



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

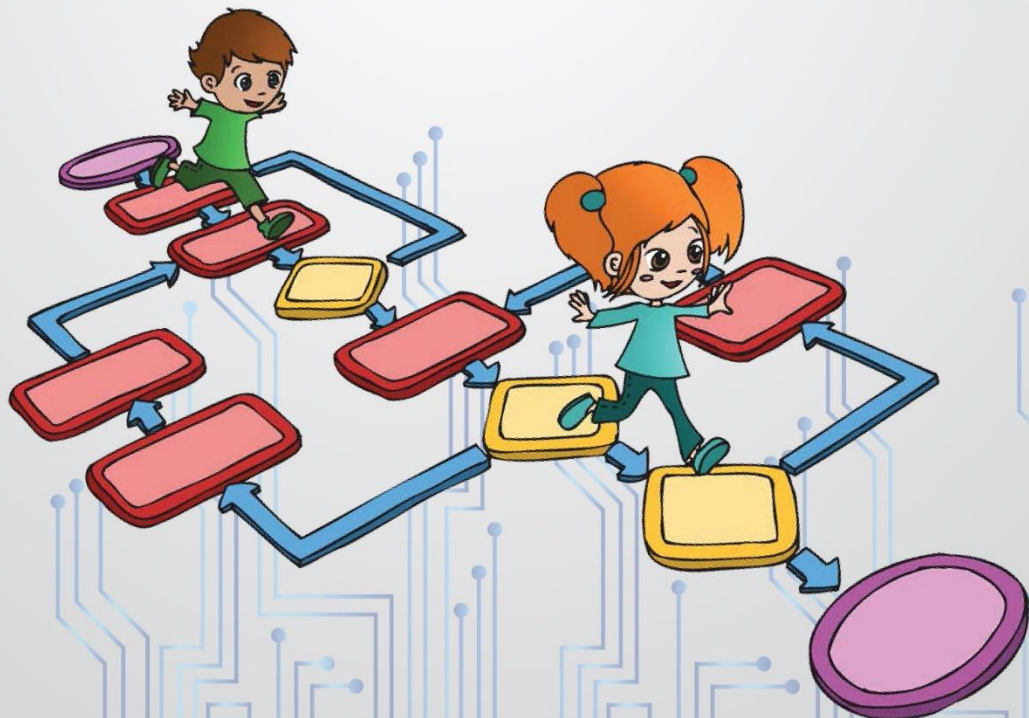


FONDATION
La main à la pâte

POUR L'ÉDUCATION À LA SCIENCE

Training Workshop on Computer Science Education

23-27 October 2017
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. The impetus to introduce this subject in the curriculum mainly arises from the technological development as we move into the digital age, in which our lives and just about everything is associated with software. While the future will certainly be a world with interactive screens, the number of people writing the software required by these ever growing screens is not increasing. Computer Science is designed to train the mind towards thinking logically and creatively to solve a problem. Coding teaches logic skills and problem solving and this will assist children to succeed in the digital world. Programming algorithm describes the exact steps that tells the computer to take to solve problems. It is reported that more and more jobs in the future require coding skills and that programming jobs are growing at a rapid rate. Hence there is the need to include learning to write and read code 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 pâte* will be organising a Training Workshop on Computer Science Education.

Thematic Programme “1, 2, 3 Codez”

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 pâte* is currently implementing project “1,2,3...Codez” 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 pâte* 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:

- i) Participants will gain the necessary knowledge and hands-on experience on ‘unplugged’ and ‘plugged’ activities in computer science using IBSE Approach
- ii) Participants will gain experience in advanced programming
- iii) Participants will be able to develop their own pedagogical projects / activities on computer science

PARTICIPANTS

About 10 international participants from developing countries and 15 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 October 23-27, 2017.

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.

POSTER SESSION

Successful participants are required to bring a poster showing teacher training activities or class projects on computer science. A special session has been set-aside for participants to present the posters.

TENTATIVE PROGRAMME

Monday	
9:00 am – 10:30 am	Opening talks
10:30 am – 11:00 am	Group photo
11:00 am – 12:30 pm	Unplugged activities I – <i>Algorithm & Language</i>
12:30 pm – 2:00 pm	Lunch
2:00 pm – 5:00 pm	Unplugged activities II – <i>Information</i>
Tuesday	
9:00 am – 12:30 pm	Programming with <i>Scratch Introduction and improvement</i>
12:30 pm – 2:00 pm	Lunch
2:00 pm – 5:00 pm	Robotics I – <i>Programming a robot (with Thymio)</i>
5:00 pm – 5:30 pm	Pause
5:30 pm – 6:30 pm	Building one's own pedagogical project 1/3 <i>Participants prepare a pedagogical project or a training activity on computer science, to be presented on Friday</i>
Wednesday	
9:00 am – 12:30 pm	What are computer sciences? Which concepts to be taught? <i>Conceptual scenario</i>
12:30 pm – 2:00 pm	Lunch
2:00 pm – 5:00 pm	Robotics II – <i>Building robotic devices (with Arduino / Mbot / Makey-makey)</i>
5:00 pm – 5:30 pm	Pause
5:30 pm – 6:30 pm	Building one's own pedagogical project 2/3 <i>Continue...</i>
Thursday	
9:00 am – 12:30 pm	Unplugged activities III – <i>Cryptography</i>
12:30 pm – 2:00 pm	Lunch
2:00 pm – 5:00 pm	Advanced programming with <i>Scratch Cryptography – Continue...</i>
5:00 pm – 5:30 pm	Pause
5:30 pm – 6:30 pm	Building one's own pedagogical project 3/3 <i>Preparation of posters to be presented on Friday</i>
Friday	
9:00 am – 11:00 am	Poster session : Computer science training or teaching activities <i>Presentation of teacher-training activities or class projects elaborated by participants before or during the workshop</i>
11:00 am – 11:30 am	Pause
11:30 am – 12:30 pm	1, 2, 3... code! <i>Presentation of a turn-key pedagogical programme by La main à la pâte</i>
12:30 pm – 3:00 pm	Lunch and Friday Prayer
3:00 pm – 4:30 pm	Workshop conclusion and evaluation
4:30 pm – 5:30 pm	Closing session

APPLICATION

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

Online application form

<https://goo.gl/forms/taPChca8DHbS22Nk2>

CLOSING DATE OF APPLICATIONS

All applications should be submitted **before 21 August 2017**. ISTIC will inform the successful applicants to the training programme **not later than 22 September 2017**. Applicants who do not receive word within this date are consider unsuccessful.

GENERAL INFORMATION

Visa Application

Selected participant from countries that required visa to Malaysia should get it before leaving home. To apply for visas, participants will be requested by the Malaysian Embassy or High Commission to submit a letter of invitation. The organiser will send an invitation letter as soon as possible to each accepted overseas applicant.

Contact information

For further information, please contact ISTIC Secretariat:

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