

Project Title : Joint university collaboration to develop students' competence and leadership in promoting integrated STEM education

Leading University : The Education University of Hong Kong

Participating UGC-funded University(ies) : The Chinese University of Hong Kong, The Hong Kong Polytechnic University, The University of Hong Kong

Project Leader(s) : Dr LEE Yeung-chung, Head and Associate Professor, Department of Science and Environmental Studies, Faculty of Liberal Arts and Social Sciences, The Education University of Hong Kong

Dr Valerie YIP Wing-yan, Assistant Professor, Division of Mathematics and Science Education, Faculty of Education, The University of Hong Kong

Professor Victor LAU Kwok-chi, Assistant Professor, Department of Curriculum and Instruction, Faculty of Education, The Chinese University of Hong Kong

Dr Eddie LAM Siu-shu, Associate Professor, Department of Civil and Environmental Engineering, Faculty of Construction and Environment, The Hong Kong Polytechnic University

With the increasing demand of Hong Kong to develop STEM professionals and literates to sustain its economic prowess and solve societal and environmental problems, it is imminent to infuse STEM education into the existing school

curriculum. This entails complementary efforts by the education faculties and STEM faculties to develop their graduates' competence and leadership in STEM education. This three-year project is a joint-institutional response to such an emerging need. Four university partners are involved in launching this project, namely EdUHK, HKU, CUHK and PolyU.

This project is innovative in that it facilitates STEM undergraduates and pre-service teachers to overcome the boundaries between different majors of the university partners. The collaborative learning process allows various majors (e.g. science, engineering and mathematics) to learn from each other and achieve synergy in problem solving. A three-stage model is proposed. The first stage is to enhance the university students' understanding of STEM by providing them with the opportunity of attending joint-university lectures/workshops outside their majors. The second stage involves the formation of joint-university multi-disciplinary STEM Learning Communities (SLCs) by different STEM majors from different universities. These SLCs will undertake experiential learning projects to solve problems through engineering designs. Each SLC will either partner with a social service provider to serve the needy, or work with a school to design STEM activities for school students. All of these service activities are based on their design outcomes. Finally, the university students will have the opportunity to visit overseas STEM promoting or STEM education centers to broaden their perspectives on STEM or STEM education. Evaluation of the project will be conducted by mixed methods including assessment of student projects and student reflective journals/portfolios, pre-post questionnaire surveys on students' self-perceived knowledge, motivation and confidence in learning STEM, and self-efficacy in teaching STEM (for pre-service teachers), as well as focus group interviews with course lecturers, project supervisors, mentors and students to gauge their feedback to the project as a whole. The outcomes of the project will be disseminated to other university students and other stakeholders of STEM. The impact created by this project will be sustained by the design and production of a teaching pack, a MOOC, and a website on STEM education that are accessible to all pre-service teachers, all UGC-funded universities that offer STEM subjects, as well as the primary and secondary school teachers responsible for STEM education.