STEM LEARNING RESOURCES ON SUSTAINABLE DEVELOPMENT GOALS PROJECT DESCRIPTION

It is the intention of the SEAMEO Regional Centre for STEM Education (SEAMEO STEM-ED) to create STEM online learning resources for STEM educators based on the sustainable development goals (SDG). To that end, the Centre will partner with university faculty in the region and international experts in curriculum development. The first of these efforts will be a partnership with the School of Science at Walailak University to develop four learning modules based on the content they have developed for use with university students. STEM educators will be trained in the use of inquiry based learning, project-based learning and the flipped classroom approach. The online learning resources to be developed will consist of four learning modules: Module 1: Climate Smart Agriculture using Sensors, AI and IoT, Module 2: Controlling Dengue Fever in Southeast Asia, Module 3: Creating Better Air Quality with PM 2.5 sensors and IoT and Module 4: Using indigenous knowledge to Mitigate Climate Change. These four online learning modules will enable classroom teachers to help their students' develop 21st century skills such as, critical thinking, problem-solving, creativity, communication, and collaboration.

The collaboration among faculty, the curriculum designer, and the Centre will ensure that each module includes a sequence of well-designed lessons that help students master the requisite concepts and skills, questions for teachers to use to check student understanding, assessments to determine the degree of student mastery, and projects for students to apply their understanding.

BACKGROUND

The 21st century is a period of rapid technological growth and social change and these online learning modules are aimed at ensuring that the people of the SEAMEO countries are well prepared to meet the challenges of posed by the SDGs. The modules will help the SEAMEO STEM-ED Center to implement STEM education in the SEAMEO member countries. The STEM online learning modules will create awareness of STEM education, provide teachers and students with knowledge and management skills, and disseminate practices that effectively inform students about (1) climate smart agricultural adaptations for improving agriculture productions, (2) dengue and zika control and prevention to reduce health risks, (3) PM 2.5 mitigation for reducing health risk and improving the quality of living in SEAMEO country members and (4) indigenous knowledge for mitigating climate change.

OBJECTIVES

- To design a set of online learning modules that will prepare prospective STEM educators to deliver high-interest content in their classrooms as well as to be instructional leaders and build a culture of improvement in their schools.
- To prepare core trainers in Thailand and selected countries in the region.
- To demonstrate the effectiveness of the new online learning modules in classrooms in the region.

- To stimulate the use of the new STEM online learning modules by STEM educators and pre-service programs in Thailand and in the region.
- To provide ongoing mentorship for master teachers for their continuous improvement and sustainability.

SCOPE OF THE PROJECT

The School of Science, Walailak University will work with an international curriculum designer selected by the Centre to ensure that the four learning modules have a sequence of well-designed lessons that will ensure student mastery of the content and provide adequate guidance for the teachers who are implementing them. The scope of the project is region-wide in Southeast Asia but the modules will first be developed and tested in Thailand.

Once proven effective, the modules will eventually be made accessible to educators and policymakers across the region.

DELIVERABLES

The deliverables for the project will be:

1. The four online learning modules for STEM professionals;
2. The development of core trainers in Thailand and in the region;
3. The study of the online learning modules effectiveness and its impact on teachers' instructional practices and student performance;
4. The adoption of the online learning modules by universities and teachers in Thailand and in the region.

EXPECTED BENEFITS

The benefits should be:

1. The modules will develop students' competencies that help them find employment upon leaving school.
2. The modules will provide STEM knowledge related to agriculture, climate change, health risk and indigenous knowledge that builds national capacity to satisfy SDG goals.
3. The modules will provide practical understandings so that the public will be satisfied with education content and skills students acquire from the modules.

STAKEHOLDERS AND BENEFICIARIES

The primary stakeholders in the project will be STEM educators and students. The project intends to build relationships with private sector organizations which can provide funding for the online training workshops as part of their CSR initiatives in SEAMEO member countries.

The initial beneficiaries will be students and teachers, but in the longer-run, parents and communities will also benefit from the improvement in STEM education which will lead to increases in social and economic development contributed by the STEM-literate workforce.

PROJECT TIMELINE AND SOURCES OF FUNDS

The project will begin in 2020 with the funding from the Chevron Enjoy Science Project Phase II in combination with funding from the Centre's government budget. In the first year, a project budget will be prepared and submitted to the Centre. Once the budget has been approved, a committee will be formed to develop the modules and an international curriculum designer selected to advise the project. Design of two modules will be completed and submitted to the Center for review by the end of Year One. In the second year, the first cohort of trainers from Thailand and the region will be selected and trained, and the pilot study of the two modules completed. The design of the second two modules will be submitted in Year Two. After the completion of the Chevron Enjoy Science Project in 2022, additional funding will be sought to conduct the field test of the second set of modules and to scale up the project in the region during the following three years.