TRAINING WORKSHOP ON Computer Science Education

6-10 April 2020 | 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.

In view of the positive findings on IBSE, the International Science, Technology and Innovation Centre for South-South Cooperation under the auspices of UNESCO (ISTIC) in collaboration with Foundation La main à la pate will be organising a Training Workshop on Computer Science Education.

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 different from 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 guide book 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. The project has received tremendous support from the schools and within two months, it has reached more than 13,000 classes surpassing the original target of reaching 10,000 classes in two years.

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), Blockly); and
3. Participants will discover turnkey pedagogical resources and will be able to develop their own pedagogical projects / activities on computer science.

MODE OF DELIVERY

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

PARTICIPANTS

About 15 international participants from developing countries and 20 from Malaysia are expected to participate in this workshop. The combination of participants from other developing countries and Malaysia will allow for exchange of knowledge, ideas and experiences as well as opportunities for networking and collaboration.

Participants will be mainly teacher trainers, curriculum developers or educational technologists responsible for computer education and developers of related resource materials. Participants must have computer skills.

Participants are required to seek travel grant from their organisation to pay their travel expenses to Kuala Lumpur, Malaysia. The organiser will bear the local cost (accommodation and meals) to selected international participants.

TIME AND VENUE

The training workshop will be held for 5 days at Kuala Lumpur, Malaysia on 6-10 April 2020.

APPLICATION

Applicants are urged to use online application. The link of online application form can be accessed from the website www.istic-unesco.org.

International Participants online application form can be found in the link below, or scan the QR code:

https://forms.gle/dneqX7mjGeCR9Ajp7

A registration fee of RM 100 (~ USD 25) will be collected from each participant during registration.

CLOSING DATE OF APPLICATIONS

All applications should be submitted to the ISTIC secretariat office before **13th March 2020.**

The organisers will inform the successful applicants to the training workshop no later than **25th March 2020.** Applicants who do not receive word within this date are considered unsuccessful.

CONTACT INFORMATION

For further information, please contact ISTIC Secretariat:

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TENTATIVE PROGRAMME

	Monday 6 April 2020	Tuesday 7 April 2020	Wednesday 8 April 2020	Thursday 9 April 2020	Friday 10 April 2020
8:30am – 9:00am	Registration				
9:00am – 9:50am	Opening Session	**Programming with Scratch I – A project for beginners 1/2**	Opening International Conference on STEM Education	**Unplugged activities III – Cryptography**	**Building a teaching or training activity 4/4** (participants test their teaching or training activity on other participants)
9:50am – 10:10am	Keynote Address				
10:10am - 10:30am	Keynote Address				
10:30am – 11:00am	Group photo				
11:00am – 12:30pm	**Unplugged activities I – Algorithm & Language**		**Unplugged activities II - Information**		Workshop conclusion and evaluation
					Closing session
12:30pm – 2:00pm	**Lunch**				Lunch / end of workshop
2:00pm – 5:00pm	**Robotics I – Programming a robot (Thymio)**	**Building a conceptual scenario about computer sciences** (main concepts to be taught)	**Programming with Scratch II – A project for beginners 2/2**	**Programming with Scratch III – A project on cryptography**	Closing International Conference on STEM Education
5:30pm – 6:30pm		**Building a teaching or training activity 1/4** (participants chose a concept from the conceptual scenario and imagine a teaching or a training activity related to this concept)	**Building a teaching or training activity 2/4** (participants prepare their teaching or training activity further)	**Building a teaching or training activity 3/4** (participants prepare the material related to their teaching or training activity)	