The Chevron Enjoy Science Newsletter

LANNA TVET HUB LAUNCHES TO RAISE THE TECHNICAL SKILLS OF TEACHERS AND STUDENTS

MOBILIZING ACADEMIC MENTORS TO ELEVATE STEM EDUCATION ACROSS THAILAND

Great teachers are the key ingredient to improving education, and so the Chevron Enjoy Science Project organized a workshop and classroom observation activities in Khon Kaen from 23-25 August for academic mentors. During the workshop, a team of experts from Columbia University’s Teachers College conducted training on high impact practices with an emphasis on classroom observation skills. In addition, mentors learned how to apply varied cognitive demands in assignments based on Bloom’s Taxonomy, which states that learning consists of six levels: recognition, comprehension, application, analysis, synthesis, and assessment.

Following the workshop, mentors visited eight lead schools in Khon Kaen to observe teaching and learning activities in action. Mentors provided constructive feedback to teachers, helping them to improve their teaching methods immediately. In this way, the mentors directly transferred the knowledge gained from the workshop to scores of teachers in Khon Kaen.

The Enjoy Science mentor program welcomed seven new members from Lampang, Nakhon Si Thammarat, Surat Thani, and Trang. There are now 24 teachers spread across Thailand involved in the program. The mentors are vital to achieving the objectives of Enjoy Science, because they will be able to share high impact practices with thousands of teachers throughout Thailand.

To analyze the true impact of the project, the Chevron Enjoy Science Project has called on Management Systems International (MSI), a development organization in the US that specializes in program monitoring and evaluation, to conduct a rigorous evaluation of the STEM & TVET components of Enjoy Science. From 15-18 August, experts from MSI and a local research team made up of academics from eight universities held initial meetings to develop a framework and methodology for collecting data, analyzing results and measuring the impact of Enjoy Science. This study will provide valuable information on STEM education in Thailand and the impact of project-based teaching on student outcomes.

The universities participating in the evaluation:
- King Mongkut’s University of Technology Thonburi (KMUTT)
- Rajamangala University of Technology Lanna (RMUTL)
- Rajabhat Rajanagarindra University (RRU)
- Songkhla Rajabhat University (SKRU)
- Suratthani Rajabhat University (SRU)
- Chiang Mai University (CMU)
- Khon Kaen University (KKU)
- Mahidol University (MU)
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The Chevron Enjoy Science Project, Rajamangala University of Technology Lanna and the National Science Technology and Innovation Policy Office (STI) officially launched the Lanna TVET Hub on October 6, 2016. The Hub will serve as a center for teacher development and vocational student training in northern Thailand. Due to its strategic public-private partnership, the Hub will provide students with a learning environment that simulates a real workplace, helping them make a seamless transition from the classroom to the workforce. In addition, business leaders and experts will work with vocational teachers to give them knowledge of the latest industrial and theoretical knowledge and tools, which the teachers will transfer to their students. In its first year, the Hub will focus on the automotive industry before expanding to cover the agriculture and food processing sectors in subsequent years.

The Lanna TVET Hub’s training center provides students with a learning environment that simulates a real workplace.

How the Lanna TVET Hub collaborates with network schools

The Hub will provide training to the schools in its network, such as Phayao Technical College, that builds the capacities of teachers and administrators by exposing them to cutting-edge industrial technology and high-impact instructional practices. As a part of the program, teachers will visit factories in Thailand and see what skills employees use firsthand. These teachers will be able to bring this knowledge to their own classrooms for the benefit of their students. Furthermore, the Hub will serve as a learning community for teachers to exchange experience and knowledge about best practices in vocational education. The goal of the Hub is to equip students with industry-specific technical knowledge and 21st century skills, such as critical thinking, problem solving, and creativity. These students will have the ability to innovate and the skills to push Thai industries up the value chain, directly impact the development of Thailand.

“To properly prepare students to meet the needs of industry, the Hub operates like a virtual workplace. When students leave, they will be fully prepared to enter the workforce and become assets to their company.”
Mr. Artit Krichphiphat, GM of Business Support, Chevron Thailand Exploration and Production, Ltd.

“The Hub will contribute to the policy of ‘Thailand 4.0,’ which aims to enhance the country’s competitiveness by building a more innovative and technically skilled workforce.”
Dr. Kitipong Promwong, Deputy Secretary of the Office of Science and Technology Policy and the National Innovation (STI).

“The Hub will serve three valuable roles to cultivate TVET education in northern Thailand: (1) facilitating communication between industry and network schools; (2) training teachers from network schools; and (3) providing pedagogical research that can be applied in network schools.”
Associate Professor Dr. Numyoot Songthanapitak, President of Rajamangala University of Technology Lanna.

“Kenan streamlines public and private initiatives and applies international best practices to strengthen vocational training. Through this collaborative approach, vocational students will receive a world class education and become key drivers of development in Thailand.”
Mr. Piyabutr Cholvijarn, President of Kenan Institute Asia.
TEACHING STUDENTS TO THINK LIKE SCIENTISTS

If we want to make Thailand 4.0 a reality, then we must focus on increasing value creation through innovation, technology, and creativity. The Chevron Enjoy Science Project believes that teachers are the starting point because they have the opportunity to work with the future of the nation on a daily basis. By creating the right learning environment, teachers can put students on a path to become innovators and leaders in science and technology fields.

