platform offering sustainable programmes and services in producing holistic talents towards institutional excellence and augmenting sustainable development for South-South Cooperation. Details of ISTIC are available at www.istic-unesco.org