

Mapping UNSW Impact Global Development

Primary SDG	4: QUALITY EDUCATION
Broad theme	Water and wastewater treatment
Research	Teaching technologies for water and wastewater treatment to university students
Impact region	Myanmar, Indonesia, Thailand
Faculty	Engineering
School/Institute	Chemical Engineering
Academic	Associate Professor Pierre Le Clech
Project partners	Yangon Technological University (YTU), New Colombo Plan funding
Related SDGs	6: Clean Water and Sanitation

Elevator pitch

Pierre is helping students in Myanmar gain applicable, real world experience by teaching them how to build water treatment systems, empowering students to go out into the community and build these systems to deliver safer water to residents.

The Challenge: Lack of real world experience, need to treat water

As the country democratises, Myanmar is in the process of building and aligning itself with the world. Engineering is a major centrepiece in this change but staff teaching engineering at the universities lack training and research experience. University laboratories, built over 60-70 years ago, are basic and there is a lack of compatibility among equipment donated by countries over the years. Curriculums need updating if courses are to satisfy quality assurance standards. Students need to gain real world experience, in the field and from building practical, applicable solutions for the real world.

Similar to other developing countries, the quality of water in Myanmar is variable. There is a central water system for the people of Yangon, but in rural areas sanitation systems and the treatment of water are rare. Households or communities rely on a communal system but water quality is unlikely to satisfy WHO standards. Even in urban areas, events like run off and increased populations are presenting sanitation challenges that ultimately affect drinking water through surface and ground waters. Very few are educated to design and operate water treatment systems.

UNSW's solution: Teach and help students create water treatment models in class

UNSW has been working with YTU since 2013, when UNSW began donating equipment, expertise and course material to help rebuild their engineering degree programs. The partnership since then has flourished. Responding to a school call-out for interest in working with YTU, Pierre visited the university in 2017 to identify new ways of working with them. He identified a need for YTU students to gain practical experience, and their lack of equipment and models in the classroom. He decided to help by providing

tutorials and teaching tools so students could build cheap, locally-sourced demonstration models that illustrate how water and wastewater can be treated.

In January 2018, Pierre organised the visit of four undergraduate students and one post-doctoral researcher from UNSW to YTU. They explained the different types of water treatment systems and developed an instruction book on to build models that demonstrate water treatment using sand filtration, activated carbon adsorption and advanced microfiltration membrane techniques. They tested the success of the booklet with a group of YTU students to confirm its success using pH meters UNSW students had brought with them. In addition, a travellers' guide for visitors to YTU from UNSW was developed based on the collective experience of the students.

Next, Pierre would like to go back to YTU to see if they are using the instruction guide to build models in each class. He would like to develop more teaching materials for YTU classes to expand student knowledge and update the university's curriculum. Pierre is also interested in taking the teaching materials and guide for the water treatment models to other universities in Myanmar, Indonesia and Thailand.

The Impact: Give students real life experience, help them deliver safer water to the community

Pierre is helping YTU students to gain real life experience in how to build water treatment systems. This small but important intervention gifts the students real world experience and boosts their confidence. In addition, it empowers them to go out into communities in rural areas and set up robust and resilient water purification systems to deliver cleaner water to residents. Safer water will improve the well being and health of community members. The teaching materials and instruction booklet can be adapted for any country, enabling this knowledge to be shared with more students in developing countries so they can expand their skillset and help solve a key development challenge (water sanitation).

Researcher

Pierre Le-Clech is an Associate Professor in the School of Chemical Engineering at UNSW. He is also a member of the UNESCO Centre for Membrane Science & Technology. He has been working on membrane processes since 1999 and has researched many aspects of the water and wastewater treatments by membrane processes. Pierre is one of the Associate Editors for Desalination and Water Treatment and on the Editorial Board of Desalination. He is passionate about turning state-of-the-art water treatment technologies into workable, appropriate options for those most in need.

Ben Falkenmire 14.08.18