To help teachers raise the achievement levels of their students, the Smithsonian Science Education Center (SSEC), an institution dedicated to improving STEM education in the United States, developed the Leadership and Assistance for Science Education Reform (LASER) model. LASER aims to build a strong science foundation among elementary and middle schools students, enabling them to pursue high-level science study and careers in the future. Upon completion of the program, students should possess a comprehensive understanding of science content and have the critical thinking skills to lead experiments, analyze data, and articulate their findings to others.

LASER, much like the Chevron Enjoy Science Project, utilizes a holistic model supported by pedagogical research that creates a strong and sustainable STEM education infrastructure. The systematic approach has five essential elements: “a research-based, inquiry-driven science curriculum; differentiated professional development; administrative and community support; materials support; and assessment.” These five elements induce superior classroom instruction and, ultimately, greater student achievement. A LASER classroom appears much different than a traditional classroom because learning is student rather than teacher driven. To create this inquiry-based learning environment, the model employs the Science and Technology Concepts (STC) curriculum, which Enjoy Science schools also use. To buttress the curriculum and its materials, LASER teachers undergo continuous professional development training, which ensures that teachers improve their own understanding of the curriculum and learn how to create hands-on learning environments for their students.

Although LASER incorporates the best pedagogical research, the University of Memphis’ Center for Research in Educational Policy (CREP) began a longitudinal study in 2010 to gauge the true impact of the model. CREP administered a matched-pair randomized controlled trial (RCT) with a comparison group design to evaluate more than 60,000 elementary and middle school students from multiple school districts in three states. The rigorous assessment found overwhelmingly positive results from LASER students when compared to their peers from non-LASER schools. Interestingly, the impact is not limited to only greater learning achievements in science, but also in reading and math. Moreover, LASER produced significantly greater outcomes among economically disadvantaged students, the group that Enjoy Science is targeting.

In the evaluation, CREP looked at student performance on both state standardized tests and a test given by the Partnership for the Assessment of Standards-Based Science (PASS), consisting of “multiple-choice questions, open-ended questions, and hands-on performance tasks.” In both assessments, LASER students demonstrated better results, but it is particularly meaningful that they outperformed control-group students on PASS’ open-ended question and performance task sections, because these sections measure student application of science concepts. The PASS results show that LASER students are thinking like scientists and not simply memorizing information.

The Chevron Enjoy Science Project has integrated the STC curriculum with practical trainings to continuously increase the competency of teachers as well as to enhance their preparation and ability to lead inquiry-based learning activities. This will help students to think like scientists and put them on a pathway to successful STEM careers. These students will become the driving force behind the achievement of Thailand 4.0.

**Beneficiary Updates**

**MASTER TRAINERS DISCUSS DYNAMIC STEM TEACHING METHODOLOGIES**

Experts about the craft of teaching, Enjoy Science Master Trainers are critical to the development of teachers in Thailand and the project’s success. Three Deputy Deans from the Faculty of Industrial Education and Technology at KMUTT and current Master Trainers recently detailed teachers’ role in modern education.

Asst. Prof. Anusit Anmanatarkul believes that it is vital for teachers to understand how to teach STEM, rather than merely explaining what STEM means. At the heart of teaching STEM is bridging the interaction gap between students and teachers. Knowledge is shared most effectively when students are immersed in the material and not simply listening to their teacher lecture.

Similarly, Asst. Prof. Dr. Pichet Pinit says that the knowledge exchanged between teachers and students is a mutually beneficial endeavor. When teachers act as partners in learning, the classroom transforms into a dynamic environment where everyone is encouraged to provide input and creativity. In addition to increasing student capacity, interactive teaching improves student attendance and discipline as they become more invested in the learning process.

Assoc. Prof. Dr. Santirat Nansaarng emphasizes that students will follow the tone set by the teacher, and so it is incumbent upon the teacher to create the type of learning environment that brings out the most in all students. Although this goal may seem difficult to achieve, teachers must always strive to create a dynamic classroom. Modern students prefer classrooms that are fun, interactive, and informal, and teachers must be able to adjust their teaching style to match the needs of students.

In summary, effective teachers utilize inquiry-based learning that involves asking students to solve challenging problems, rather than forcing students to memorize a series of facts. To contribute in the modern economy, students must acquire the mental agility to search for information, think critically, and solve difficult problems. As the Master Trainers indicate, teachers should provide students with hands-on experience in the classroom that allows them to interact with content in creative ways.

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**Upcoming Events**

**TRAINING ON HIGH-IMPACT PRACTICES**

During December 2016, the Chevron Enjoy Science Project will organize a series of workshops for school administrators on High-Impact Practices (HIP). The Consortium for Policy Research in Education (CPRE) developed HIP based on more than 20 years of pedagogical research and its practices have proven effective in countries around the world. School administrators will be able to adapt the practices to fit the Thai context. The two-day training program will be conducted in Songkhla, Khon Kaen, Samut Prakan, Chiang Mai and Nakhon Si Thammarat provinces, reaching more than 200 school administrators from 77 network schools. Mr. Thomas Corcoran, Director of CPRE, will be among the speakers during the workshops.

**DESIGNING ACTIVITIES FOR THAILAND CHILDREN’S UNIVERSITY**

The LUMA Centre-Finland will lead a workshop about hands-on science activities for twenty-two Thai organizations, including the Office of Science and Technology (NSTDA), Institute for the Promotion of Teaching Science and Technology (IPST), and Chevron Enjoy Science Project. During the workshop, the various organizations will co-design student activities based on LUMA’s suggestions for Thailand Children’s University, which will be held from 30 November to 2 December 2016 at Thailand Science Park in Pathum Thani province.

**KEEP IN TOUCH:**

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