

Project Title : Self-tutoring e-Platform – STeP

Leading University : The Hong Kong University of Science and Technology

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

Project Leader(s) : Professor Jishan Hu, Department of Mathematics, The Hong Kong University of Science and Technology

Layman Summary of Proposal

This project is aimed at undergraduate science, technology, engineering and mathematics (STEM) education and will establish an online self-tutoring, problem-solving platform. The purpose of this platform is to enable students to develop problem-solving and reasoning skills in first-year science foundation courses. A large set of tailor-made problems will be provided to demonstrate how to break a difficult problem into manageable sub-problems, how these problems are linked to the key concepts, and how logical step-by-step reasoning can produce solutions. The system will facilitate students' problem-solving development by leading their thinking through sequential steps in solving problem sets related to the key concepts of science foundation courses in various science disciplines, including mathematics, physics, chemistry and life science.

The online platform will have four key components –

1. Deconstruction of each complex problem into manageable sub-problems using a database of science problems created by the project team;
2. Step-by-step, transparent logical reasoning for dealing with each problem;
3. References to key concepts through embedded hyperlinks; and
4. Discussion forums to enable students to engage actively with peers and tutors around each problem and its solution.

The first phase of the project will be developed based on The Hong Kong University of Science and Technology (HKUST)'s curricula and syllabuses, involving faculty

members across HKUST's School of Science. The second phase will include colleagues from other UGC-funded institutions as test users and peer-evaluators. The third and final phase of the project will broaden the scope of the curriculum implementation and use to the other UGC-funded institutions.

Layman Summary of Final Report

After three years hard working, we are able to offer to our students a useful teaching and learning tool.

1. The platform allows instructors to assign homework for several core courses in mathematics subjects and the system can grade the homework automatically. It can provide instructors real-time course management.
2. With a large problem bank, students can obtain appropriate guidance in problem-solving practice. The system can imitate mutual interaction between students and instructors and provide all necessary help online anywhere anytime.
3. The platform provides many useful tools for students to manage their learning contents, including course reviewing and history of exercises and notes.
4. The platform can help students improve their learning. In future, we plan to implement some artificial intelligence algorithms so each student can receive personal assistance.